Report

Air Quality Updating and Screening Assessment

A report produced for Lisburn City Council

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Executive Summary

The UK Government published its strategic policy framework for air quality management in 1995 establishing national strategies and policies on air quality. The Environment (NI) Order came into operation in January 2003 and implements both the European Air Framework Directive 96/62EC and the UK Air Quality Strategy. The Air Quality Strategy provides a framework for air quality control through air quality management and air quality objectives.

Under the Air Quality Strategy all Local Authorities are required to undertake an air quality review. In areas where air quality objectives are not anticipated to be met by the specified date, Local Authorities are required to establish Air Quality Management Areas to improve air quality.

Local Air Quality Management Policy Guidance (LAQM.PGNI (03)) is designed to help relevant authorities with their Local Air Quality Management (LAQM) duties under Part III of the Environment (NI) Order 2002. The Environment (NI) Order 2002 provides the framework for LAQM across Northern Ireland. The Air Quality Objectives set out in the Air Quality Regulations (NI) 2003 provide the statutory basis for the system of LAQM.

The first round of air quality review and assessments has been completed by Lisburn City Council. The Council are now required to proceed to the second round of review and assessment in which sources of emissions to air are reassessed to identify whether the situation has changed since the first round, and if so, what impact this may have on predicted exceedences of the air quality objectives.

The second round of review and assessment is to be undertaken in two steps. The first step is an Updating and Screening Assessment, which updates the findings of the previous Review and Assessment cycle, undertaken for all pollutants identified in the Air Quality Regulations. Where a significant risk of exceedence is identified for a pollutant it will be necessary for the local authority to proceed to a Detailed Assessment the following year. Where a local authority does not need to undertake a Detailed Assessment, a progress report is required instead.

This report is an Updating and Screening Assessment for Lisburn City Council as outlined in the Government's published guidance.

This Updating and Screening Assessment has concluded that Lisburn City Council is not required to carry out a Detailed Review and Assessment for carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide, PM_{10} or sulphur dioxide.

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Acronyms and definitions used in this report

AADTF	Annual Average Daily Traffic Flow
ADMS	an atmospheric dispersion model
AQDD	an EU directive (part of EU law) - Common Position on Air Quality Daughter Directives, commonly referred to as the Air Quality Daughter Directive
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
AURN	Automatic Urban and Rural Network (Defra funded air quality monitoring network)
CO	Carbon monoxide
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
EPA	Environmental Protection Act
EPAQS	Expert Panel on Air Quality Standards (UK panel)
EU	European Union
kerbside	0 to 1 m from the kerb
Limit Value	An EU definition for an air quality standard of a pollutant listed in the air quality directives
NAEI	National Atmospheric Emission Inventory
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NRTF	National Road Traffic Forecast
ppb	parts per billion
receptor	In the context of this study, the relevant location where air quality is assessed or predicted (for example, houses, hospitals and schools)
roadside	1 to 5 m from the kerb
SO_2	Sulphur dioxide
TEA	Triethanolamine
TEOM	Tapered Element Oscillating Microbalance

1 Introduction to the Updating and Screening Assessment

1.1 PURPOSE OF THE UPDATING AND SCREENING ASSESSMENT

The first round of air quality review and assessments is now complete and all local authorities should have completed all necessary stages. Where the likelihood of exceedences of air quality objectives have been identified in areas of significant public exposure, an air quality management area should have been declared, followed by a Stage 4 Assessment, and the formulation of an action plan detailing measures intended to reduce or to eliminate exceedences.

Local authorities are now required to proceed to the second round of review and assessment. The updating and screening assessment reassesses sources of emissions to air to identify whether the situation has changed since the first round of review and assessment. Changes are reviewed to assess the potential impact on predicted exceedences of the air quality objectives. Such changes might include significant traffic growth on a major road, which had not been foreseen, construction of a new industrial plant with emissions to air, or significant changes in the emissions of an existing plant.

The second round of review and assessment is to be undertaken in two steps. The first step is an Updating and Screening Assessment. This Assessment updates the findings of the previous Review and Assessment cycle, undertaken for all pollutants identified in the Air Quality Regulations. Where a significant risk of exceedence is identified for a pollutant it will be necessary for the local authority to proceed to a Detailed Assessment. Where a local authority does not need to undertake a Detailed Assessment, a progress report is required instead by the following year.

This report is an Updating and Screening Assessment for Lisburn City Council as required under part III of the Environment (NI) Order 2002.

1.2 STRUCTURE OF THE REPORT

The report is structured as follows:

- **Section 1** summarises the aims of the updating and screening assessment, the approach adopted for the assessment, the pollutants and air quality objectives;
- **Section 2** summarises the UK Air Quality Strategy and the function of an updating and screening assessment;
- **Section 3** summarises the conclusions of air quality review and assessment work to date within the Lisburn area, identifies data used in support of this assessment as well as relevant background information on the Council area, and relevant emissions-to-air sources and highlights significant changes in emissions to air within the city since the last round of review and assessment;
- **Sections 4-10** present the review and assessment for each of the seven pollutants included in the Air Quality Regulations;
- **Section 11** presents conclusions and recommendations for further work, where required, for each of the seven pollutants;

1.3 OVERVIEW OF APPROACH TAKEN

The general approach taken in this Updating and Screening Assessment was to:

- Identify the conclusions of the last round of review and assessment for each of the seven pollutants included in the air quality regulations;
- Identify significant sources of emissions to air for the seven pollutants included in the air quality regulations, including major roads and industrial plant;
- Identify new sources not previously considered in the first round of review and assessment;
- Identify any sources for which emissions have changed significantly since the last round of review and assessment;
- Identify and interpret the significance of air quality monitoring data made available since the last round of review and assessment;
- Assess the risk of exceedences of the air quality objectives in locations where relevant public exposure may exist using screening models and nomograms; and
- Where necessary, identify locations and pollutants for which further detailed assessment of air quality will be required.

1.4 RELEVANT GUIDANCE DOCUMENTATION

This report takes into account the guidance in LAQM.TG(03)[1], published January 2003, and the update to this guidance[2], published January 2006.

1.5 POLLUTANTS CONSIDERED IN THIS REPORT

All pollutants included in the Air Quality Regulations[3] for the purposes of Review and Assessment have been considered in this report (Table 1.1).

Table 1.1 Objectives included in the Air Quality Regulations (NI) 2003 for the purpose of Local Air Quality Management.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 μgm^{-3}	Running annual mean	31.12.2003
	3.25 μgm^{-3}	Running annual mean	31.12.2010
1,3 Butadiene	2.25 μgm^{-3}	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mgm^{-3}	Maximum daily running 8-hour mean	31.12.2003
Lead	0.5 μgm^{-3}	Annual mean	31.12.2004
	0.25 μgm^{-3}	Annual mean	31.12.2008
Nitrogen Dioxide[1]	200 μgm^{-3} not to be exceeded more than 18 times a year	1 hour mean	31.12.2005
	40 μgm^{-3}	annual mean	31.12.2005
Particles (PM_{10})[2] **Gravimetric**[3]	50 μgm^{-3} not to be exceeded more than 35 times a year	24 hour mean	31.12.2004
	40 μgm^{-3}	annual mean	31.12.2004
Sulphur Dioxide	350 μgm^{-3} not to be exceeded more than 24 times per year	1 hour mean	31.12.2004
	125 μgm^{-3} not to be exceeded more than 3 times per year	24 hour mean	31.12.2004
	266 μgm^{-3} not to be exceeded more than 35 times per year	15 minute mean	31.12.2005

Notes
1. The objectives for nitrogen dioxide are provisional.
2. Likely to be new particles objective for 2010, not in regulation at present, expected after the review of the EU's first Air Quality Daughter Directive (2005)
3. Measured using the European Gravimetric reference standard or equivalent.

2 The UK Air Quality Strategy

2.1 NATIONAL AIR QUALITY STANDARDS

The Government prepared the Air Quality Strategy for England, Scotland, Wales and Northern Ireland[4] for consultation in August 1999 and the strategy was published in January 2000. The Environment (NI) Order 2002 came into operation in January 2003 and implements both the European Air Framework Directive 96/62/EC, Daughter Directives and the UK Air Quality Strategy. The Air Quality Strategy uses national air quality standards and objectives against which air quality can be measured and assessed. The strategy also provides the timescales for the achievement of objectives. The objectives are to be achieved between 2003 and 2010 (Table 1.1). Table 1.1 shows the objective values in mass concentrations ($\mu g\ m^{-3}$ or $mg\ m^{-3}$), the relevant averaging period and the number of exceedences that are permitted (where applicable).

2.2 TIMESCALES TO ACHIEVE THE OBJECTIVES FOR THE POLLUTANTS IN AIR QUALITY STRATEGY

In most local authorities in the UK, objectives were (or will be) met for most of the pollutants within the timescale of the objectives shown in Table 1.1. It is important to note that the objectives for NO_2 remain provisional. The Government has recognised the problems associated with achieving the standard for ozone and this is not therefore a statutory requirement. Ozone is a secondary pollutant and transboundary in nature and it is recognised that local authorities themselves can exert little influence on concentrations as they are the result of regional primary emission patterns.

2.3 AIR QUALITY REVIEWS – THE APPROACHES AND EXPECTED OUTCOMES

Technical Guidance has been issued in 'Review and Assessment: Technical Guidance' LAQM.TG (03)[1] to enable air quality to be monitored, modelled, reviewed and assessed in an appropriate and consistent fashion. This updating and screening assessment has considered the procedures set out in the technical guidance, and in the update[2] to the guidance, published in January 2006.

The primary objective of undertaking a review of air quality is to identify any areas that are unlikely to meet national air quality objectives and ensure that air quality is considered in local authority decision-making processes. The complexity and detail required in a review depends on the risk of failing to achieve air quality objectives and it has been proposed therefore that reviews should be carried out in two steps. Both steps of review and assessment may be necessary and every authority is expected to undertake at least a first stage review and assessment of air quality in their authority area. The steps are briefly described in Table 2.1.

Table 2.1 Brief details of steps in the second round of the Air Quality Review and Assessment process

Level of Assessment	Objective	Approach
Updating and Screening	To identify those matters that have changed since the last review and assessment, which might lead to a risk of an air quality objective being exceeded	Use a checklist to identify significant changes that require further consideration. Where such changes are identified, then apply simple screening tools to decide whether there is sufficient risk of an exceedence of an objective to justify a Detailed Assessment
Detailed Assessment	To provide an accurate assessment of the likelihood of an air quality objective being exceeded at locations with relevant exposure. This should be sufficiently detailed to allow the designation or amendment of any necessary AQMAs	Use quality-assured monitoring and validated modelling methods to determine current and future pollutant concentrations in areas where there is a significant risk of exceeding an air quality objective.
Annual Progress reports	Local authorities should prepare annual air quality Progress Reports between subsequent rounds of reviews and assessments. The concept is that this will ensure continuity in the LAQM process.	The precise format of the progress report is left up to the local authority to decide, but guidance on what it should cover is available in LAQM.PRG(03)[5], published in 2003. It is envisaged that these Progress Reports could be useful for the compilation of annual 'state of the environment' reports that many authorities already prepare.

The current deadline for completion of updating and screening assessments is April 2006, and for detailed assessments April 2007.

2.4 LOCATIONS THAT THE REVIEW AND ASSESSMENT MUST CONCENTRATE ON

For the purpose of review and assessment, the authority should focus their work on locations where members of the public are likely to be exposed over the averaging period of the objective. Table 2.2 summarises the locations where the objectives should and should not apply.

Table 2.2 Typical locations where the objectives should and should not apply

Averaging Period	Pollutants	Objectives *should* apply at …	Objectives should *not* generally apply at …
Annual mean	• 1,3 Butadiene • Benzene • Lead • Nitrogen dioxide • Particulate Matter (PM_{10})	All background locations where members of the public might be regularly exposed.	Building facades of offices or other places of work where members of the public do not have regular access.
		Building facades of residential properties, schools, hospitals, libraries etc.	Gardens of residential properties.
			Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term
24 hour mean and 8-hour mean	• Carbon monoxide • Particulate Matter (PM_{10}) • Sulphur dioxide	All locations where the annual mean objective would apply.	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
		Gardens of residential properties.	
1 hour mean	• Nitrogen dioxide • Sulphur dioxide	All locations where the annual mean and 24 and 8-hour mean objectives apply.	Kerbside sites where the public would not be expected to have regular access.
		Kerbside sites (e.g. pavements of busy shopping streets).	
		Those parts of car parks and railway stations etc. which are not fully enclosed.	

Averaging Period	Pollutants	Objectives *should* apply at …	Objectives should *not* generally apply at …
		Any outdoor locations to which the public might reasonably be expected to have access.	
15 minute mean	• Sulphur dioxide	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

It is unnecessary to consider exceedences of the objectives at any location where public exposure over the relevant averaging period would be unrealistic. Locations should also represent non-occupational exposure.

3 Information used to support this assessment

3.1 THE FIRST ROUND OF REVIEW AND ASSESSMENT OF AIR QUALITY FOR LISBURN CITY COUNCIL

Lisburn City Council has completed the following review and assessments of air quality to date:

- Stage 1 (2003)
- Stages 2 and 3 (2004)[6]

The Stage 1 report concluded that a Stage 2 assessment was required for nitrogen dioxide, PM_{10}, carbon monoxide and sulphur dioxide. Initial screening prior to the Stage 2 assessment indicated that further assessment of carbon monoxide was not necessary. The Stage 2/3 report investigated NO_2 and PM_{10} from road transport and PM_{10} and SO_2 from domestic solid fuel combustion.

Modelling and monitoring data indicated there would be no exceedences of the objectives for the pollutants studied. No further assessment was required and no AQMAs have been declared.

3.2 PROPOSED DEVELOPMENTS WHICH MAY AFFECT AIR QUALITY

Any new developments in the local authority or in surrounding areas that may impact on local air quality need to be considered.

3.2.1 Industry

Lisburn City Council have confirmed that there are no major industrial developments planned for the area.

3.2.2 Housing and redevelopment

Lisburn City Council have confirmed that there are no major housing developments under construction within the area. Outline planning permission has been applied for relating to a housing development of 1000 units. This will need to be assessed in relation to possible impacts on air quality. This assessment will be undertaken, as further information becomes available, before or at the next annual progress report.

3.2.3 Transport

A new road has been constructed since the last round of Review and Assessment – the North Feeder Road. No traffic count data are available for this route, although anecdotal evidence provided by the local authority suggests that the road has a relatively low traffic flow and is not congested. This will need to be assessed in relation to possible impacts on air quality as further information becomes available.

3.3 AIR QUALITY MONITORING

There are three automatic monitoring sites in Lisburn:

- Island Civic Centre (SO_2, PM_{10})

- Dunmurry High School (PM_{10})
- Lagan Valley Hospital (NO_2, PM_{10})

Monitoring of NO_2 with diffusion tubes has also been carried out at 10 locations across the City. More details of the monitoring data and site locations is available in Appendix 1.

3.4 MAPS AND DISTANCES OF RECEPTORS FROM ROADS

Lisburn City Council have provided traffic counts for the major roads in the area. Distances from receptors have been estimated using GIS LandLine™ data supplied by the council.

3.5 ROAD TRAFFIC DATA

3.5.1 Summary of traffic data provided

This section summarises the information used in this report; detailed information is given in Appendix 2. Appendix 2 lists the locations of the traffic flow and speed measurement points, flow and speed data and other relevant traffic statistics.

Where no average speed data were available, estimated speeds were used near receptors and junctions. Speeds below the national speed limits have been assigned to sections of roads in areas close to junctions.

3.5.2 Proportion of HDVs

For most of the road links assessed, the proportion of HDVs was supplied with the traffic count data. For roads where this was not the case, an estimate of 5% has been assumed.

3.5.3 Base year for traffic

The base year for the traffic data supplied by the Council was 2004.

3.5.4 Traffic growth

No traffic growth factors specific to Northern Ireland are available. In the absence of these data, we have relied on the NRTF factors.

3.5.5 Distance from the centre of the road to the kerbside and to the receptors

Distances from the centre of the road to the receptors were estimated as 5m as a worst case scenario. Where this indicated an exceedence, a more realistic distance was estimated from the GIS LandLine data supplied.

3.6 PART A AND B INDUSTRIAL PROCESSES

There are nine Part A and Part B authorised industrial processes in Lisburn City Council area. These are listed in Appendix 4.

3.7 SCREENING TOOLS

Appendix 3 includes outline details of the DMRB and other screening tools used in the assessment.

4 Updating and Screening Assessment for Carbon Monoxide

4.1 THE NATIONAL PERSPECTIVE

The main source of carbon monoxide in the United Kingdom is road transport, which accounted for 49% of total releases in 2003. Annual emissions of carbon monoxide have been falling steadily since the 1970s and are expected to continue to do so. The automatic monitoring network recorded no exceedences of the objective in 2005 at any location across the UK.

4.2 STANDARD AND OBJECTIVE FOR CARBON MONOXIDE

The Government and the Devolved Administrations originally adopted an 8-hour running mean concentration of 11.6 mgm^{-3} as the air quality standard for carbon monoxide. A new objective was then set at a slightly tighter level of 10 mgm^{-3} as a running 8-hour mean concentration, to have been achieved by the end of 2003, bringing it into line with the second Air Quality Daughter Directive limit value.

4.3 CONCLUSIONS OF THE FIRST ROUND OF REVIEW AND ASSESSMENT FOR CARBON MONOXIDE

The Stage 1 assessment concluded that the risk of exceedence of the objective for CO was not negligible, and that a Stage 2 assessment should be carried out. On further assessment of sources of CO, during the Stage 2 assessment, revealed that the actual risk of exceedence was low, and this pollutant was not considered further. No AQMAs have been declared for CO in Lisburn City Council area.

4.4 SCREENING ASSESSMENT OF CARBON MONOXIDE

4.4.1 Screening check list

The Technical Guidance LAQM TG(03) requires assessment of carbon monoxide to consider the following sources, data or locations:

- Monitoring Data
- Very Busy Roads or junctions in built up areas

These are described in the following sections and summarised in the table below.

Table 4.1 - Updating and Screening Assessment Summary Checklist for **Carbon Monoxide**

Item	Response
A) Monitoring data	No monitoring of CO has been carried out in Lisburn
B) Very busy roads or junctions in built-up areas	No 'very busy roads' and the background concentration is below the guidance threshold

4.4.2 Background Concentrations of carbon monoxide

The average background annual mean concentration for carbon monoxide estimated from the UK background maps[7] (http://www.airqualityarchive.co.uk/archive/laqm/tools.php) and the year adjustment factors published in LAQM.TG(03) was 0.16mg m^{-3} with a maximum concentration of 0.26mg m^{-3} in 2005.

4.4.3 Screening assessment of monitoring data

No monitoring of carbon monoxide has been carried out in Lisburn City Council area.

4.4.4 Screening assessment for very busy roads

The guidance document LAQM TG(03)[1] requires assessment of CO only at 'very busy roads', or junctions in built up areas. A 'very busy' road is defined in LAQM TG(03) as a single carriageway road with a daily average traffic flow greater than 80,000 vehicles. Very busy dual carriageways and motorways have daily average traffic flows greater than 120,000 and 140,000 respectively. In addition to this, the guidance also states that these will only need to be assessed in areas where the estimated background concentration is expected to be above 1mg m^{-3}.

The maximum background concentration for Lisburn is estimated at 0.26 mg m^{-3} and based on the traffic data supplied by Lisburn City Council there are no roads that can be classified as 'very busy.'

4.5 CONCLUSIONS FOR CARBON MONOXIDE CONCENTRATIONS IN COUNCIL AREA

There are no roads that can be classified as 'very busy' within the Lisburn City Council area. The background concentrations also suggest that an exceedence of the objective for carbon monoxide is unlikely.

Lisburn City Council is not required to proceed to a detailed assessment for carbon monoxide.

5 Updating and Screening Assessment for Benzene

5.1 THE NATIONAL PERSPECTIVE

The main sources of benzene emissions in the UK are petrol-engined vehicles, petrol refining, storage and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems. A number of policy measures already in place, or planned for future years, will continue to reduce emissions of benzene. Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1%, from a previous upper limit of 5%. The European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of benzene from the storage and distribution of petrol are controlled by vapour recovery systems. The UK automatic monitoring network has recorded no exceedences of the 2003 objective in the objective year or since. Whilst the 2010 objectives are expected to be met at all urban background locations, and most roadside locations, there is the possibility for some remaining exceedences that will require additional measures at a local level.

5.2 STANDARD AND OBJECTIVE FOR BENZENE

The Government and the Devolved Administrations have adopted a running annual mean concentration of 16.25 μgm^{-3} as the air quality standard for benzene, with an objective for the standard to have been achieved by the end of 2003. However, in light of the health advice from EPAQS and the Department of Health's Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) to reduce concentrations of benzene in air to as low a level as possible, additional tighter objectives have also been set. The additional objective is for an annual mean of 3.25 μgm^{-3} to be achieved by the end of 2010 in Northern Ireland.

5.3 CONCLUSIONS OF THE FIRST ROUND OF REVIEW AND ASSESSMENT FOR BENZENE

All sources of benzene were screened out at Stage 1 – no further assessment was required. No AQMAs have been declared for benzene.

5.4 SCREENING ASSESSMENT OF BENZENE

5.4.1 Screening check list

The Technical Guidance LAQM TG(03)[1] requires assessment of benzene to consider the following sources, data or locations:

- Monitoring Data outside an AQMA
- Monitoring Data within an AQMA
- Very Busy Roads or Junctions in Built-up Areas
- New Industrial Sources
- Industrial sources with substantially increased emissions or new relevant exposure
- Petrol Stations
- Major Fuel Storage Depots (Petroleum only)

These are described in the following sections and summarised in the table below.

Table 5.1 - Updating and Screening Assessment Summary Checklist for **Benzene**

Item	Response
A) Monitoring data outside an AQMA	No monitoring of benzene has been carried out in Lisburn
B) Monitoring data within an AQMA	No AQMAs for benzene in area
C) Very busy roads or junctions in built up areas	No 'very busy roads' and background concentration is below the threshold
D) New industrial sources.	None present
E) Industrial sources with substantially increased emissions, or new relevant exposure	None present
F) Petrol stations	None meeting the criteria with relevant exposure
G) Major fuel storage depots (petrol only)	None present

5.4.2 Background concentrations for benzene

The average background benzene concentration in 2003 in Lisburn City Council area, estimated from the UK 2001 background maps[7] was 0.41 μgm^{-3}, with a maximum concentration of 1.46 μgm^{-3}. This was well below the objective. The projected concentrations for 2010 are even lower, with an average concentration of 0.37μgm^{-3} and a maximum 0.98μgm^{-3}.

5.4.3 Screening assessment of monitoring data

No monitoring of benzene has been carried out in Lisburn City Council area.

5.4.4 Screening assessment of very busy roads

The guidance document LAQM TG(03)[1] requires assessment of benzene only at 'very busy roads', or at junctions in built up areas, with a predicted background concentration of more than 2 μgm^{-3} (Appendix 2 Table A2.1).

The traffic flow data provided by Lisburn City Council indicates that there are no roads in the area which can be classified as 'very busy' and the background concentration is also estimated to be below the threshold.

5.4.5 Screening assessment of industrial sources

The Guidance LAQM TG(03) lists the following processes as significant potential sources of benzene:

Part A (percentage of total emissions from all UK plant in this sector to the UK total in brackets)
Petroleum processes (73)
Petrochemical processes (2)
Carbonisation processes (12)

Cement/lime manufacture (7)
Gasification processes (5)

Part B
Processes for the storage and unloading of petrol at terminals

No new industrial processes have been identified since the first round of Review and Assessment

5.4.6 Screening assessment of Petrol Stations

There are two large petrol stations in Lisburn. The guidance requires petrol stations to be considered only if they are near a busy road, that is with more than 30,000 vehicles per day and have a throughput greater than 2 million litres.

Only one of the petrol stations has a throughput of more than 2 million litres. This is situated at an out of town shopping centre. There is no relevant public exposure within 10m of the pumps.

5.4.7 Screening assessment of Fuel Storage Depots

There are no major fuel storage depots in the Lisburn City Council area.

5.5 CONCLUSIONS FOR BENZENE IN COUNCIL AREA

There are no roads in the Lisburn City Council area that can be classified as 'very busy' with relevant exposure according to the criteria in the guidance. There are also no petrol stations that meet the criteria for assessment, and no petrol storage depots.

Lisburn City Council is not required to carry out a Detailed Assessment for benzene.

6 Updating and Screening Assessment for 1,3-Butadiene

6.1 THE NATIONAL PERSPECTIVE

The main source of 1,3-butadiene in the United Kingdom is emissions from motor vehicle exhausts. 1,3-butadiene is also an important industrial chemical and is handled in bulk at a small number of industrial premises. Maximum running annual mean concentrations of 1,3-butadiene measured at all urban background/centre and roadside locations in the national network are all well below the 2003 objective of 2.25 μgm^{-3}. The increasing numbers of vehicles equipped with three way catalysts will significantly reduce emissions of 1,3-butadiene in future years. Recently agreed further reductions in vehicle emissions and improvements to fuel quality are expected to further reduce emissions of 1,3-butadiene from vehicle exhausts.

6.2 STANDARD AND OBJECTIVE FOR 1,3-BUTADIENE

The Government and the Devolved Administrations have adopted a maximum running annual mean concentration of 2.25 μgm^{-3} as an air quality standard for 1,3-butadiene. The objective is for the standard to have been achieved by the end of 2003.

6.3 CONCLUSIONS OF THE FIRST ROUND OF REVIEW AND ASSESSMENT FOR 1,3-BUTADIENE

All potential sources of 1,3-butadiene were screened out at Stage 1 – no further assessment was required. No AQMAs have been declared for 1,3-butadiene in Lisburn City Council area.

6.4 SCREENING ASSESSMENT OF 1,3-BUTADIENE

6.4.1 Screening check list

The Technical Guidance LAQM TG(03) requires assessment of 1,3-butadiene to consider the following sources, data or locations:

- Monitoring Data
- New Industrial Sources
- Existing Industrial Sources with Significantly Increased Emissions, or new relevant exposure

These are described in the following sections and summarised in the table below.

Table 6.1 - Updating and Screening Assessment Summary Checklist for **1,3-butadiene**

Item	Response
A) Monitoring data	None – background maps indicate below the objective
B) New industrial sources.	None present

Item	Response
C) Industrial sources with substantially increased emissions, or new relevant exposure	None present

6.4.2 Background concentrations for 1,3-Butadiene

The average background 1,3-butadiene concentration for 2005 estimated from the UK background maps[7] and the year adjustment factors was 0.06 μgm^{-3} with a maximum concentration of 0.12 μgm^{-3}.

6.4.3 Screening assessment of monitoring data

No monitoring of 1,3-butadiene has been undertaken in Lisburn City Council area or in any neighbouring authorities.

6.4.4 Screening assessment of industrial sources

The LAQM TG(03) Guidance lists the following processes as significant potential sources of 1,3-butadiene:

Part A (percentage of total emissions from all UK plant in this sector to the UK total in brackets)
Petroleum processes (2)
Petrochemical processes (95)
Organic chemical manufacture (3)

Part B
Rubber processes

No new industrial processes have been identified since the first round of Review and Assessment.

6.5 CONCLUSIONS FOR 1,3-BUTADIENE CONCENTRATIONS IN COUNCIL AREA

Estimated background concentrations indicate that the objective for 1,3-butadiene was achieved by the end of 2003, and the 2005 values show that the standard is continuing to be met. There are no significant industrial sources that have the potential to emit 1,3-butadiene in the Lisburn City Council area.

Lisburn City Council is not required to carry out a Detailed Assessment for 1,3-butadiene.

7 Updating and Screening Assessment for Lead

7.1 THE NATIONAL PERSPECTIVE

The agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel Fuels (part of the Auto-Oil Programme) led to a ban on sales of leaded petrol in the United Kingdom with effect from 1 January 2000. Emissions of lead are now restricted to a variety of industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping.

Detailed assessments of the potential impact of lead emissions from industrial processes have been undertaken by the Government and the Devolved Administrations based upon both monitoring and sector analysis studies. The former has included a 12-month monitoring survey in the vicinity of 30 key industrial sites in the UK, which has been used to supplement information already provided from the non-automatic monitoring networks. These monitoring data have generally indicated no exceedences of the 2004 or 2008 objectives, although locations in proximity to non-ferrous metal production and foundry processes were deemed to have the potential for risk of exceedence.

7.2 STANDARD AND OBJECTIVE FOR LEAD

The Government and the Devolved Administrations adopted an annual mean concentration of 0.5 μgm^{-3} as the air quality standard for lead, with an objective for the standard to have been achieved by the end of 2004. In addition, a lower air quality objective of 0.25 μgm^{-3} has also been set to be achieved by the end of 2008.

7.3 CONCLUSIONS OF THE FIRST ROUND OF REVIEW AND ASSESSMENT FOR LEAD

All potential sources of lead were screened out at Stage 1 – a Stage 2 assessment was not required. No AQMAs have been declared for lead.

7.4 SCREENING ASSESSMENT OF LEAD

7.4.1 Source checklist

The Technical Guidance LAQM TG(03) requires assessment of lead to consider the following sources, data or locations:

- Monitoring Data
- New Industrial Sources
- Existing Industrial Sources with Significantly Increased Emissions or new relevant exposure

These are described in the following sections and summarised in the Table below.

Table 7.1 - Updating and Screening Assessment Summary Checklist for **Lead**

Item	Response
A) Monitoring data	No monitoring of lead has been carried out in Lisburn
B) New industrial sources.	None present
C) Industrial sources with substantially increased emissions, or new relevant exposure	None present

7.4.2 Screening assessment of monitoring data

No monitoring of lead has been undertaken in Lisburn City Council area.

Annual average data for lead in 2001 at National monitoring sites were generally below the 2004 and 2008 objectives with the exception of one monitoring station (not in Northern Ireland) located in an industrial area, which measured 0.419 μgm^{-3}, which is within the 2004 objective but higher than the 0.25 μgm^{-3} objective for the end of 2008.

7.4.3 Screening assessment of industrial sources

The Guidance LAQM TG(03) lists the following processes as significant potential sources of lead:

Part A (percentage of total emissions from all UK plant in this sector to the UK total in brackets)
Iron and steel (37)
Non-ferrous metals (23)
Manufacture of organic chemicals (35)

Part B
Non-ferrous metal furnaces
Electrical furnaces
Blast cupolas
Aluminium processes
Zinc Processes
Copper processes
Lead glass manufacture

No potential industrial sources of lead have been identified in the Lisburn City Council area.

7.5 CONCLUSIONS FOR LEAD CONCENTRATIONS IN COUNCIL AREA

Emissions of lead from industrial processes in the Lisburn City Council area are not likely to exceed the objectives for lead to be achieved in 2004 and 2008.

Lisburn City Council is not required to carry out a Detailed Review and Assessment for lead.

8 Updating and Screening Assessment for Nitrogen Dioxide

8.1 THE NATIONAL PERSPECTIVE

The principal source of NO_x emissions is road transport, which accounted for about 40% of total UK emissions in 2003. Major roads carrying large volumes of high-speed traffic (such as motorways and other primary routes) are a predominant source, as are conurbations and city centres with congested traffic. Within most urban areas, the contribution of road transport to local emissions will be much greater than for the national picture.

Meeting the annual mean objective for 2005, and the corresponding limit value in 2010, is considerably more demanding than achieving the 1-hour objective. By 2005, the annual mean objective was being achieved at all urban background locations outside of London, but being exceeded more widely at roadside sites throughout the UK in close proximity to busy road links. Projections for 2010 indicate that the EU limit value may still be exceeded at urban background sites in inner London, and at roadside locations in other cities.

8.2 STANDARDS AND OBJECTIVES FOR NITROGEN DIOXIDE

The Government and the Devolved Administrations have adopted two Air Quality Objectives for nitrogen dioxide, as an annual mean concentration of 40 μgm^{-3}, and a 1-hour mean concentration of 200 $\mu g\ m^{-3}$ not to be exceeded more than 18 times per year. The objectives were to be achieved by the end of 2005.

8.3 CONCLUSIONS OF THE FIRST ROUND OF REVIEW AND ASSESSMENT FOR NITROGEN DIOXIDE

The following conclusions were given for nitrogen dioxide in the first round of review and assessment reports for Lisburn City Council:

- The Stage 1 assessment concluded that the risk of exceeding the objectives for NO_2 could not be considered negligible.
- The Stage 2/3 report assessed road transport sources of NO_2 and found that no exceedences were predicted at relevant locations.

No AQMAs have been declared for nitrogen dioxide in the Lisburn City Council area.

8.4 SCREENING ASSESSMENT OF NITROGEN DIOXIDE

8.4.1 Screening checklist

The Technical Guidance LAQM TG(03)[1] requires assessment of nitrogen dioxide to consider the following sources, data or locations:

- Monitoring data outside an AQMA
- Monitoring data within an AQMA
- Narrow congested streets with residential properties close to the kerb
- Junctions
- Busy streets where people may spend 1-hour or more close to traffic
- Roads with high flow of buses and/or HGVs

- New roads constructed or proposed since last round of review and assessment
- Roads with significantly changed traffic flows or new, relevant exposure
- Bus Stations
- New industrial sources
- Industrial sources with substantially increased emissions or new relevant exposure
- Aircraft

These are evaluated in the following sections and summarised in the table below.

Table 8.1 Updating and Screening Assessment Summary Checklist for **Nitrogen Dioxide**

Item	Response
A) Monitoring data outside an AQMA	Diffusion tube monitoring has indicated no exceedences of the objectives.
B) Monitoring data within an AQMA	No AQMAs declared for nitrogen dioxide in Lisburn
C) Narrow congested streets with residential properties close to the kerb	None identified
D) Junctions.	DMRB indicates no exceedences
E) Busy streets where people may spend 1-hour or more close to traffic	None identified
F) Roads with high flow of buses and/or HGVs.	None identified
G) New roads constructed or proposed since the previous round of R&A	None identified
H) Roads with significantly changed traffic flows, or new relevant exposure	DMRB indicates no exceedences
I) Bus Stations	Less than 1000 daily bus movements
J) New industrial sources.	None present

Item	Response
K) Industrial sources with substantially increased emissions, or new relevant exposure	None present
L) Aircraft	No airports in City area or close to the border

8.4.2 Background concentrations for nitrogen dioxide

The estimated average background nitrogen dioxide concentration for 2005 was 7.1μgm^{-3} with a maximum concentration of 18μgm^{-3}.

8.4.3 Screening assessment of monitoring data

8.4.3.1 Automatic monitoring data

Automatic monitoring of nitrogen dioxide has been carried out using a chemiluminescence analyser at the Lagan Valley Hospital monitoring site. Table 8.2 summarises the results from this site. The full data are presented in Appendix 1.

Table 8.2 NO_2 Monitoring Results for Lisburn, 2005 ($\mu g\ m^{-3}$)

Site	Annual Mean	Maximum hourly mean	Number of exceedences of hourly mean
Lagan Valley Hospital	27	298	1

The measured concentrations for 2005 are well below both of the objectives. Data capture was 100%, and the data has been fully ratified by **netcen**. The quality control process applied involves data screening, scaling and a final critical review. These data are of comparable quality to those produced within the national network.

8.4.3.2 Diffusion tube monitoring data

Nitrogen dioxide has been monitored; using the preparation method 10% TEA in water, at ten locations across the city, with triplicate tubes at three of the sites so that the precision of the tubes can be assessed. A co-location study has been carried out in three local authorities within the Eastern Group. These three co-location studies have used the same laboratory (Eurofins Laboratories Ltd), exposure periods, study length and tube preparation method. The results of these studies are presented in Table 8.3. The factor used within this Updating and Screening Assessment for the adjustment of the Lisburn diffusion tubes is the average of the three Eastern Group studies. An average was chosen in line with the procedure adopted within the UWE national Bias correction spreadsheet which averages factors from a collection of studies by tube supplier and year. No bias adjustment factors for this laboratory are provided in the survey of UK national diffusion tube bias published by UWE (2006).

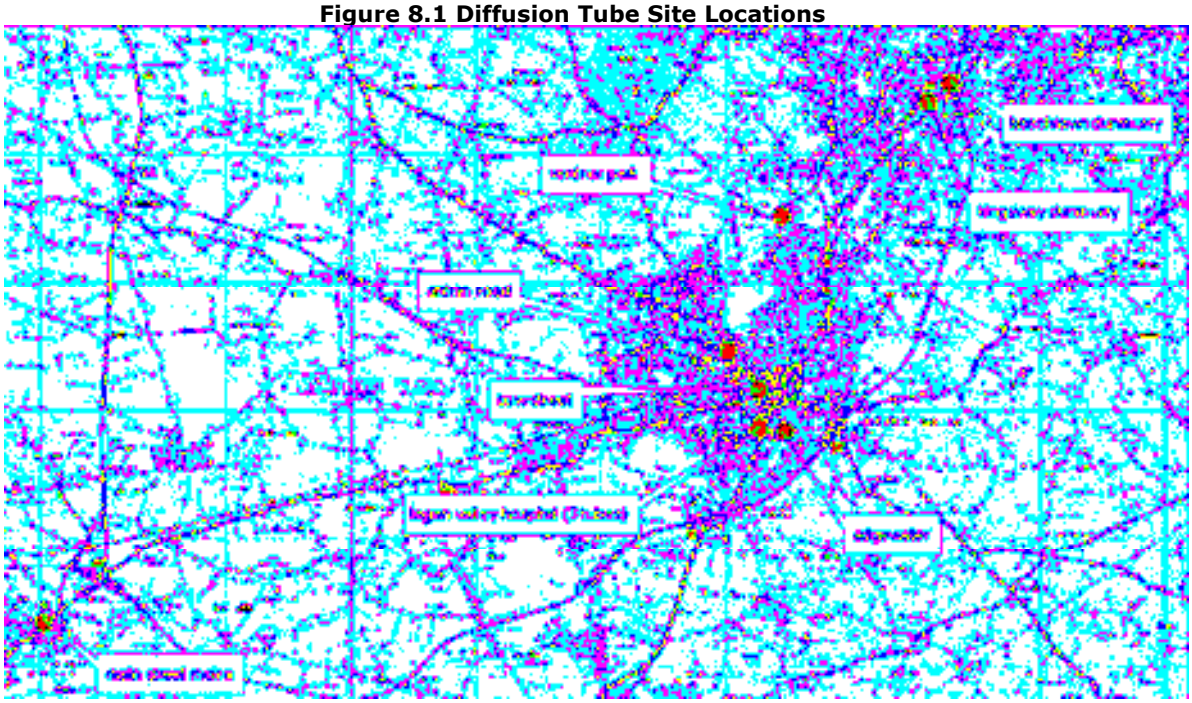
Table 8.3 Calculation of Bias Adjustment Factor

Site Name	Diffusion tube mean ($\mu g\ m^{-3}$)	Automatic Analyser Mean ($\mu g\ m^{-3}$)	Bias adjustment Factor
Lisburn Lagan Valley Hospital	26	27	1.04
North Down Holywood A2	42	27	0.67
Castlereagh Loughview Drive	27	22	0.81
Average			**0.84**

Figure 8.1 shows the locations of the diffusion tube sites. Two additional sites are also now in place at Benford Park and Sprucefield Court. The Benford Park site is situated on the motorway

slip road, less than 20m from the M1 motorway. The Sprucefield Court Site is located at the junction of the M1 with Hillsborough Old Road.

Figure 8.1 Diffusion Tube Site Locations



License number DCOU018

The results of the diffusion tube monitoring is summarised in Table 8.4. The monthly mean values can be found in Appendix 1. The bias adjusted monitoring data does not indicate any exceedences of the objective in 2005.

Table 8.4 Diffusion Tube Monitoring Results

Site	Data Capture (months)	Raw Mean (ugm-3)	Bias Adjustment Factor	Adjusted Mean (2005)
Northern Bank Lisburn	12	45	0.84	38
Antrim Road Lisburn	12	28	0.84	24
Ventnor Park Lisburn	12	15	0.84	13
Edgewater Lisburn	12	18	0.84	15
Moira	9	41	0.84	34
Kingsway Dunmurry	11	35	0.84	29
Beechlawn Dunmurry	12	27	0.84	23
Lagan Valley Hospital	12	26	0.84	22
Benford Park	11	27	0.84	23
Sprucefield Court	11	38	0.84	32

8.4.4 Screening assessment of road traffic sources

Traffic flow data for 2004 has been provided by Lisburn City Council. Traffic growth factors for 2005 and 2010 are unavailable for Northern Ireland, NRTF factors have been used in their place. As a worst case scenario, the roads have been assessed with a relatively low speed of 30km/h for all non-motorway roads and 112km/h for motorways and a distance of 5m from the road centre to the nearest receptor.

The results of the DMRB screening model are summarised in table 8.5. The model has indicated that, even using the worst case assumptions as noted above, the NO_2 concentrations are likely to be well below the 40μg m^{-3} annual objective at roadside locations in the Lisburn City Council area.

Table 8.5 Estimated nitrogen dioxide concentrations near roads in Lisburn in 2005

Road name	Distance from link centre to receptor (m)	AADT (combined, veh/day)	Annual average speed (km/h)	Total % HDV	NO_2 (μg/m^3)
A1, Lisburn - Hillsborough at Carnbane	5	27744	30	9.7	21
A1, Belfast - Lisburn at Derriaghy	5	10886	30	4.9	13
A1, Belfast - Lisburn at Lambeg	5	15169	30	5.1	16
A1, Hillsborough S - Hillsborough N	5	27632	30	9.6	21
B103, Drumbeg Road, near Lisburn	5	4965	30	2.3	9
B23, Hillhall Road, Lisburn, near Ballyaghlis	5	12046	30	2.9	13
M1, Blacks Road on - slip	5	13297	112	5	16
M1, Blacks Road off - slip	5	12921	112	5	15
M1, Blacks Road - Saintfield Road (Jct 6)	5	46790	112	5	21
M1, Sprucefield (Jct 7) - Moira (Jct 9)	5	33991	112	5	19

As part of this assessment, the following items from the checklist have been considered:

- Narrow congested properties with residential properties close to the kerb – none have been identified
- Busy streets where people may spend 1-hour or more close to traffic – none have been identified.
- Roads with high flow of buses and/or HGVs – none have been identified
- New roads constructed or proposed since the last round of review and assessment – no new roads have been constructed.
- Roads with significantly changed traffic flows or new, relevant exposure – changes to the traffic flows since the last round of review and assessment have been considered in the above screening assessment.

8.4.5 Busy Junctions

Only three junctions have previously been identified as busy and with relevant exposure in the Lisburn City Council area. These were assessed in the Stage 2/3 report using the DMRB model. This indicated values well within the objectives for NO_2, so it is not necessary to reassess these roads. One new busy junction has been identified for this round – Drumbeg Road and Hillhall Road. The results of the DMRB assessment are presented in Table 8.6. Worst-case receptor distances of 5m from each road link have been assumed.

Table 8.6 Estimated nitrogen dioxide concentrations near road junctions in Lisburn, 2005

Receptor number	Name	AADT	Distance from receptor	Annual Average Speed (km/h)	% HDV	Annual mean μg/m^3
1	Drumbeg Road	4965	5	20	2.3	14.9
	Hillhall Road	12046	5	20	2.9	

The DMRB has indicated that the NO_2 concentration for 2005 was well below the annual mean objective.

8.4.6 Screening assessment of industrial sources

The Guidance LAQM TG(03)[1] lists the following processes as significant potential sources of nitrogen dioxide:

Part A (percentage of total emissions from all UK plant in this sector to the UK total in brackets)
Iron and steel (19)
Petroleum processes (16)
Combustion processes (34)
Cement/lime manufacture (9)
Carbonisation (6)
Gasification (4)
Inorganic chemicals (4)

Part B
Glass manufacture

None of the authorised industrial processes in the Lisburn City Council area fall into any of the categories listed above. Therefore no further assessment is required for industrial sources.

8.4.7 Screening assessment of other transport sources

Bus Stations : The number of bus movements at Lisburn Smithfield bus station is estimated to be approximately 300 per day. This is well below the 1000 movements threshold stated in the Technical Guidance. There is therefore no need to assess the bus station any further.

Airports: There are no airports in the Lisburn City Council area. The nearest airport is Belfast International Airport, in neighbouring County Antrim. Since this is further than 1km from the Lisburn City Council border, it does not need to be considered further here.

8.5 CONCLUSIONS FOR NITROGEN DIOXIDE CONCENTRATIONS IN COUNCIL AREA

There are no significant industrial sources of NO_2 in the Lisburn City Council area. Monitoring data has not indicated any exceedences of the objectives for NO_2 and nor has the DMRB screening of transport sources.

Lisburn City Council is not required to carry out a Detailed Review and Assessment for nitrogen dioxide.

9 Updating and Screening Assessment for Sulphur Dioxide

9.1 THE NATIONAL PERSPECTIVE

The main source of sulphur dioxide in the United Kingdom is power stations, which accounted for 69% of emissions in 2004. There are also significant emissions from other industrial combustion sources. Emissions from domestic sources fell by 34% in 2002-2003, but these can still have a significant effect locally. Road transport currently accounts for less than 1% of emissions.

Local exceedences of the objectives (principally the 15-minute mean objective) may occur in the vicinity of small combustion plant (less than 20 MW), which burn coal or oil, in areas where solid fuels are the predominant form of domestic heating, and in the vicinity of major ports.

9.2 STANDARD AND OBJECTIVE FOR SULPHUR DIOXIDE

The Government and the Devolved Administrations have adopted a 15-minute mean of 266 μgm^{-3} as an air quality standard for sulphur dioxide, with an objective for the standard not to be exceeded more than 35 times in a year by the end of 2005.

Additional objectives have also been set which are equivalent to the EU limit values specified in the First Air Quality Daughter Directive. These are for a 1-hour mean objective of 350 μgm^{-3}, to be exceeded no more than 24 times per year, and a 24-hour objective of 125 μgm^{-3}, to be exceeded no more than 3 times per year, to be achieved by the end of 2004.

9.3 CONCLUSIONS OF THE FIRST ROUND OF REVIEW AND ASSESSMENT FOR SULPHUR DIOXIDE

The first round of review and assessment found the following:

- The Stage 1 assessment found that there were areas in the Lisburn City Council area with a high density of houses burning solid fuels.
- Detailed modelling in the Stage 2/3 report found that this was unlikely to cause exceedences of the objectives for SO_2 within the Lisburn City Council area.

No AQMAs have been declared for SO_2 in the Lisburn City Council area.

9.4 SCREENING ASSESSMENT OF SULPHUR DIOXIDE

9.4.1 Source checklist

The Technical Guidance LAQM TG(03) requires assessment of sulphur dioxide to consider the following sources, data or locations:

- Monitoring data outside an AQMA
- Monitoring data within an AQMA
- New industrial sources
- Industrial sources with substantially increased emissions, or new relevant exposure
- Areas of domestic coal burning
- Small boilers (>5MW (thermal)) burning coal or oil
- Shipping

- Railway Locomotives

These are evaluated in the following sections and summarised in the table below.

Table 9.1 Updating and Screening Assessment Summary Checklist for **Sulphur Dioxide**

Item	Response
A) Monitoring data outside an AQMA	Monitoring data indicates no exceedences of any of the objectives
B) Monitoring data within an AQMA	No AQMAs declared for SO2
C) New industrial sources.	None present
D) Industrial sources with substantially increased emissions, or new relevant exposure	None present
E) Areas of domestic coal burning	Assessed previously – not causing exceedences
F) Small Boilers > 5 MW (thermal).	None identified
G) Shipping	Not relevant
H) Railway Locomotives	Not relevant

9.4.2 Background concentrations for sulphur dioxide

The estimated average background sulphur dioxide concentration for 2001 was 1.63μgm^{-3} with a maximum concentration of 10.5μgm^{-3}.

9.4.3 Screening assessment of monitoring data

Monitoring of SO_2 in 2005 took place at the Lisburn Island Civic Centre site. Table 9.2 summarises the results from this site.

Table 9.2 SO_2 Monitoring Results for Lisburn, 2005 ($\mu g\ m^{-3}$)

Site	Maximum 15 minute mean	Maximum hourly mean	Maximum daily mean
Island Civic Centre	114	56	17

The measured concentrations for 2005 are well below all of the objectives. Data capture was 92%, and the data has been fully ratified by **netcen**. The quality control process applied involves data screening, scaling and a final critical review. These data are of comparable quality to those produced within the national network.

Measurements at the Lisburn Island Civic Centre site have been consistently low over the past three years of the monitoring programme. There have been no exceedences at this location of any of the objectives for SO_2. On the basis of these results the monitoring of sulphur dioxide is no longer necessary at this location; consideration should be given to re-locating the

instrumentation to other areas where it may be used to confirm the findings of the Review and Assessment process elsewhere in the Libsurn City Council area.

9.4.4 Screening assessment of industrial sources

The Guidance LAQM TG(03)[1] lists the following processes as significant potential sources of sulphur dioxide:

Part A (percentage of total emissions from all UK plant in this sector to the UK total in brackets)
Iron and steel (9)
Petroleum processes (15)
Combustion processes (45)
Cement/lime manufacture (3)
Carbonisation (10)
Non-ferrous metals (7)
Ceramic Production (9)

Part B
Combustion plant 20-50 mwth
Furnaces 20-50 mwth
Copper processes
Refractory goods
Glass manufacture
Roadstone coating

None of the Part A and Part B processes (see Appendix 4) in the Lisburn City Council area fall into the categories listed above.

9.4.5 Small Boilers

No small boilers meeting the criteria specified in the guidance have been identified in the Lisburn City Council area.

9.4.6 Domestic coal burning

Domestic coal burning was modelled in detail in the Stage 2/3 assessment. The results of this assessment showed that exceedences of the objectives resulting from this source were unlikely. Domestic coal burning is not expected to have increased since the Stage 2/3 assessment was completed in 2004.

9.4.7 Screening assessment of other transport Sources

Shipping : There are no shipping movements in the Lisburn City Council area.

Railways : No locations were identified within the Lisburn City Council area where locomotives are stationary for prolonged periods.

9.5 CONCLUSIONS FOR SULPHUR DIOXIDE CONCENTRATIONS IN COUNCIL AREA

There are no significant industrial sources of sulphur dioxide in the Lisburn City Council area. Areas of domestic solid fuel use have been modelled previously, and are not causing exceedences of the objectives for SO_2.

Lisburn City Council is not required to carry out a Detailed Review and Assessment for sulphur dioxide.

10 Updating and Screening Assessment for PM_{10}

10.1 THE NATIONAL PERSPECTIVE

National UK emissions of primary PM_{10} have been estimated as totalling 141,000 tonnes in 2003. Of this total, around 27% was derived from road transport sources. It should be noted that, in general, the emissions estimates for PM_{10} are less accurate than those for the other pollutants with prescribed objectives, especially for sources other than road transport.

The Government established the Airborne Particles Expert Group (APEG) to advise on sources of PM_{10} in the UK and current and future ambient concentrations. Their conclusions were published in January 1999 (APEG, 1999). APEG concluded that a significant proportion of the current annual average PM_{10} is due to the secondary formation of particulate sulphates and nitrates, resulting from the oxidation of sulphur and nitrogen oxides. These are regional scale pollutants and the annual concentrations do not vary greatly over a scale of tens of kilometres. There are also natural or semi-natural sources such as wind-blown dust and sea salt particles. The impact of local urban sources is superimposed on this regional background. Such local sources are generally responsible for winter episodes of hourly mean concentrations of PM_{10} above 100 $\mu g\ m^{-3}$ associated with poor dispersion. However, it is clear that many of the sources of PM_{10} are outside the control of individual local authorities and the estimation of future concentrations of PM_{10} are in part dependent on predictions of the secondary particle component.

10.2 STANDARD AND OBJECTIVE FOR PM_{10}

The Government and the Devolved Administrations have adopted two Air Quality Objectives for fine particles (PM_{10}), which are equivalent to the EU Stage 1 limit values in the first Air Quality Daughter Directive. The objectives are 40 μgm^{-3} as the annual mean, and 50 μgm^{-3} as the fixed 24-hour mean to be exceeded on no more than 35 days per year, to have been achieved by the end of 2004. In addition there is an objective of 50 μgm^{-3} as the fixed 24-hour mean to be exceeded on no more than 7 days per year and 20 μgm^{-3} as the annual mean to be achieved by the end of 2010. The objectives are based upon measurements carried out using the European gravimetric transfer reference sampler or equivalent.

It should be noted that the objectives for 2010, based on the Stage 2 EU Limit Values have not been included in the Air Quality Regulations for Northern Ireland, and local authorities are not currently required to assess against them. In addition, they were the subject of the European Commission's recent review of the First Daughter Directive.

The Commission is currently consulting on a new consolidated Directive on Ambient Air Quality, which is likely to see changes to the above Limit Values, though the nature of these changes cannot be confirmed at this time.

10.3 CONCLUSIONS OF THE FIRST ROUND OF REVIEW AND ASSESSMENT FOR PM_{10}

The following conclusions were given for PM_{10} in the first round of Review and Assessment for Lisburn City Council:

- The Stage 1 report concluded that there were road transport, industrial and domestic sources of PM_{10} which had the potential to lead to exceedences of the objectives.
- The Stage 2/3 report modelled domestic solid fuel use and road transport, and concluded that the PM_{10} objectives were likely to be exceeded.

No AQMAs have been declared for PM_{10}.

10.4 SCREENING ASSESSMENT OF PM_{10}

10.4.1 Checklist for PM_{10}

The Technical Guidance LAQM TG(03)[1] requires assessment of PM_{10} to consider the following sources, data or locations:

- Monitoring data outside an AQMA
- Monitoring data within an AQMA
- Junctions
- Roads with high flow of buses and/or HGVs
- New roads constructed or proposed since last round of review and assessment
- Roads close to the objective during the last round of review and assessment
- Roads with significantly changed traffic flows, or new relevant exposure
- New industrial sources
- Industrial sources with substantially increased emissions, or new relevant exposure
- Areas with domestic solid fuel burning
- Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc
- Aircraft

These are evaluated in the following sections and summarised in the table below.

Table 10.1 - Updating and Screening Assessment Summary Checklist for **PM_{10}**

Item	**Response**
A) Monitoring data outside an AQMA	Monitoring data indicates no exceedences
B) Monitoring data within an AQMA	No AQMAs declared for PM_{10}
C) Busy roads and junctions in Scotland	Not applicable
D) Junctions.	Junctions assessed using DMRB – no exceedences indicated
E) Roads with high flow of buses and/or HGVs.	None identified
F) New roads constructed or proposed since last round of R&A	No major road changes
G) Roads with significantly changed traffic flows, or new relevant exposure.	All roads assessed using DMRB with up to date traffic data.

Item	Response
H) Roads close to the objective during the second round of Review and Assessment	All roads assessed using DMRB with up to date traffic data. There were no roads close to the objective in the last updating and screening assessment
I) New industrial sources.	None present
J) Industrial sources with substantially increased emissions, or new relevant exposure	None present
K) Areas of domestic solid fuel burning	Assessed previously
L) Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports etc.	No relevant exposure at quarry sites
M) Aircraft	No airports in area or close to border

10.4.2 Background concentrations for PM_{10}

The estimated average background PM_{10} concentration for 2005 was 13.6 μgm^{-3} in the Lisburn City Council area with a maximum concentration of 25.4 μgm^{-3}.

10.4.3 Screening assessment of monitoring data

Monitoring of PM_{10} has been undertaken at three locations in the Lisburn City Council area during 2005. A summary of the data is presented in table 10.2. TEOM monitors were used at all three sites – the values presented here have been corrected to the gravimetric equivalent using the factor of 1.3 as stated in the Technical Guidance. Full data summaries from the monitoring site locations are included in Appendix 1.

Table 10.2 Summary of PM_{10} Monitoring data

Site	Annual Mean ($\mu g\ m^{-3}$)	Maximum Daily Mean ($\mu g\ m^{-3}$)	Number of exceedences of daily mean objective	Data Capture %
Dunmurry High School	21	98	8	95.5
Lagan Valley Hospital	25	88	8	99.6
Island Civic Centre	21	66	8	89.5

The annual means measured at all three sites are well within the annual mean objective of

40μg m^{-3}, and the number of exceedences of the daily mean at all sites is also well below the permitted number of 35.

The data has been fully ratified by **netcen**. The quality control process applied involves data screening, scaling and a final critical review. These data are of comparable quality to those produced within the national network.

10.4.4 Screening assessment of road traffic sources

Traffic flow data for 2004 has been provided by Lisburn City Council. No road traffic growth factors are available for Northern Ireland, so NRTF factors have been used in their place. As a worst case scenario, the roads have been assessed with a relatively low speed of 30km/h for all non-motorway roads and 112km/h for motorways, and a distance of 5m from the road centre to the nearest receptor.

The results of the DMRB screening model are summarised in table 10.3. The model has indicated that, even using the worst case assumptions as noted above, the PM_{10} concentrations are likely to be well below the 40μg m^{-3} annual mean objective at roadside locations in the Lisburn City Council area, and that the number of exceedences of the daily mean objective is also very unlikely to be greater than the permitted level of 35. Projections indicate that the PM_{10} concentrations at roadside locations in Lisburn are likely to be below the provisional objectives set for 2010.

Table 10.3 Modelled annual mean PM_{10} concentrations and 24 hour exceedences alongside roads in Lisburn

Road name	Receptor Distance (m)	AADT combined veh/day (2005)	Annual average speed (km/h)	% HDV	Annual mean 2005 (μg m^{-3})	Annual mean 2010 (μg m^{-3})	24 hour mean exceedences 2005	24 hour mean exceedences 2010
Lisburn - Hillsborough at Carnbane	5	27744	30	9.7	22.0	17.8	6	1
Belfast - Lisburn at Derriaghy	5	10886	30	4.9	17.6	15.5	1	0
Belfast - Lisburn at Lambeg	5	15169	30	5.1	18.8	16.2	2	0
Hillsborough S - Hillsborough N	5	27632	30	9.6	21.9	17.8	6	1
Drumbeg Road, near Lisburn	5	4965	30	2.3	15.7	14.4	0	0
Hillhall Road, Lisburn, near Ballyaghlis	5	12046	30	2.9	17.3	15.4	1	0
Blacks Road on - slip	5	13297	112	5	18.9	16.5	2	1
Blacks Road off - slip	5	12921	112	5	18.7	16.5	2	0
Blacks Road - Saintfield Road (Jct 6)	5	46790	112	5	22.1	18.7	7	2
Sprucefield (Jct 7) - Moira (Jct 9)	5	33991	112	5	21.3	18.1	5	1

The following items from the checklist for PM_{10} have also been considered:

- Roads with a high flow of buses and/or HGVs – None have been identified
- New roads constructed or proposed since the last round of review and assessment – no new roads have been constructed.
- Roads close to the objective during the last round of review and assessment – there were no roads that were close to the objective during the last round of review and assessment.

- Roads with significantly changed traffic flows or new, relevant exposure – changes to the traffic flows since the last round of review and assessment have been considered in the above screening assessment

10.4.5 Busy Junctions

Only three junctions have previously been identified as busy and with relevant exposure in the Lisburn City Council area. These were assessed in the Stage 2/3 report using the DMRB model. This indicated values well within the objectives for PM_{10}, so it is not necessary to reassess these roads. One new busy junction has been identified for this round – Drumbeg Road and Hillhall Road. The results of the DMRB assessment are presented in Table 10.4. Worst-case receptor distances of 5m from each road link have been assumed.

Table 10.4 Estimated PM_{10} concentrations near road junctions in Lisburn, 2005

						2005		2010	
Receptor number	Name	AADT	Distance from receptor	Annual Average Speed (km/h)	% HDV	Annual mean $\mu g/m^3$	Days $>50\mu g\ m^{-3}$	Annual mean $\mu g/m^3$	Days $>50\mu g\ m^{-3}$
1	Drumbeg Road	4965	5	20	2.3	19	2	18	2
	Hillhall Road	12046	5	20	2.9				

The DMRB has indicated that the PM_{10} concentration for 2005 was well below the annual mean objective, and there were only 2 days exceeding the $50\mu g\ m^{-3}$ daily mean objective. Projections for 2010 indicate that the PM_{10} concentrations will meet the provisional objectives for that year.

10.4.6 Screening assessment of industrial sources

The Guidance LAQM TG(03)[1] lists the following processes as significant potential sources of PM_{10}:

Part A (percentage of total emissions from all UK plant in this sector to the UK total in brackets)

Iron and steel (61)
Petroleum processes (4)
Combustion processes (13)
Cement/lime manufacture (7)
Carbonisation (2)
Gasification (4)
Non-ferrous metals (4)
Fertilizer production

Part B
Combustion plant 20-50 mwth
Furnaces 20-50 mwth
Coal and coke processes
Quarry Process
Roadstone coating
Rubber processes
China and clay processes
Coating powder
Coil coating

There is one Part A process in the Lisburn City Council area which falls into one of the categories specified above – Montupet UK Ltd (non ferrous metals processing). This was considered in the Stage 2/3 report in the first round of Review and Assessment, which concluded that this was not a potential source.

There are a number of Part B authorised quarries in the area, which are considered in the following section.

10.4.7 Quarries and landfill sites

There are 6 operating quarries in the Lisburn City Council area. Following the Technical Guidance, these only need to be assessed if there is relevant exposure within 200m of the source, since the background concentration is less than 26μg m^{-3}. Since there are no residential properties near to the emissions source, it is not necessary to consider these further.

10.4.8 Domestic solid fuel burning

Emissions from domestic solid fuel use were modelled in detail in the Stage 2/3 report, and it was found that this source was not leading to an exceedence of the objectives for PM_{10}. Solid fuel use is not expected to have increased since this report was completed in 2004.

10.4.9 Screening assessment of other transport sources

There are no airports in Lisburn City Council's area. The nearest airport is Belfast International Airport in neighbouring County Antrim. Since this is more than 500m from the boundary of Lisburn City Council, it is unlikely to impact on the air quality here, so this source has not been considered further.

10.5 CONCLUSIONS FOR PM_{10} CONCENTRATIONS IN COUNCIL AREA

The DMRB screening model indicates that both the annual mean objective of 40 μgm^{-3} for $PM_{10,}$ and the daily mean objective has been met at roadside locations in 2005. The provisional objectives for 2010 are also likely to be met. Monitoring equipment has measured concentrations below the objectives at all three sites.

Lisburn City Council is not required to carry out a Detailed Assessment for PM_{10}.

11 Conclusions

11.1 CARBON MONOXIDE

There are no roads that can be classified as 'very busy in the Lisburn City Council area and the background maps indicate concentrations well below the objective. Lisburn City Council is not required to carry out a Detailed Assessment for carbon monoxide.

11.2 BENZENE

There are no roads in the Lisburn City Council area that can be classified as 'very busy' according to the criteria in the guidance. There are no petrol stations with a throughput greater than 2 million litres and with relevant exposure within 10m of the pumps. Lisburn City Council is not required to carry out a Detailed Review and Assessment for benzene.

11.3 1,3-BUTADIENE

Estimated background concentrations indicate that the 2003 objective for 1,3-butadiene is being achieved in the Lisburn City Council area. There are no significant industrial sources that have the potential to emit 1,3-butadiene. Lisburn City Council is not required to carry out a Detailed Review and Assessment for 1,3-butadiene.

11.4 LEAD

Emissions of lead from industrial processes in and around the Lisburn City Council area are not likely to exceed the objectives for lead to be achieved in 2004 and 2008. Lisburn City Council is not required to carry out a Detailed Review and Assessment for lead.

11.5 NITROGEN DIOXIDE

There are no significant industrial sources of nitrogen dioxide in the Lisburn City Council area. The DMRB screening tool indicates that nitrogen dioxide levels, at sites of relevant exposure, alongside roads are unlikely to have exceeded the 2005 annual mean objective value. Automatic measurements and diffusion tube measurements in 2005 showed no exceedences of the objective. Lisburn City Council is not required to carry out a Detailed Review and Assessment for nitrogen dioxide.

11.6 SULPHUR DIOXIDE

There are no significant industrial sources of SO_2 in the Lisburn City Council area and domestic solid fuel use has been modelled previously and was not found to lead to exceedences. Monitoring of SO_2 at the Lisburn Island Civic Centre has indicated low concentrations meeting all of the objectives for the past three years. The Council may therefore wish to remove the monitor from this site, and move it to a different location.

Lisburn City Council is not required to carry out a Detailed Assessment for SO_2.

11.7 PM_{10}

The DMRB screening model indicates that the annual mean objective of 40 μgm^{-3} and the daily mean objective for PM_{10} were achieved in 2005 at roadside locations. Projections for 2010 indicate values below the objectives for that year. Automatic measurements in 2005 showed no

exceedences of the objectives. Lisburn City Council is not required to carry out a Detailed Review and Assessment for PM_{10}.

11.8 SUMMARY AND RECOMMENDATIONS

A Detailed Assessment is not required for benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, PM_{10} or sulphur dioxide.

12 References

1. Part IV of the Environment Act 1995. Local Air Quality Management. Technical Guidance LAQM.TG(03) January 2003.

2. LAQM.TG(03) – Update. January 2006

3. The Air Quality Regulations NI (2003)

4. DETR (2000) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Department of the Environment, Transport and the Regions. Cm 4548, SE 2000/3, NIA 7

5. Part IV of the Environment Act 1995. Local Air Quality Management. Progress Report Guidance. LAQM.PRG(03). 2003

6. Air Quality Review and Assessment, Stage two and stage three. 2004, AEA Technology plc, Report AEAT/ENV/R/1782

7. Maps of Estimated Ambient Air Pollution in 2001 and Projections for Other Years. http://www.airquality.co.uk/archive/laqm/tools.php

8. Design Manual For Roads and Bridges, Highways Agency, 2003

Appendices

CONTENTS

Appendix 1
Monitoring data

CONTENTS

A1.1 Monthly average NO_2 concentrations (2005)

Site		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern Bank Lisburn		40.0	54.0	42.0	34.0	31.0	42.0	39.0	35.0	43.0	42.0	71.0	61.0
Antrim Road Lisburn		23.0	35.0	33.0	28.0	28.0	19.0	21.0	14.0	25.0	30.0	35.0	39.0
Ventnor Park Lisburn		10.0	20.0	16.0	14.0	13.0	10.0	10.0	9.0	12.0	16.0	20.0	24.0
Edgewater Lisburn		16.0	26.0	16.0	20.0	13.0	12.0	12.0	11.0	16.0	18.0	27.0	25.0
Moira		31.0	48.0	37.0				31.0	32.0	38.0	53.0	52.0	51.0
Kingsway Dunmurry		28.0	43.0	38.0	37.0	35.0		24.0	22.0	34.0	37.0	46.0	45.0
Beechlawn Dunmurry		20.0	35.0	30.0	22.0	29.0	19.0	21.0	15.0	24.0	31.0	38.0	42.0
Lagan Valley Hospital	1	21.0	31.0	21.0	21.0	26.0	23.0	22.0	21.0	25.0	26.0	37.0	37.0
	2	22.0	31.0	24.0	24.0	22.0	18.0	20.0	26.0	27.0	25.0	36.0	43.0
	3	23.0	35.0	22.0	22.0	22.0	22.0	20.0	23.0	24.0	31.0	34.0	38.0
Benford Park	1		31.0	22.0	21.0	23.0	20.0	14.0	17.0	20.0	35.0	35.0	38.0
	2			29.0	27.0	28.0	21.0	16.0	17.0	24.0	34.0	35.0	
	3			29.0	22.0	22.0	20.0	17.0	16.0	22.0	43.0	38.0	
Sprucefield Court	1		42.0	34.0	38.0	36.0	37.0	26.0	31.0	36.0	41.0	46.0	47.0
	2			42.0	44.0	35.0	34.0	27.0	34.0	36.0	40.0	44.0	
	3			28.0	45.0	37.0	32.0	27.0	31.0	35.0	41.0	44.0	

Notes :
1. All concentrations are μg m^{-3} expressed as NO_2 .
2. These data have not been bias adjusted

A 1.2 Air Pollution Report for Lagan Valley Hospital

LISBURN LAGAN VALLEY HOSPITAL
01 January to 31 December 2005

These data have been fully ratified by netcen

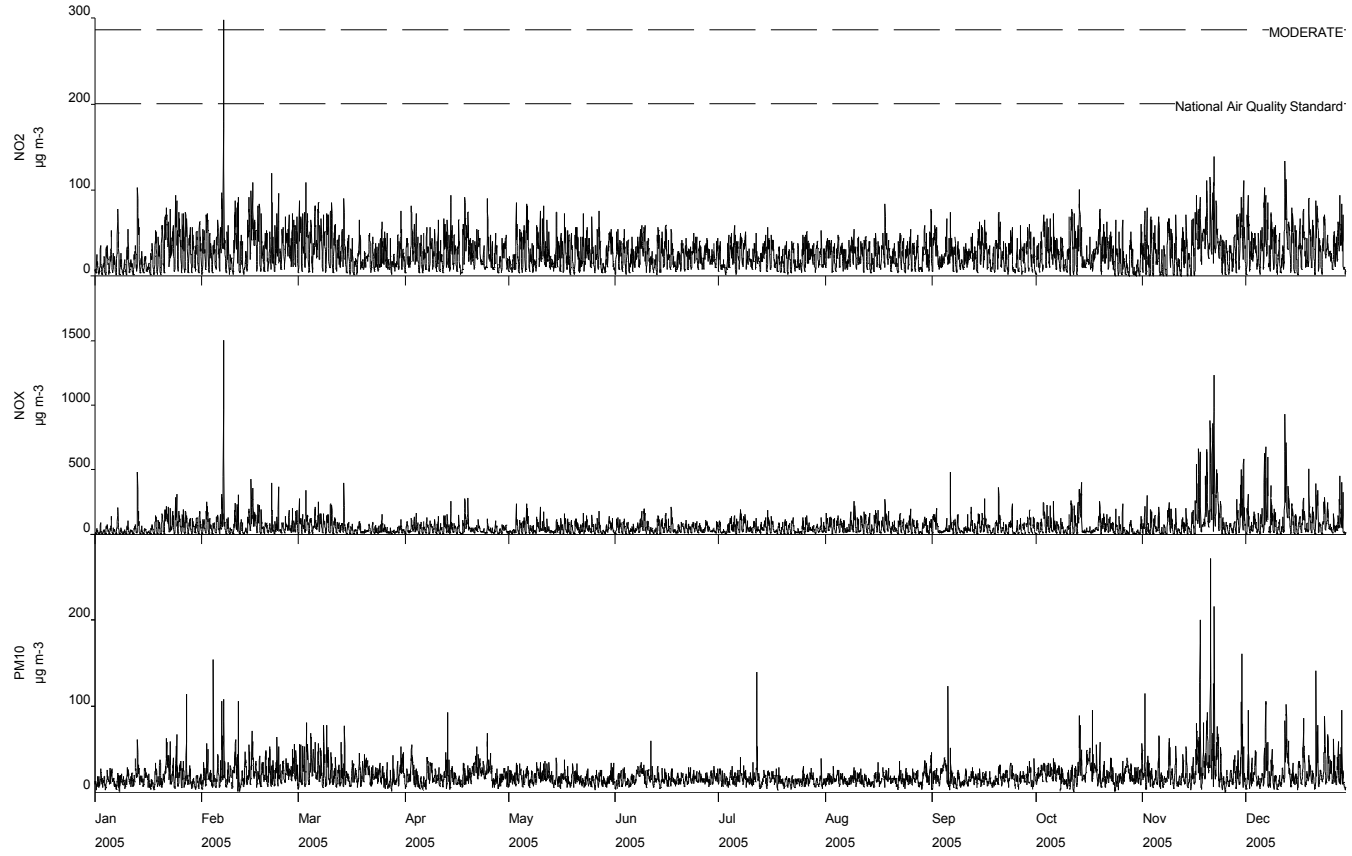
POLLUTANT	NO_2	NO_X	PM_{10}+
Number Very High	0	-	0
Number High	0	-	0
Number Moderate	1	-	99
Number Low	8718	-	8661
Maximum 15-minute mean	521 µg m^{-3}	2512 µg m^{-3}	444 µg m^{-3}
Maximum hourly mean	298 µg m^{-3}	1503 µg m^{-3}	272 µg m^{-3}
Maximum running 8-hour mean	125 µg m^{-3}	681 µg m^{-3}	140 µg m^{-3}
Maximum running 24-hour mean	79 µg m^{-3}	479 µg m^{-3}	74 µg m^{-3}
Maximum daily mean	71 µg m^{-3}	435 µg m^{-3}	68 µg m^{-3}
Average	27 µg m^{-3}	60 µg m^{-3}	19 µg m^{-3}
Data capture	99.5 %	99.5 %	99.6 %

+ PM_{10} instrument is a TEOM
All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	1	1
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	8	8
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	0	-

Produced by netcen on behalf of Lisburn CC

Lisburn Lagan Valley Hospital Air Monitoring
Hourly Mean Data for 01 January to 31 December 2005



A1.3 Air Pollution Report for Dunmurry High School

LISBURN DUNMURRY HIGH SCHOOL
01 January to 31 December 2005

These data have been fully ratified by netcen

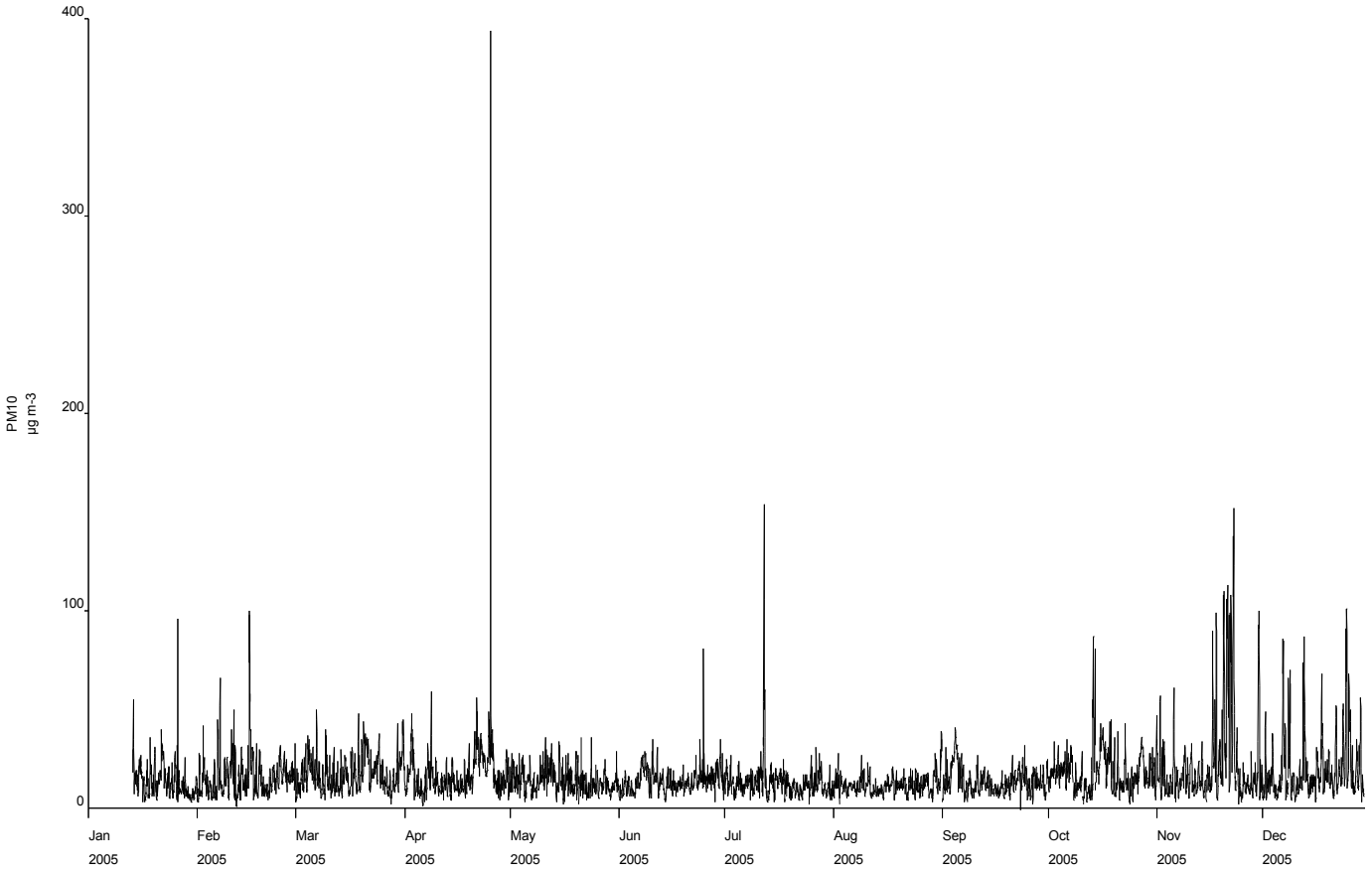
POLLUTANT	PM_{10}+
Number Very High	0
Number High	4
Number Moderate	82
Number Low	8355
Maximum 15-minute mean	606 µg m^{-3}
Maximum hourly mean	394 µg m^{-3}
Maximum running 8-hour mean	120 µg m^{-3}
Maximum running 24-hour mean	77 µg m^{-3}
Maximum daily mean	75 µg m^{-3}
Average	16 µg m^{-3}
Data capture	95.5 %

+ PM_{10} instrument is a TEOM
All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	8	8
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	0	-

Produced by netcen on behalf of Lisburn CC

Lisburn Dunmurry High School Air Monitoring
Hourly Mean Data for 01 January to 31 December 2005



A1.4 Air Pollution Report for Lisburn Island Civic Centre

LISBURN ISLAND CIVIC CENTRE
01 January to 31 December 2005

These data have been fully ratified by netcen

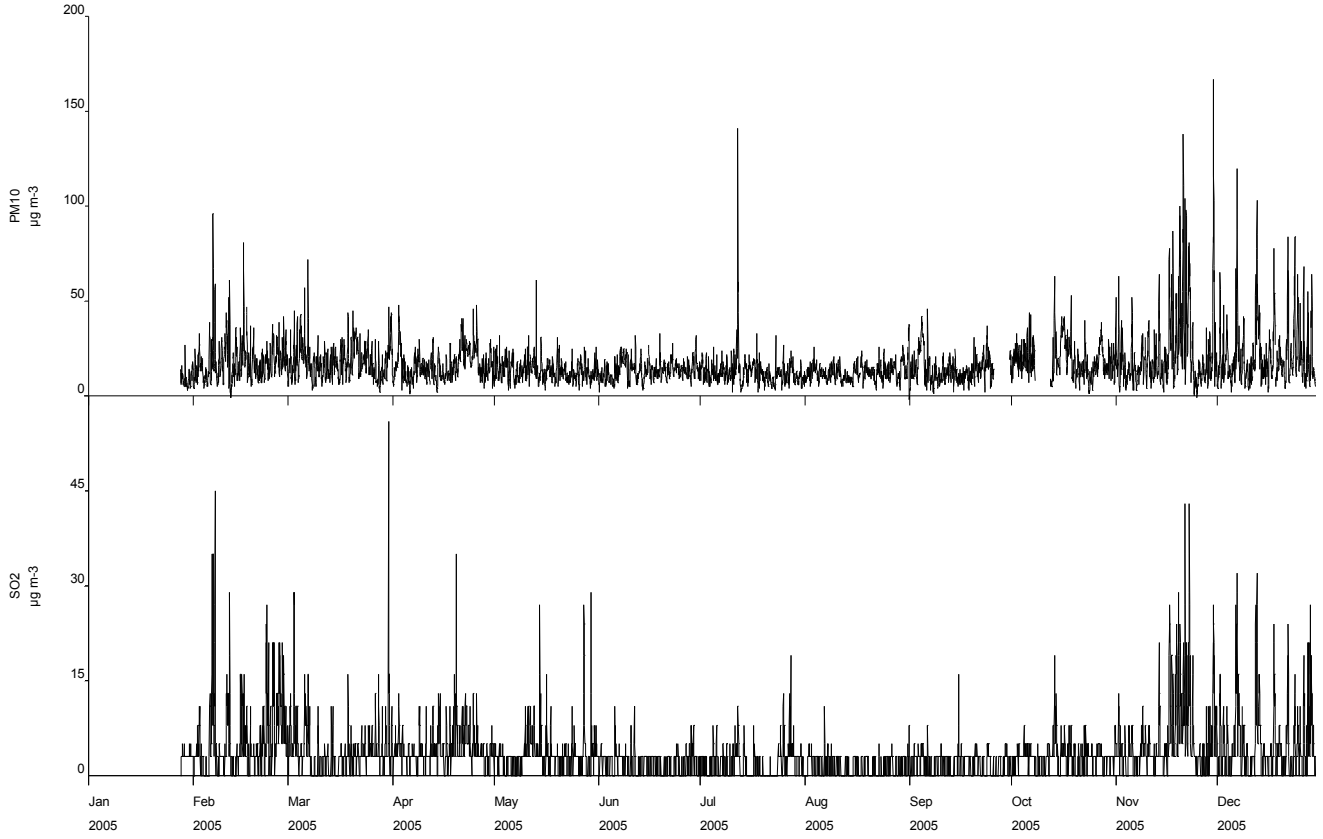
POLLUTANT	PM_{10}+	SO_2
Number Very High	0	0
Number High	0	0
Number Moderate	59	0
Number Low	7787	31639
Maximum 15-minute mean	201 µg m^{-3}	114 µg m^{-3}
Maximum hourly mean	167 µg m^{-3}	56 µg m^{-3}
Maximum running 8-hour mean	100 µg m^{-3}	27 µg m^{-3}
Maximum running 24-hour mean	58 µg m^{-3}	18 µg m^{-3}
Maximum daily mean	51 µg m^{-3}	17 µg m^{-3}
Average	16 µg m^{-3}	3 µg m^{-3}
Data capture	89.5 %	92.2 %

+ PM_{10} instrument is a TEOM
All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	8	8
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	0	-
Sulphur Dioxide	15-minute mean > 266 µg m^{-3}	0	0
Sulphur Dioxide	Hourly mean > 350 µg m^{-3}	0	0
Sulphur Dioxide	Daily mean > 125 µg m^{-3}	0	0

Produced by netcen on behalf of Lisburn CC

Lisburn Island Civic Centre Air Monitoring
Hourly Mean Data for 01 January to 31 December 2005



Appendix 2
Traffic Flow Data

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Table A2.1 Road classifications in LAQM TG(03)

Very busy roads	Single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day. Dual carriageway (2 or 3-lane) roads with daily average traffic flows which exceed 120,000 vehicles per day. Motorways with daily average traffic flows which exceed 140,000 vehicles per day.
Busy Roads	Roads with more than 30,000 vehicles per day.

Table 2.2 Traffic flow data supplied by Lisburn City Council (2004)

CP	Road No.	Road Name	X	Y	AADT	% HDV
522	A1	Lisburn - Hillsborough at Carnbane	323856	359314	27270	9.7
524	A1	Belfast - Lisburn at Derriaghy	328013	367446	10700	4.9
525	A1	Belfast - Lisburn at Lambeg	327589	366760	14910	5.1
530	A1	Hillsborough S - Hillsborough N	323856	359314	27160	9.6
528	B103	Drumbeg Road, near Lisburn			4880	2.3
527	B23	Hillhall Road, Lisburn, near Ballyaghlis	330049	364871	11840	2.9
230	M1	Blacks Road on - slip	329697	369723	13070	
231	M1	Blacks Road off - slip	329791	369673	12700	
520	M1	Blacks Road - Saintfield Road (Jct 6)	328385	364375	45990	
521	M1	Sprucefield (Jct 7) - Moira (Jct 9)	322214	360664	33410	

Appendix 3

Descriptions of selected models and tools

CONTENTS

Simple screening models[a]

A3.1. Design Manual for Roads and Bridges (DMRB) - This screening method was formulated by the former Department of Transport. The method gives a preliminary indication of air quality near roads. The DMRB method requires information on vehicle flow, HDV mix, vehicle speed and receptor-road distances. It contains a useful database of vehicular emission factors for future years.

The method adopts the annual mean concentration as the base statistic. Background pollutant levels are included explicitly in the calculations by adding an amount to the annual mean traffic contribution using the Air Quality Archive (paragraph 6.09) or default values The model also estimates, from the annual mean PM_{10} prediction, the number of days where the PM_{10} concentration exceeds the 50µg m^{-3} daily mean objective. The latest version of the DMRB nomogram (1.02, dated February 2003) has been used for this assessment. Details of the road layout cannot be specified.

A3.2. Guidance for Estimating the Air Quality Impact of Stationary Sources (GSS); this guide provides precalculated dispersion results for stack emissions expressed as nomograms, was published by the Environment Agency (EA) in 1998. The nomograms are based on a large number of computations using ADMS. They cover 10 stack heights, 4 categories of surface roughness, 3 averaging times and 3 climate types. The predicted pollutant concentrations are comparable with the prescribed air quality objectives. The model is limited to a range of stack heights and exit velocities, and cannot treat building wake effects or non-buoyant source releases.

Where such point sources needed to be assessed, the **netcen** point source spreadsheet, based on this methodology has been used. This is available from http://www.airquality.co.uk/archive/laqm/tools.php.

[a] The information on simple screening models has been taken from LAQM.TG(03) Review and Assessment: *Selection and use of dispersion models*.

Appendix 4

Part A and Part B Regulated Processes

CONTENTS

A4.1 List of Authorised Industrial Processes

IPC No.	Site Operator Name	Site Address 1	Site Address 2	Site Address 3	Town	Post Code	Council Area	Section No.	Process Type
0043/99B	Readymix (NI) Ltd	Aughrim Quarry	Flowbog Road	Ballycollin	LISBURN	BT28 3TE	Lisburn BC	Section 3.1 & 3.4 &	Bulk cement & Mineral/Quarry & Roadstone coating
0051/99B	Budore Quarries	15 Sycamore Road		Dundrod	BELFAST	BT29 4JE	Lisburn BC	Section 3.4	Mineral/Quarry
0061/99B	M W Johnston & Son	Ballynagarrick Quarry	12 Leverogue Road	Ballynagarrick	LISBURN	BT27 5PP	Lisburn BC	Section 3.4	Mineral/Quarry
0110/00B	Whitemountain Quarries Ltd	Whitemountain Quarry	Whitemountain Road		LISBURN	BT28 3QU	Lisburn BC	Section 3.1 & 3.4	Bulk Cement & Mineral/Quarry
0111/00B	Whitemountain Quarries Ltd	Temple Quarry	26 Ballycarngannon Road		LISBURN	BT27 6YA	Lisburn BC	Section 3.4 & 6.3	Mineral/Quarry & Roadstone coating
0131/00B	Whitemountain Quarries Ltd	Whitemountain Quarry	Whitemountain Road		LISBURN	BT28 3QU	Lisburn BC		
0149/01A	**Montupet** (**UK**) Ltd	The Cutts		Dunmurry	BELFAST	BT17 9HN	Lisburn BC	Section 2.2	Non-Ferous metals
0190/03B	Stoneyford Concrete/Flomix Ltd	50 Stoneyford Road			LISBURN, Co. Antrim	BT28 3SP	Lisburn BC		5
0192/03B	Aughrim Quarry	143 Colinglen Road			Dunmurry, Co. Antrim	BT17 0NP	Lisburn BC		
0066/05A	Ulster Farm By-Products	Ballyvannon Road	Glenavy		Lisburn	BT29 4QL	Lisburn City Council	section 6.8	animal by-products rendering
0065/05A	LisburnProteins	211 Moira Road	Lisburn		Lisburn	BT29 4QJ	LisburnCity Council	Section 6.8	animal by-products rendering

Taken from: Environment and Heritage Service, 2006. http://www.ehsni.gov.uk/environment/industrialPollution/Listofpartabprocesses.asp