

First Stage Review and Assessment of Local Air Quality

March 2001



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FOREWORD

This first stage Review and Assessment Report on Air Quality for Newtownabbey Borough Council is based on technical guidance issued by the Department of the Environment, Transport and the Regions, May 2000. This guidance provides suitable methods and approaches, which can be used by Local Authorities to assess the likelihood of the Air Quality Strategy (January 2000) objectives being exceeded in future years.

There is currently no legislation in place in Northern Ireland making the review and assessment of air quality by district councils a statutory requirement. Nevertheless, the Department of the Environment (NI) have encouraged councils to start work on a voluntary basis and make a commitment to complete a first stage review.

ACKNOWLEDGEMENTS

Newtownabbey Borough Council wish to acknowledge the following organisations which have assisted with the provision of information:

- Roads Service, Eastern Division, Belfast
- Northern Ireland Housing Executive
- Industrial Pollution Inspectorate, Environment and Heritage Service, Department of Environment
- Northern Group Systems
- Department of Environment for Northern Ireland, The Planning Service, Belfast

PART ONE – NATIONAL AIR QUALITY STRATEGY

1.1 The Legislative Background

The Environment Act 1995 – Part IV Section 80 required the Secretary of State to publish a strategy containing policies with respect to the assessment and management of the quality of air, i.e. a National Air Quality Strategy (NAQS).

1.2 Introduction to the National Air Quality Strategy

The UK, NAQS (2000) describes the plans drawn up by the Government and the devolved administrations to improve and protect ambient air quality in the UK in the medium term. The primary objective is to make sure that everyone can enjoy a level of ambient air quality in public places, which poses no significant risk to health or quality of life. The Strategy establishes the future for ambient air quality policy in the UK to 2003 and beyond.

The strategy addresses the following eight pollutants:

- Benzene
- 1,3-butadiene
- Carbon monoxide (CO)
- Lead
- Nitrogen dioxide (NO₂)
- Ozone
- Particles (PM₁₀)
- Sulphur dioxide (SO₂)

It sets health-based standards for these pollutants and objectives for achieving them throughout the UK. For two of the pollutants, NO₂ and SO₂, it also sets objectives for protecting vegetation and Eco systems.

The Strategy also identifies what needs to be done at international, national and local level to achieve the objectives. It provides a framework that allows all stakeholders to identify the contributions they can make. It aims for action to be taken within the overall framework of sustainable development and for it to take account of the need to balance costs and benefits, as far as current knowledge allows.

The Strategy has been prepared according to the following guiding principles:

- it should provide the best practicable protection to human health and the environment;
- the Expert Panel on Air Quality standards' recommendations should be the basis for objectives, except where an objective derives from an Air Quality Daughter Directive limit value, based on World Health Organisation guidelines;
- it should allow the Government to comply with the EU Air Quality Daughter Directive, but allow for stricter national objectives for some pollutants;
- objectives should also reflect the practicability of the measures needed to reduce pollutants, their costs and benefits and other social and economic factors; and

- it should take account, as far as possible, of developments in European legislation, technological and scientific advances, improved air pollution modelling techniques and increased understanding of economic and social issues.

1.3 The National Air Quality Standards and Objectives

The objectives set out in the Air Quality Strategy for England, Wales and Northern Ireland and formalised in the Air Quality Regulations 2000 (N.B. Great Britain only), set the pollution parameters or bench marks for reviewing and assessing air quality. The only exceptions are ozone and the new objectives for protecting vegetation and Eco systems, which are not included in the Regulations for the purposes of Local Air Quality Management.

Table 1 - Objectives to be included in the Regulations 2000 for the Purpose of Local Air Quality Management

Pollutant	Air Quality Objective		Date to be Achieved By
	Concentration ¹	Measured As	
Benzene	6.25 µg/m ³ (5ppb)	Running annual mean	31.12.2003
1,3 Butadiene	2.25 µg/m ³ (1ppb)	Running annual mean	31.12.2003
Carbon monoxide	11.6 mg/m ³ (10ppm)	Running 8-hour mean	31.12.2003
Lead	0.5 µg/m ³	Annual mean	31.12.2004
	0.25 µg/m ³	Annual mean	31.12.2008
Nitrogen dioxide ²	200 µg/m ³ (105ppb) not to be exceeded more than 18 times a year	1 hour mean	31.12.2005
	40 µg/m ³ (21ppb)	annual mean	31.12.2005
Particles (PM ₁₀) ³	50 µg/m ³ (gravimetric) not to be exceeded more than 35 times a year	24 hour mean	31.12.2004
	40 µg/m ³ (gravimetric)	annual mean	31.12.2004
Sulphur dioxide	350 µg/m ³ (132ppb) not to be exceeded more than 24 times a year	1 hour mean	31.12.2004
	25 µg/m ³ (47ppb) not to be exceeded more than 3 times a year	24 hour mean	31.12.2004
	266 µg/m ³ (100ppb) not to be exceeded more than 35 times a year	15 minute mean	31.12.2005

1. Conversions of ppb to µg/m³ and ppm to mg/m³ at 20 deg C and 1013 mb.
2. The objectives for nitrogen dioxide are provisional
3. Measured using the European gravimetric transfer standard or equivalent. The Government and the devolved administrations see this new objective for particles as a staging post rather than a final outcome. Work has been set in hand to assess the prospects of strengthening the new objective.

The air quality standards in the Strategy are based purely on medical evidence of the effects of particular pollutants on health. They represent minimum or no significant risk levels. They are not based on a costs and benefits assessment or on a technical feasibility, but on the advice of the Expert Panel on Air Quality Standards (EPAQS). Standards based on EU limit values are generally derived from World Health Organisation (WHO) guideline values.

The air quality objectives in the Strategy, on the other hand, represent the Government's and the devolved administrations' medium term policy intentions. They are based on the recommended standards, and take account of costs and benefits, and the feasibility of moving towards those standards. Air quality objectives therefore provide a framework for determining the extent to which policies should aim to improve air quality. They also provide a measure for each of the pollutants of concern against which future progress can be judged.

PART TWO - LOCAL AIR QUALITY MANAGEMENT

2.1 Introduction to Local Air Quality Management

The Environment Act 1995 - Section 82(1) requires local authorities in GB, to carry out periodic reviews of air quality in their areas, and to assess present and likely future quality against the air quality objectives prescribed by the Air Quality Regulations 1997. The key requirements of the Environment Act 1995 are detailed in Table 2.

Table 2: Environment Act 1995

Part IV Air Quality	Commentary
Section 80	Requires the Secretary of State (SoS) to publish a National Air Quality Strategy.
Section 81	Requires the Environment Agency or any newly formed agency to have regard to the Strategy.
Section 82	Requires District Councils to carry out periodic reviews of air quality in their areas, and to assess present and likely future quality against the air quality objectives prescribed by the Air Quality Regulations 1997.
Section 83	Requires District Councils to designate Air Quality Management Areas (AQMA) where air quality standards or objectives are not being achieved or are not likely to be achieved within the relevant period.
Section 84	Where an AQMA has been designated the local authority must prepare an action plan.
Section 85	The SoS can undertake the air quality review and assessment in default or require a local authority to undertake the review.
Section 86	The County Council may make recommendations i.e. the carrying out of the review and assessment or the preparation of any action plan, to the District Council who must take into account of any such recommendations.
Section 87	Gives the SoS powers to make regulations in respect of air quality.
Section 88	The SoS may issue guidance relating to Part IV of the Act which local authorities must have regard to.

The legal provisions relating to local air quality management is seen as a framework for local authority activity. The provisions in Part IV of the Act are largely enabling and, therefore, provide the flexibility which local authorities will need to take local air quality management forward at a local level. It allows for the development of local priorities according to local needs.

2.2 Review and Assessment of Air Quality

Review of air quality means consideration of the levels of pollutants in the air for which objectives are prescribed in regulations, and estimation of likely future levels.

Assessment of air quality is the consideration of whether estimated levels for the future period are likely to exceed the levels set in the objectives.

A review and assessment of air quality is the first and most important step in the LAQM process. Part IV of the Act requires each local authority to review air quality periodically. The Air Quality Regulations 2000 prescribe air quality objectives and the dates for meeting them. For each objective, local authorities have to consider present and likely future air quality, and assess whether the objectives are likely to be achieved in time. A review and assessment will give local authorities a benchmark against which to measure later successes. It can also help ensure that decision-makers throughout the local authority (but particularly planners and traffic managers) take account of air quality issues.

In order to assist local authorities, the DETR has issued a raft of guidance documents which aim to ensure that the whole process is carried out in a consistent framework and timescale, and in a systematic way. (See Appendix 1).

2.3 The Phased Approach

The DETR guidance document LAQM.G.1 (00) – Framework for Review and Assessment of Air Quality, recommends a phased approach involving three stages (Appendix 2).

First Stage – This involves an initial screening of industrial, transport and other sources of pollutants which may have a significant impact within an authority's area.

Second Stage – This involves the estimation, modelling or monitoring of levels of pollutants in areas influenced by transport, industrial or other significant sources based on simple modelling and monitoring techniques which provide additional screening of pollutant concentrations in the area.

Third Stage – This requires a detailed and accurate appraisal of the potential impacts involving monitoring, modelling and emission inventories.

All local authorities should complete the first stage. The results of the first stage will indicate whether it is necessary to go on to the second stage. Similarly, the results of the second stage will indicate whether it is necessary to go on to the third stage.

For First and Second Stage review and assessments, it is recommended that a conservative approach is taken towards the assumptions that are used. This will tend to overestimate the predicted concentrations, such that, despite the degree of uncertainty that might be expected, the authority can be reasonably confident that it has identified all areas at risk of exceeding the air quality objectives.

The aim of the Third Stage review and assessment is to identify those areas that are likely to exceed the air quality objective in the relevant year. It is therefore recommended that the authority uses assumptions that are 'reasonably realistic', to ensure that the nature and extent of any exceedances are not significantly overestimated.

2.4 Public Exposure

The Air Quality Regulations 2000 provide that the achievement or likely achievement of the objectives is to be determined by reference to the quality of the air at locations which are situated outside of buildings or other natural or man-made structures above or below ground, and where members of the public are regularly present. For the purpose of determining the focus of review and assessment, local authorities should have regard to those locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Authorities should not consider exceedances of the objectives at any location where relevant public exposure would not be realistic. Some examples of where the objectives should and should not apply are provided in Appendix 3.

Authorities should consider current and likely future exposure to pollutants. Where there are plans, for example, to build new houses in an area currently experiencing high levels of any of the relevant pollutants, or where a future development is likely to mean increased traffic levels or increased industrial emissions at any relevant location, authorities should ensure that this is taken into account in their reviews and assessments.

2.5 The Administrative Area of Newtownabbey Borough Council

The Newtownabbey Borough Council area is 54 square miles, situated north of Belfast. It is the fourth largest Council area in Northern Ireland and is bound to the west by Antrim Borough Council, to the north by Larne Borough Council, to the east by Carrickfergus Borough Council and to the south by Belfast City Council. More specifically, its eastern boundary is formed by Belfast Lough and the hills of Knockagh and Woodburn. On the west it is bound by the Sixmile Water River Valley which leads to Lough Neagh and to the north are the Big Collin, Wee Collin and Cairnard Hills. The south boundary abutts the Greater Belfast area.

The majority of the population of the Borough is located in the southern part and Ballyclare. There are a number of rural villages such as Ballynure, Ballyrobert, Ballyeaston, Doagh, Hydepark, Mallusk and Straid, all of which lie within the commuter belt of Belfast.

The Newtownabbey Borough has experienced strong population growth over the last 20 years – three times the average Northern Ireland rate. In 1999 the estimated population for the area was 81,300.

The Borough has a strong economic base with large industrial centres at Mallusk, Hydepark and Monkstown and is well provided for in terms of major retail outlets and shopping centres at Abbeycentre and Northcott, Glengormley. Newtownabbey's proximity to Northern Ireland's ports and airports makes these industrial parks an ideal place to locate. The port of Larne, Belfast International Airport and Belfast City Airport are within 30 minutes drive and the area is also well served by major roads linking it to the rest of the province.

PART THREE – REVIEW AND ASSESSMENT OF CARBON MONOXIDE

3.1 Introduction

The Government and the devolved administrations have adopted an 8-hour running mean of 11.6 mg/m³ (10 ppm) as an air quality standard for carbon monoxide (CO), with an objective for the standard to be achieved as the maximum 8-hour running mean by the end of 2003. The focus of the authority's review and assessment for carbon monoxide should be at the following locations:

- background locations;
- roadside locations (sites close to the façade of a building);
- other locations where potentially significant groups might be exposed, such as schools or hospitals.

3.2 National Perspective – What Areas are at Risk of Exceeding the Objective?

The main source of carbon monoxide in the United Kingdom is currently road transport, in particular petrol-engined vehicles, which account for about 75% of emissions. Road traffic will constitute a larger proportion of the total within urban areas, and maximum 8-hour running mean concentrations are therefore expected to be found near busy, congested roads.

Recently agreed further reductions in vehicle emissions as part of the Auto-Oil programme are expected to deliver the revised air quality objective by the end of 2003, even at roadside locations, and no further measures are thought to be needed. Only those authorities with certain stationary sources in their area with the potential to cause elevated concentrations of carbon monoxide in relevant locations are expected to need to proceed beyond the First Stage review and assessment.

3.3 First Stage Review and Assessment of Carbon Monoxide

To carry out the First Stage review and assessment, the authority should collate the following information:

- information on existing and 2003 forecast annual average daily traffic flows for any existing or proposed roads in the authority's area, with traffic flows which could generate significant quantities of carbon monoxide i.e.
 - single carriageway > 80,000 v.p.d (vehicles per day)
 - dual carriageway > 120,000 v.p.d (vehicles per day)
 - motorway > 140,000 v.p.d (vehicles per day)
- details of existing and/or proposed Part A authorised processes in the authority's area;
- details of existing and /or proposed Part B authorised processes in the authority's area;
- details of any planned developments in the authority's area, particularly if they will affect traffic flows;

- details of any significant sources of carbon monoxide in neighbouring areas which could impact within the authority's area.

For each existing or proposed emissions source, the authority needs to identify those which have the potential, either singly or together, to emit significant quantities of carbon monoxide. Clearly these sources need to be in existence and/or operation in 2003. Authorities are also reminded that only those sources which have the potential to cause exposure of the public at relevant locations need be considered.

3.4 Data Considered

3.4.1 Road Traffic

Appendix 7 details traffic data for the Borough.

- No single carriageway roads will exceed daily average traffic flow of 80,000 vehicles per day by 2003 (see Appendix 7.1).
- No dual carriageway (2 or 3 lane) roads will exceed daily average traffic flow of 120,000 vehicles per day by 2003 (see Appendix 7.2).
- No motorways will exceed daily average traffic flow of 140,000 vehicles per day by 2003 (see Appendix 7.2).
- No junctions where 2 or more roads intersect will exceed daily average traffic flow of 80,000 vehicles per day by 2003 (see Appendix 7.3).

3.4.2 Industrial Sources

Appendices 5 and 6 detail the Part A and Part B industrial processes within Newtownabbey and neighbouring areas.

There are no significant existing or proposed Part A or Part B processes in Newtownabbey.

One Part A industrial process within Belfast City Council area, DoE Waste Sludge Incinerator at Dargan Road is a potentially significant source of carbon monoxide.

3.4.3 Planned Developments

The Planning Service has indicated there are at least 6 proposed developments within Newtownabbey which are considered to have a potential impact in respect of traffic (Appendix 4).

None of these developments are likely to increase road traffic flows to the extent that the daily average traffic flow would exceed 80,000 vehicles per day (single carriageway road).

3.5 Conclusions on Data Considered

Due to the one Part A process in Belfast City Council area a second stage review and assessment will be required.

3.6 Recommendation

It is recommended to proceed to second Stage Review and Assessment for carbon monoxide.

PART FOUR – REVIEW AND ASSESSMENT OF BENZENE

4.1 Introduction

The Government and the devolved administrations have adopted a running annual mean of 16.25 $\mu\text{g}/\text{m}^3$ (5ppb) as an air quality standard for benzene, with an objective for the standard to be achieved by the end of 2003. The focus of the authority's review and assessment for benzene should be the following locations:

- background locations;
- roadside locations (sites close to the façade of a building);
- other locations where potentially significant groups might be regularly exposed, such as schools or hospitals.

4.2 National Perspective – What Areas are at Risk of Exceeding the Objective?

The main sources of benzene in the United Kingdom are petrol-engined vehicle exhausts, petrol refining, distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems.

Benzene concentrations at UK national network sites (1996-98) indicate running annual mean concentrations of benzene measured at urban background/centre, roadside and kerbside locations are already below the 2003 objective of 16.25 $\mu\text{g}/\text{m}^3$ (5ppb), even close to heavily-trafficked roads.

The increasing numbers of vehicles equipped with three way catalysts will significantly reduce emissions of benzene in future years. Recently agreed additional reductions in vehicle emissions as part of the Auto-Oil programme are expected to further reduce emissions of benzene from vehicle exhausts, and proposals to control emissions from petrol station forecourts during vehicle refuelling are expected to lead to significant reductions in these uncontrolled emissions. These existing and proposed measures are expected to deliver the revised air quality objective by the end 2003 and no further measures are thought to be needed. Only those authorities with relevant locations in the vicinity of major industrial processes which handle, store or emit benzene, are expected to proceed beyond the first stage review and assessment.

4.3 First Stage Review and Assessment of Benzene

To carry out the first stage review and assessment, the authority should collate the following information:

- details of existing and/or proposed Part A authorised processes in the authority's area;
- details of existing and/or proposed Part B authorised processes in the authority's area;

- details of any significant sources of benzene in neighbouring areas which could impact within the authority's area.

It should be noted that emissions from road traffic are unlikely to be significant, and should not generally need to be considered by the authority.

The Government and the devolved administrations are currently finalising an investigation into ambient levels of benzene in the vicinity of petrol stations. Whilst there may be current exceedances of the objective in the vicinity of some large petrol stations in London (where background concentrations are higher), the expected reduction in emissions will ensure that there will be no exceedances due to petrol stations by 2003. Authorities should therefore assume that petrol stations **do not** give rise to significant emissions of benzene.

For each existing or proposed emissions source, the authority needs to identify those which have the potential, either singly or together, to emit significant quantities of benzene. Clearly these sources need to be in existence and/or operation in 2003. Authorities are also reminded that only those sources which have the potential to cause exposure of the public at relevant locations need be considered.

4.4 Data Considered

4.4.1 Industrial Sources

Appendices 5 and 6 detail the Part A and Part B industrial processes within the Newtownabbey and neighbouring areas.

There are no significant existing or planned Part A or Part B processes with the potential to emit significant quantities of benzene in the Newtownabbey or neighbouring areas.

4.5 Conclusions on Data Considered

The guidance concludes that if there are no significant Part A and/or Part B processes existing or planned in the Newtownabbey area then the risk of the air quality objective for benzene being exceeded by the end of 2003 is considered to be negligible and there is no need to consider the possibility of an air quality management area for benzene.

There are no significant sources of benzene in the Newtownabbey area or in neighbouring areas and there are no proposals for development likely to emit this pollutant.

The objective for benzene is likely to be achieved at all locations within the Newtownabbey area.

4.6 Recommendation

It is recommended not to proceed to a second stage review and assessment for benzene.

PART FIVE – REVIEW AND ASSESSMENT OF 1,3 BUTADIENE

5.1 Introduction

The Government and the devolved administrations have adopted a maximum running annual mean of 2.25 µg/m³ (1ppb) as an air quality standard for 1,3 butadiene, with an objective for the standard to be achieved by the end 2003. The focus of the authority's review and assessment for 1,3 butadiene should be at the following locations:

- background locations;
- roadside locations (sites close to the façade of a building);
- other locations where potentially significant groups might be regularly exposed, such as schools or hospitals.

5.2 National Perspective – What Areas are at Risk of Exceeding the Objective?

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.

1,3 butadiene concentrations at UK national network sites (1996-98) indicate maximum running annual mean concentrations of 1,3 butadiene measured at all urban background/centre and roadside locations are already well below the 2003 objective of 2.25 µg/m³ (1ppb).

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 of fuel quality, as part of the Auto-Oil programme, are expected to further reduce emissions of 1,3 butadiene from vehicle exhausts. These measures are expected to deliver the air quality objective by the end 2003, and no further measures are thought to be needed. Only those authorities with relevant locations in the vicinity of major industrial processes which handle, store or emit 1,3 butadiene, are expected to proceed beyond the First Stage review and assessment.

5.3 First Stage Review and Assessment of 1,3 Butadiene

To carry out the First Stage review and assessment, the authority should collate the following information:

- details of existing and/or proposed Part A authorised processes in the authority's area;
- details of existing and/or proposed Part B authorised processes in the authority's area;
- details of any significant sources of 1,3 butadiene in neighbouring areas which could impact within the authority's area.

It should be noted that emissions from road traffic are likely to be insignificant, and should not generally need to be considered by the authority.

For each existing or proposed emissions source, the authority needs to identify those which have the potential, either singly or together, to emit significant quantities of 1,3 butadiene. Clearly these sources need to be in existence and/or operation in 2003. Authorities are also reminded that only those sources which have the potential to cause exposure to members of the public at relevant locations need be considered.

5.4 Data Considered

5.4.1 Industrial Sources

Appendices 5 and 6 detail the Part A and Part B industrial processes within the Newtownabbey and neighbouring areas.

There are no significant existing or planned Part A or Part B processes with the potential to emit significant quantities of 1,3 butadiene in the Newtownabbey or neighbouring areas.

5.5 Conclusions on Data Considered

The guidance concludes that if there are no significant Part A and/or Part B processes existing or planned in the Newtownabbey area then the risk of the air quality objective for 1,3 butadiene being exceeded by the end of 2003 is considered to be negligible and there is no need to consider the possibility of an air quality management area for 1,3 butadiene.

There are no significant sources of 1,3 butadiene in the Newtownabbey area or in neighbouring areas and there are no proposals for developments likely to emit this pollutant.

The objective for 1,3 butadiene is likely to be achieved at all locations within the Newtownabbey area.

5.6 Recommendation

It is recommended not to proceed to a second stage review and assessment for 1,3 butadiene.

PART SIX – REVIEW AND ASSESSMENT OF LEAD

6.1 Introduction

The Government and the devolved administrations have adopted an annual mean of 0.5 µg/m³ as an air quality standard for lead, with an objective for the standard to be achieved by the end 2004. In addition, a lower air quality objective of 0.25µg/m³ is to be achieved by the end 2008. The focus of the authority's review and assessment for lead should be the following locations:

- background locations;
- roadside locations (sites close to a façade of a building);
- other locations where potentially significant groups might be regularly exposed, such as schools or hospitals.

6.2 National Perspective – What Areas are at Risk of Exceeding the Objective?

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

Lead-in-air concentrations at UK national network sites (1994-98) indicate annual mean concentrations of lead measured at urban background and kerbside sites have declined significantly over recent years, with the increasing reduction of leaded petrol. Concentrations at all background and kerbside sites are now well below the objectives for both 2004 and 2008, and are expected to decline further following the withdrawal of leaded petrol.

Measured concentrations in close proximity to specific industrial installations are however much higher, and at several sites, currently exceed the objectives for 2004 and 2008. At present however, there is insufficient data to allow a clear picture to be drawn regarding the extent to which emissions from industrial sites may lead to localised exceedances of the objective. Further work is currently under way to measure concentrations around these sites, and these will be reported during 2001.

Existing national policies are expected to deliver the air quality objectives at all rural, urban background and roadside/kerbside sites, in both 2004 and 2008. Only local authorities with significant industrial sources, which have the potential to result in elevated levels of lead in relevant locations, are expected to proceed beyond the First Stage review and assessment.

6.3 First Stage Review and Assessment of Lead

To carry out the First Stage review and assessment, the authority should collate the following information:

- details of existing and/or proposed Part A authorised processes in the authority's area;

- details of existing and/or proposed Part B authorised processes in the authority's area;
- details of any significant sources of lead in neighbouring areas which could impact within the authority's area.

It should be noted that emissions from road traffic do not need to be considered by the authority.

For each existing or proposed emissions source, the authority needs to identify those which have the potential, either singly or together, to emit significant quantities of lead. Clearly these sources need to be in existence and/or operation in either/both 2004 and 2008. Authorities are also reminded that only those sources which have the potential to cause exposure of the public at **relevant locations** need be considered.

6.4 Data Considered

6.4.1 Industrial Sources

Appendices 5 and 6 detail the Part A and Part B industrial processes within Newtownabbey and neighbouring areas.

There is one Part A process at Brett Martin Plastics, Mallusk which is currently going through authorisation with the Industrial Pollution Inspectorate which is a potentially significant source of lead in the Newtownabbey area.

There are no significant existing or proposed Part A or Part B processes in the neighbouring areas.

6.5 Conclusions on Data Considered

There is no emissions data available for the new Part A process, therefore a second stage review and assessment will be required.

6.6 Recommendation

It is recommended to proceed to a second stage review and assessment for lead.

PART SEVEN – REVIEW AND ASSESSMENT OF NITROGEN DIOXIDE

7.1 Introduction

The Government and the devolved administrations have adopted an annual mean of $40\mu\text{g}/\text{m}^3$ (21ppb), and a 1-hour mean of $286\mu\text{g}/\text{m}^3$ (150ppb), as the air quality standards for nitrogen dioxide. The objectives are for the annual mean standard to be achieved by the end 2005, and a 1-hour mean of $200\mu\text{g}/\text{m}^3$ (105 ppb) not to be exceeded more than 18 times per year, to be achieved by the end of 2005 (approximately equivalent to the 99.8th percentile of hourly means).

The focus of the authority's review and assessment for the **annual mean objective** for nitrogen dioxide should be the following locations:

- background locations;
- roadside locations (sites close to the façade of a building);
- other locations where potentially significant groups might be regularly exposed, such as schools or hospitals.

For the **1-hour mean objective**, the focus of the authority's review and assessment for nitrogen dioxide should include any non-occupational, outdoor locations (including kerbside sites) given that short-term exposures are potentially likely at these locations.

7.2 National Perspective – What Areas are at Risk of Exceeding the Objective?

Nitrogen dioxide (NO_2) and nitric oxide (NO) are both oxides of nitrogen and are collectively referred to as NO_x . All combustion processes produce some NO_x emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. Only nitrogen dioxide is associated with adverse effects upon human health.

The main sources of NO_x emissions in the UK are road transport, which accounted for almost 50% of total UK emissions in 1997; the electricity supply industry which accounted for 20%; and the industrial and commercial sectors which accounted for about 17%. In most urban areas, the contribution of road transport to local emissions will be much greater, and for example, accounts for more than 75% of NO_x emissions in London.

Significant reductions in emissions are expected by 2005 from the road transport sector as a result of the implementation of various policy measures. As large power stations are generally located outside of major urban areas, and emit NO_x from high chimneys, these emissions are not thought to be a major source of non-transport related urban NO_x . Emissions associated with space heating from boilers are, however, considered to be an important source of NO_x emissions, and are not expected to reduce significantly in the future.

Nitrogen dioxide concentrations at UK national network sites (1996-98) indicate the annual mean objective of $40\mu\text{g}/\text{m}^3$ (21 ppb) is currently widely exceeded at urban sites in the UK, with higher concentrations being recorded at roadside locations. The number of exceedances of the 1-hour objective show considerable year-to-year variability, and are driven by meteorological conditions which give rise to both

winter episodes of poor dispersion and summer oxidant episodes. A greater number of exceedances has been recorded at kerbside and roadside sites, and within the London area.

Recently agreed further reductions in industrial emissions, as part of the EC Large Combustion Plant directive, the National Emissions Ceiling Directive (NECD), and more stringent control of vehicle emissions as part of the Auto-Oil programme, will all serve to further reduce NO_x emissions by 2005. Despite these reductions, it is considered that additional measures will be required in some areas to meet the objectives at all relevant locations by the end of 2005.

In practice, meeting the annual mean objective is expected to be more demanding than achieving the 1-hour objective. It is therefore generally considered that if the annual mean objective is achieved, it is unlikely that the 1-hour objective will be exceeded. Exceptions to this rule may occur where emissions are predominantly related to large stationary sources. National studies have indicated that the annual mean objective is expected to be met at all urban background locations outside of London, but that the objective may be exceeded more widely, at roadside sites in close proximity to busy road links.

In general, only those authorities with relevant locations in close proximity to busy roads are expected to proceed beyond the Second Stage review and assessment, although there are some areas with potentially significant industrial sources which cannot be discounted, and will also need to be considered in greater detail.

7.3 First Stage Review and Assessment of Nitrogen Dioxide

To carry out the First Stage review and assessment, the authority should collate the following information:

- estimated 2005 annual mean background NO_x concentrations from the Internet site (www.aeat.co.uk/netcen/airqual/);
- information on existing and 2005 forecast annual mean traffic flows for any existing or proposed roads in the authority's area which could generate significant quantities of NO_x;
- details of existing and/or proposed Part A authorised processes in the authority's area;
- details of existing and/or proposed Part B authorised processes in the authority's area;
- details of any planned developments in the authority's area, particularly if they will affect traffic flows;
- details of any significant sources of NO_x in neighbouring areas which could impact within the authority's area.

For each existing or proposed emissions source, the authority needs to identify those which have the potential, either singly or together, to emit significant quantities of NO_x. Clearly these sources need to be in existence and/or operation in 2005. Authorities are also reminded that only those sources which have the potential to cause exposure of the public at **relevant locations** need be considered.

7.4 Data Considered

7.4.1 Background NO_x Concentrations

The estimated annual mean background NO_x concentration for 2005 is the starting point for the assessment. This data has been mapped for the UK by NETCEN, and can be accessed via the internet (<http://www.aeat.co.uk/netcen/airqual/>). Details of the mapping process can also be found on the internet site. The NO_x maps have been prepared based upon a typical 1996 meteorology, and as such represent a worst case scenario. The maps identify local authority boundaries, and zoom in on a particular area of interest in order to get the forecast NO_x concentrations for 2005.

Projected total background NO_x concentrations for 2005 range from 6.3 µg/m³ to a maximum of 32.1 µg/m³ for the Newtownabbey Borough Council area. For the purpose of this first stage review a concentration of 32.1 µg/m³ will be used in future predictions, thus indicating a worst case scenario.

7.4.2 Road Traffic

The potential significance of NO_x emissions from road traffic is dependent upon a number of factors including the projected 2005 background concentration, and traffic conditions such as the traffic flow, speed and HGV mix. The impact of traffic emissions falls off rapidly with increasing distance from the kerbside. It is important to take account of where the nearest exposed population will be.

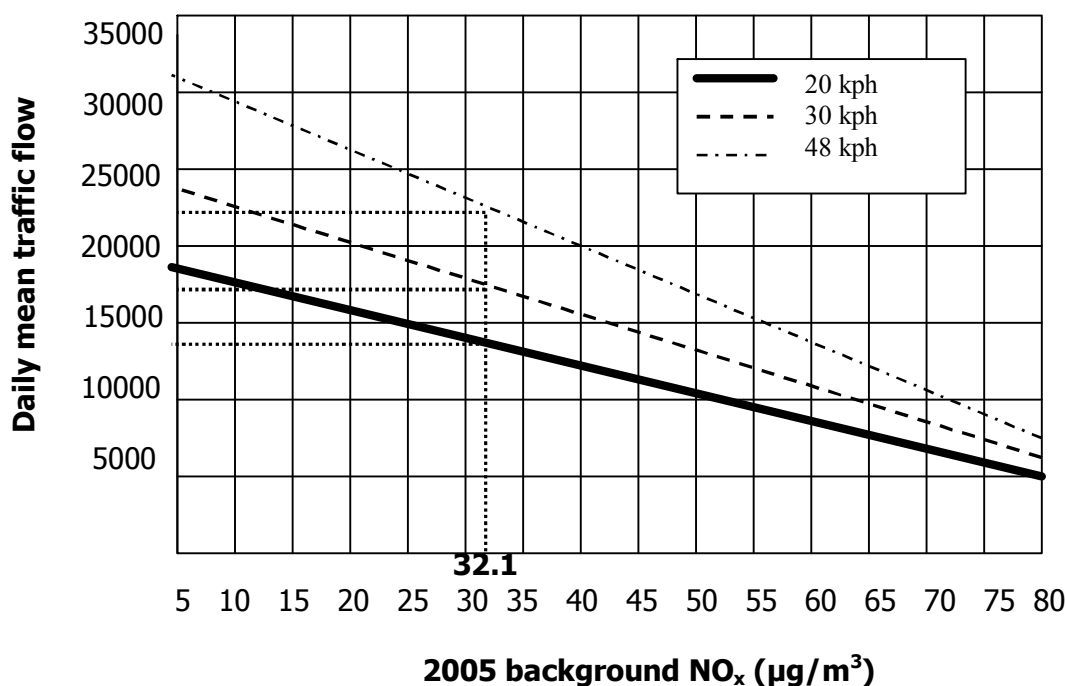
Appendix 7 details traffic data for the Borough.

Two nomograms, for a single carriageway road and a dual carriageway road or a motorway (shown in Tables 3 and 4 below), were used to determine the relationship between daily mean traffic flow, average traffic speed and 2005 background NO_x and the risk of exceeding the objective for nitrogen dioxide.

Single Carriageway Roads

To establish a threshold for road traffic data, which if exceeded, indicates a need to proceed to second stage review and assessment, the figure of 32.1µg/m³ as a 2005 background NO_x was applied to Table 3.

Table 3 - Relationship between daily mean traffic flow, average traffic speed and 2005 background NO_x and the risk of exceeding the objective for nitrogen dioxide. Single carriageway road, 12 % HGV, receptor 2 metres from kerbside.



An appropriate average speed of 20 kph (12.5 mph) or 48 kph (30 mph) was chosen and applied for each single carriageway road giving thresholds of **14,000** and **22,500** vehicles per day (vpd) respectively.

Appendix 7.4 indicates that there are 13 single carriageway roads with predicted traffic flows greater than the thresholds (14,000 or 22,500 vpd).

Data was not available for the following roads which are also considered to have high traffic flows likely to exceed the threshold level:

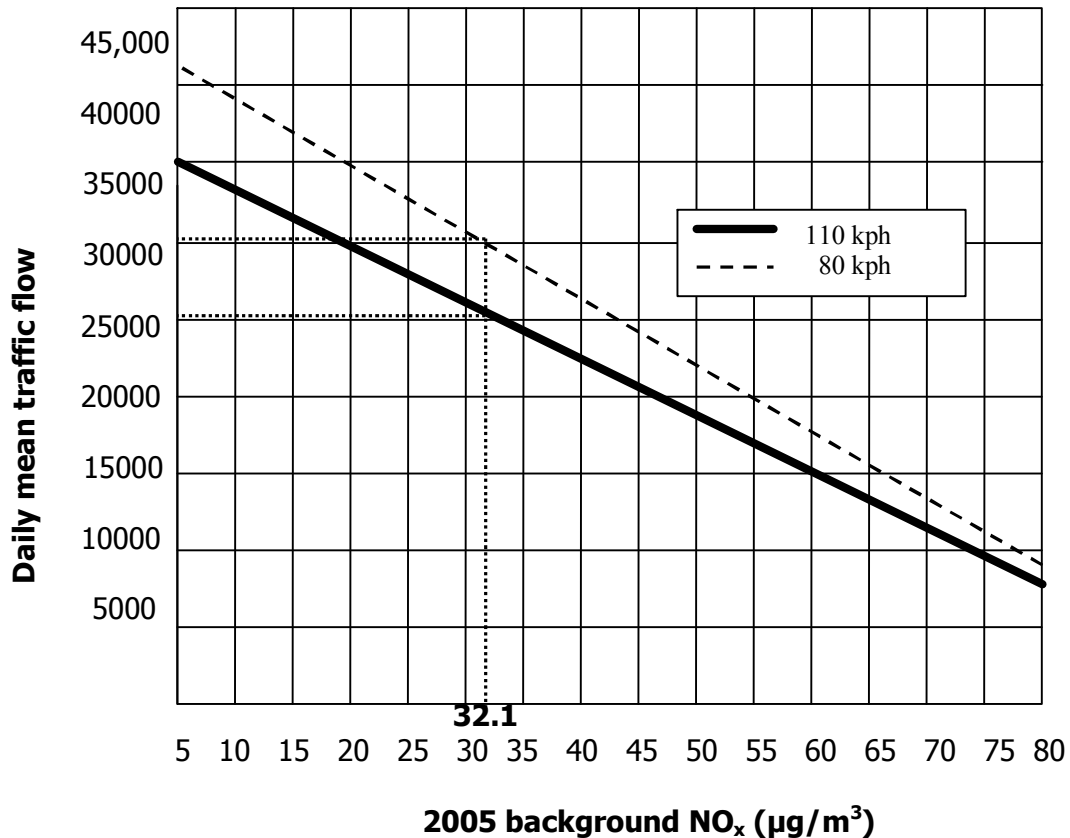
- Shore Road – between Station Road and Mill Road
- Monkstown Road
- Ballyclare Road – between Northcott and Glengormley town centre
- Carntall Road
- Antrim Road – between Sandyholme Park and O’Neill Road
- Hightown Road – between junction with Mallusk Road and Glengormley town centre
- Doagh Road – between Manse Road and Kings Road
- between O’Neill Road roundabout and Shore Road
- Templepatrick Road – from Old Ballynure Road to NBC boundary at Hagan’s Caravans
- Doagh Village - Station Road
- Main Street
- Burn Road
- Ballymena Road
- Mallusk Road – between Hightown Road and Bernice Road
- Carrickfergus Road – between junction of Straid Road and intersection with A8

It is recommended that these roads be considered at second stage review.

Dual Carriageway Roads/Motorway

To establish a threshold for road traffic data which if exceeded indicates a need to proceed to second stage review and assessment, the figure of $32.1\mu\text{g}/\text{m}^3$ as a 2005 background NO_x was applied to Table 4.

Table 4 - Relationship between daily mean traffic flow, average traffic speed and 2005 background NO_x and the risk of exceeding the objective for nitrogen dioxide. Dual carriageway road/motorway, 12 % HGV, receptor location 10 metres from kerbside or hard shoulder.



Appendix 7.5 indicates that there are 4 dual carriageway roads/motorway with predicted traffic flows greater than the threshold (30,000 vpd).

Junctions

Appendix 7.6 indicates that there are 37 junctions with predicted traffic flows greater than the threshold (14,000 vpd).

Data was not available for the following junctions, which are also considered to have high traffic flows likely to exceed the threshold level:

- Shore Road/Mill Road
- O'Neill Road/Antrim Road
- Antrim Road/Collinbridge Road
- Mallusk Road/Park Road
- Church Road/Antrim Road/Glenwell Road

It is recommended that these junctions be considered at second stage review.

Other Potentially Sensitive Locations

The guidance states that roads with less than 10,000 vpd are unlikely to have a significant impact and can effectively be ignored. However, for roads with vehicle movements between 10,000 vpd and the screening thresholds, sensitive properties within 2 metres of the kerbside should be subjected to a second stage review, ie, kerbside sites such as the pavements of busy shopping street and property facades.

A number of kerbside/sensitive locations have been identified with traffic flows over the nomogram threshold.

It is recommended that these junctions be considered at second stage review. Consideration at second stage review may also have to be given to additional kerbside/sensitive locations.

7.4.3 Industrial Sources

Appendices 5 and 6 detail the Part A and Part B industrial processes within the Newtownabbey and neighbouring areas.

There are no significant Part A or Part B processes existing or planned in Newtownabbey.

One Part A industrial process in Carrickfergus Borough Council area, Kilroot Power Station and one Part A process in Belfast City Council area, DoE Waste Sludge Incinerator are potentially significant sources of NO₂.

7.4.4 Planned Developments

The Planning Service has indicated there are at least 6 proposed developments within Newtownabbey which are considered to have a potential impact in respect of traffic (see Appendix 4).

7.5 Conclusions on Data Considered

There are at least 13 sections of single carriageway roads, 4 dual carriageway/motorways and 37 junctions which will exceed the projected annual average daily traffic flow thresholds. It is therefore necessary to proceed to a second stage review and assessment.

There are no significant existing or planned Part A or Part B processes within Newtownabbey.

There is one Part A process identified in the Carrickfergus Borough Council area and one in the Belfast City Council area which are potentially significant sources of NO₂.

There are at least 6 planned developments within Newtownabbey with potential to increase traffic flows by 2005.

7.6 Recommendations

It is recommended to proceed to a second stage review for NO₂ emissions.

PART EIGHT – REVIEW AND ASSESSMENT OF SULPHUR DIOXIDE

8.1 Introduction

The Government and the devolved administration have adopted a 15-minute mean of $266\mu\text{g}/\text{m}^3$ (100 ppb) as an air quality standard for sulphur dioxide (SO_2), with the objective for the standard not to be exceeded more than 35 times in a year (approximately equivalent to the 99.9th percentile) by the end of 2005. A new 1-hour mean objective of $350\mu\text{g}/\text{m}^3$ (132 ppb), to be exceeded no more than 24 times per year (approximately equivalent to the 99.7th percentile), and a new 24-hour mean objective of $125\mu\text{g}/\text{m}^3$ (47 ppb), to be exceeded no more than 3 times per year (approximately equivalent to the 99th percentile), have been adopted as additional objectives to be achieved by the end of 2004.

The focus of the authority's review and assessment for the **24-hour objective** for sulphur dioxide should be at the following locations:

- background locations;
- roadside locations (sites close to the façade of a building);
- other locations (e.g. in the vicinity of housing, schools or hospitals etc).

For the 1-hour and 15-minute mean objectives, the focus of the authority's review and assessment should be any location, where members of the public might be exposed over the relevant period. This might, for example, include an area such as a playing field downwind of a point source.

8.2 National Perspective – What Areas are at Risk of Exceeding the Objective?

Emissions of sulphur dioxide are dominated by coal fired power stations, which contribute more than 65% of the UK total. There are also significant emissions from other industrial sources. Road transport contributes less than 2% of emissions.

Sulphur dioxide concentrations at UK national network sites (1996-98) indicate that the 15-minute objective is considerably more stringent than either the 1-hour or the 24-hour objectives.

The 15-minute objective is currently widely exceeded in the UK, at both urban and rural sites. These exceedances are associated with emissions from both large and small combustion plants, and domestic coal burning. Exceedances of the 1-hour and 24-hour objectives are confined to Belfast, and are associated with domestic coal burning which is still widespread in this area.

A variety of measures are in place which will serve to significantly reduce emissions from large combustion plant, and thus reduce the likelihood of exceedances of the objectives from this sector. However, there remains the potential for localised exceedances of the objective to occur in the vicinity of small combustion plant less than 20MW, which burn coal or oil, and in areas where coal is the predominant form of domestic heating.

It should be noted that sulphur dioxide concentrations are elevated at kerbside locations, but not to the extent to cause exceedances of the objectives. Authorities should not need to consider road transport emissions unless there are other significant sources nearby.

8.3 First Stage Review and Assessment of Sulphur Dioxide

To carry out the First Stage review and assessment, the authority should collate the following information:

- details of existing or proposed Part A authorised processes in the authority's area;
- details of existing or proposed Part B authorised processes in the authority's area;
- details of any small combustion plant (> 5 MW thermal) using solid fuels or fuel oil – these are likely to be associated with schools, hospitals, and other large commercial and industrial buildings;
- details of the density of houses burning coal or Solid Smokeless Fuel (if appropriate) (more than 300 houses per km²);
- details of any significant sources of SO₂ in neighbouring areas which could impact within the authority's area.

For each existing or proposed emissions source, the authority needs to identify those which have the potential, either singly or together, to emit significant quantities of SO₂. Clearly these sources need to be in existence and/or operation on 2004/2005. Authorities were also reminded that only those sources which have the potential to cause exposure of the public at relevant locations need to be considered.

8.4 Data Considered

8.4.1 Industrial Sources

Appendices 5 and 6 detail the Part A and Part B industrial processes within Newtownabbey and neighbouring areas.

There are no significant Part A or Part B processes existing or planned in Newtownabbey.

One Part A industrial process in Belfast City Council area, DoE Waste Sludge Incinerator, Dargan Road, is a potentially significant source of SO₂.

8.4.2 Solid Fuel or Fuel Oil Combustion Systems (> 5 MW)

Only one combustion system greater than 5 MW exists within the Newtownabbey Borough. This is located at the University of Ulster where 6 boilers produce a combined total of 15.7 MW. This is dual fired (gas and oil (3,500 sec and 35 sec)) however these fuel oils are only used for 1 hour every 3 months. Given the main source of fuel is natural gas this boiler plant is not considered to be a significant source of SO₂.

8.4.3 Domestic Sources

Residential coal burning data was compiled in accordance with the procedure outlined in Appendix 8. Eight 1 x 1 km squares were selected throughout the Borough. From these eight squares, assessments of the number of houses burning coal have been carried out for the four most densely populated grid squares as detailed in Appendix 9, Maps 1 and 2. These are considered to be the most densely populated 1 x 1 km grid squares in the Newtownabbey Borough.

Appendix 8.1 indicates that four 1 x 1 km square areas (Ballyclare, Carnmoney, Mossley and Rathcoole) have been identified as having more than 300 houses burning coal, thus indicating the need for a second stage review and assessment.

8.4.4 Other Transport Sources

Emissions of Sulphur Dioxide from road traffic are low and may generally be considered to be insignificant. There is however the potential for SO₂ emissions to arise from other forms of transport including railways. SO₂ emissions from railways are only associated with diesel engines. Emissions are too low to have any impact alongside railway tracks but there is the potential for a significant impact where there are stationary idling engines, eg a major depot or terminus with sensitive properties nearby.

The Larne and Bleach Green railway lines which pass through the Newtownabbey area are not considered to be significant sources of SO₂.

8.5 Conclusions on Data Considered

There are no planned or existing Part A or Part B processes with the potential to emit significant quantities of SO₂ within the Newtownabbey Borough or neighbouring areas.

There are no significant combustion systems with thermal power ratings greater than 5 MW.

There are at least four 1 x 1 km grid squares within Newtownabbey Borough area with potentially more than 300 households burning coal.

There are no other transport sources with a potential to emit significant levels of SO₂.

In view of the above information, there is a risk of the 2005 objective for SO₂ being exceeded for residential coal burning.

8.6 Recommendation

It is recommended to proceed to a second stage review and assessment for SO₂.

PART NINE – REVIEW AND ASSESSMENT OF PM₁₀

9.1 Introduction

The Government and the devolved administrations have adopted two air quality objectives for fine particles (PM₁₀), which are equivalent to the EU Stage 1 Limit Values. The objectives are 40 µg/m³ as the annual mean, and 50 µg/m³ as the fixed 24-hour mean to be exceeded no more than 35 days per year, to be achieved by the end of 2004. The objectives are based on measurements carried out using the European gravimetric transfer reference sampler or equivalent.

The focus of the authority's review and assessment for PM₁₀ should be the following locations:

- background locations;
- roadside locations;
- other locations where potentially significant groups might be exposed, such as schools or hospitals.

The proposed 24-hour objective is **highly unlikely** to be exceeded if the annual mean concentration is below 28µg/m³, gravimetric. This approach is appropriate for the first and second stage review and assessment.

9.2 National Perspective – What Areas are at Risk of Exceeding the Objective?

There is a wide range of emission sources which contribute to PM₁₀ concentrations in the UK. These can usefully be divided into 3 main source categories:

- Primary Combustion Particles – particles emitted directly from combustion processes such as road traffic, power generation, industrial combustion processes etc. These particles are generally less than 2.5 µm and often well below 1 µm in diameter;
- Secondary particles – particles formed in the atmosphere following their release in the gaseous phase. These include sulphates and nitrates, formed from emissions of SO₂ and NO_x; these particles are generally less than 2.5 µm in diameter;
- 'Coarse' or 'Other' particles – the so-called 'coarse' or 'other' particles component comprises of emissions from a wide range of non-combustion sources. These include resuspended dust from road traffic, construction and mineral extraction processes, wind-blown dusts and soils, and sea salt. These particles are generally greater than 2.5 µm in diameter.

There are several reasons why it is important to bear in mind the different source categories, and their respective contribution to PM₁₀ concentrations, within the review and assessment process:

- The expected reduction in particle emissions in future years is different for each type of source. For example, emissions from road transport will be governed by new legislation in vehicle emission standards; emissions of secondary particles will be largely governed by controls on power generation, industrial and transport SO₂ and NO_x emissions, both in the UK and in Europe, emissions of

coarse particles are largely uncontrolled, and in general are not expected to decline in future years. In forecasting future emissions it is therefore essential to treat each source category separately.

- The principal focus of Local Air Quality Management should be towards the control of emissions at a local level. It is therefore important that the review and assessment process identifies the contribution of local emission sources, so that the effectiveness of control policies or action plans can be evaluated.

A description of the different source categories, and their approximate contribution to annual mean background concentrations is described in Table 5. A significant proportion of current annual mean PM₁₀ is derived from regional (including long distance transport from Europe) background sources. The exact regional background contribution at any site is variable, and will be dependent upon the precise geographic location. Typical regional annual mean background contributions are currently within the range of about 18-26µg/m³, gravimetric and are outside of the control of local authorities. Where exceedances of the objectives are predicted, local authorities are strongly advised to focus their efforts on the identification of the contribution of local sources to overall PM₁₀ concentrations.

Table 5 – Approximate Contributions to PM₁₀ Concentrations 1998

Type of Particle	Source Location	Main Source Categories	Main Source Types	Typical Contribution to Annual Mean Concentration (µg/m³ gravi.)
Coarse 2.5-10µm	Immediate local (very close)	Traffic	Resuspended dusts Tyre Wear	1-6
		Industry	Fugitive dusts Stockpiles Quarries Construction	Variable
	Urban Background	Traffic	Resuspended dusts Tyre Wear	1-4
		Industry	Fugitive dusts Stockpiles Quarries Construction	0.5-2
	Regional (including distant sources)	Natural	Resuspended dust/soil	2-3
			Sea salt	1-2
			Biological	1
Fine	Immediate local (very close)	Traffic	Vehicle exhaust	1-6
		Industry	Combustion Industrial processes	Variable
		Domestic	Coal combustion	Variable

Table 5 (cont'd)

Type of Particle	Source Location	Main Source Categories	Main Source Types	Typical Contribution to Annual Mean Concentration ($\mu\text{g}/\text{m}^3$ gravi.)
	Urban background	Traffic	Vehicle exhaust	1-4
		Industry	Combustion Industrial processes	0.5-2
		Domestic	Coal combustion	Variable
	Regional (including distant sources)	Secondary	Power Stations Industrial processes Vehicles	6-16
		Primary (Europe)	Vehicles Combustion processes	1-2
		Natural	Sea Salt	0.5-1

PM₁₀ data from monitoring sites within the Automatic Urban and Rural Networks indicate that the proposed annual mean objective (40 $\mu\text{g}/\text{m}^3$, gravimetric) is estimated to have been met at all sites in 1997, with the exception of a kerbside site in London (Camden Roadside), which exceeded by less than 2 $\mu\text{g}/\text{m}^3$. The 24-hour objective (50 $\mu\text{g}/\text{m}^3$, gravimetric, maximum of 35 exceedances per year) is estimated to have been exceeded at most of the roadside/kerbside sites, and exceeded or closely approached at about 30% of urban and suburban locations. Concentrations at rural/remote sites were well below the objective.

It is confidently expected that PM₁₀ concentrations will have fallen by the end of 2004, when the objectives are to be met. An analysis of PM₁₀ projections for 2004 is presented in the Air Quality Strategy. The analysis was carried out using both 1995 and 1996 monitoring data, because 1996 was characterised by a much higher frequency of easterly winds associated with the transport of polluted air from mainland Europe to the UK. The 1996 meteorology occurs about once every five to ten years and may therefore be described as 'atypical', and as such represents a worst-case pessimistic scenario upon which to base predictions of future PM₁₀ concentrations. The analysis has indicated that with existing national policy measures and atypical meteorology, exceedances of the objectives might be found in the following areas:

- urban background sites;
- areas adjacent to busy roads, particularly within major urban areas;
- areas which have significant emissions from the domestic burning of solid fuels;
- areas in the vicinity of industrial plant, or which have significant uncontrolled or fugitive emissions (for example quarrying, materials handling facilities etc).

Such areas are expected to form the focus of more detailed review and assessment for local authorities. It is considered unlikely that the objectives will be exceeded at

locations other than those listed above. It is not anticipated that local authorities will generally need to proceed beyond the First Stage review and assessment in areas other than those listed above.

9.3 First Stage Review and Assessment of PM₁₀

To carry out the First Stage review and assessment, the authority should collate the following information:

- estimated annual mean background PM₁₀ concentrations (gravimetric) for 2004;
- traffic data for existing or proposed roads (excluding those with daily average traffic flows of less than 5,000 vehicles/day);
- information on domestic solid fuel use;
- information on existing and/or proposed Part A and Part B authorised processes;
- information on sources of controlled or fugitive dust emissions, such as quarries, landfill sites, major construction works, coal and aggregate stock yards etc.;
- details of any planned developments in the area, particularly if they will affect traffic flows;
- details of any significant sources of PM₁₀ in neighbouring areas which could impact within the authority's area.

For each existing or proposed emissions source, the authority needs to identify those which have the potential, either singly or together, to emit significant quantities of PM₁₀. Clearly, the sources will need to be in existence and/or in operation in 2004. Authorities are also reminded that only sources which have the potential to cause exposure of the public at **relevant locations** need be considered.

9.4 Data Considered

9.4.1 Background PM₁₀ Concentrations

The estimated annual mean background PM₁₀ (gravimetric) concentration for 2004 is the starting point for the assessment. This data has been mapped for the UK by NETCEN, and can be accessed via the internet (<http://www.aeat.co.uk/netcen/airqual/>). Details of the mapping process can be found on the internet site. The PM₁₀ maps have been prepared based upon a typical 1996 meteorology, and as such represent a worst case scenario. The maps identify local authority boundaries, and zoom in on a particular area of interest in order to get the forecast PM₁₀ concentrations (gravimetric) for 2004.

Projected total background PM₁₀ concentrations for 2004 range from 17.2 µg/m³ to a maximum of 22.3 µg/m³ for the Newtownabbey Borough Council area. For the purpose of this first stage review a concentration of 22.3 µg/m³ will be used in future predictions, thus indicating a worst case scenario.

9.4.2 Road Traffic

The potential significance of PM₁₀ emissions from road traffic is dependent upon a number of factors including the background concentration (for 2004), and traffic conditions such as the traffic flow, speed and HGV mix. The impact of traffic emissions falls off rapidly with increasing distance from the kerbside, and it is also important to take account of where the nearest exposed population will be.

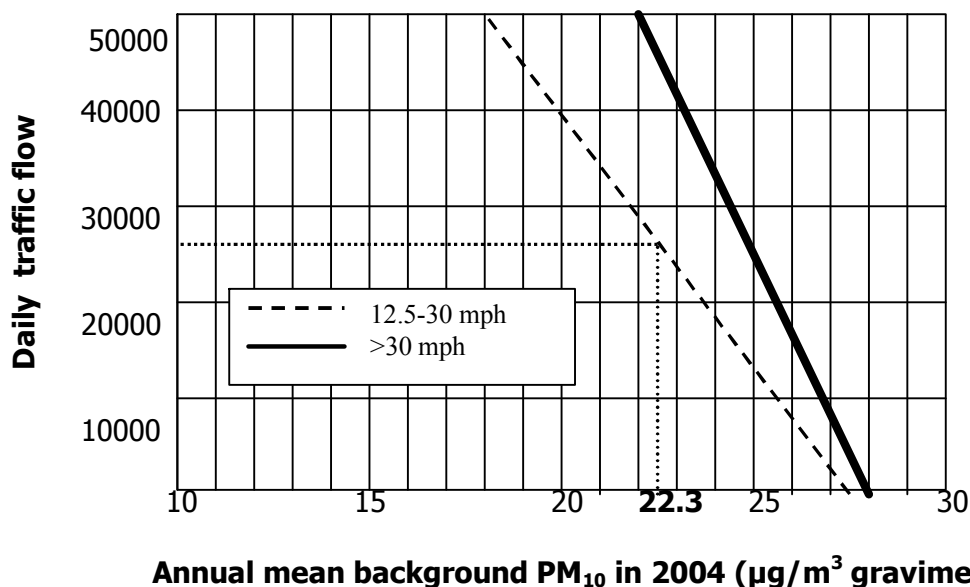
Appendix 7 details traffic data for the Borough.

Two nomograms for a single carriageway road a dual carriageway road or motorway (see Table 6 and 7 below) were used to determine the relationship between daily mean traffic flow, average traffic speed and 2004 background PM₁₀ concentrations and the risk of exceeding the objective for PM₁₀.

Single Carriageway Roads

To establish a threshold for road traffic data which, if exceeded, indicates a need to proceed to second stage review and assessment, the figure of 22.3 µg/m³ as a 2004 background PM₁₀ concentration was applied to Table 6.

Table 6 - Relationship between daily mean traffic flow, annual mean background PM₁₀ (2004) and the risk of exceeding the objective. Single carriageway road, 12 % HGV, receptor location 2 metres from kerbside.



An appropriate average speed of 20 kph (12.5 mph) or 48 kph (30 mph) was chosen and applied for each single carriageway road, giving a threshold of **27,000** vpd.

Appendix 7.7 indicates that there is one single carriageway road with a predicted traffic flow greater than the threshold (27,000 vpd).

Data was not available for the following roads which are considered to have high traffic flows:

- Shore Road – between Station Road and Mill Road
- Monkstown Road
- Ballyclare Road – between Northcott and Glengormley town centre

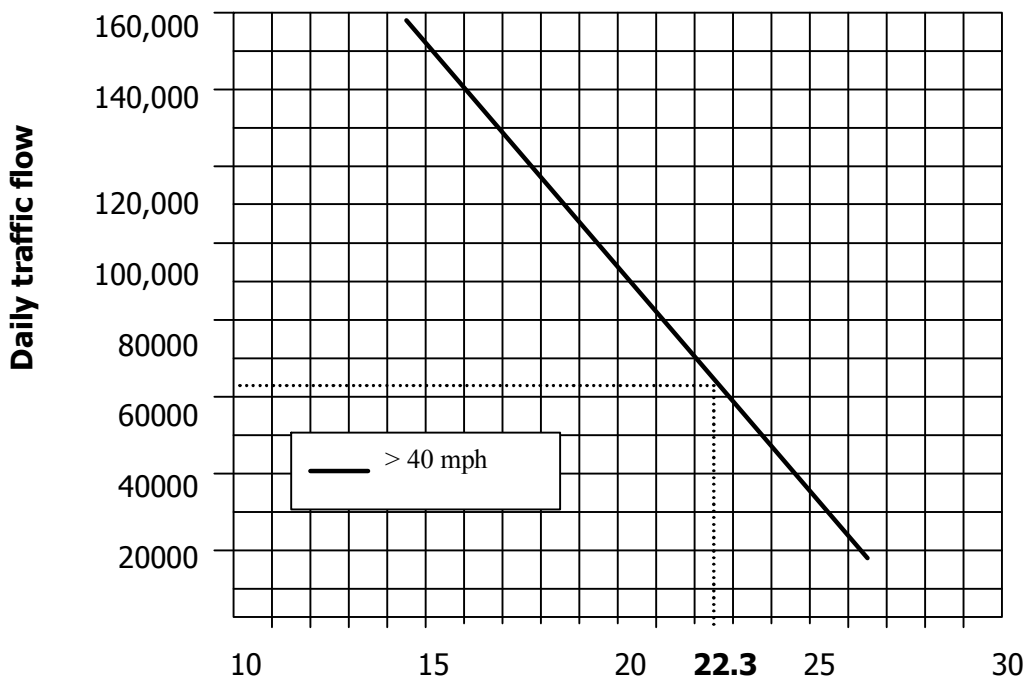
- Carntall Road
- Antrim Road – between Sandyholme Park and O’Neill Road
- Hightown Road – between junction with Mallusk Road and Glengormley town centre
- Doagh Road – between Manse Road and Kings Road
- between O’Neill Road roundabout and Shore Road
- Templepatrick Road – from Old Ballynure Road to NBC boundary at Hagan’s Caravans
- Doagh Village - Station Road
- Main Street
- Burn Road
- Ballymena Road
- Mallusk Road – between Hightown Road and Bernice Road
- Carrickfergus Road – between junction of Straid Road and intersection with A8

It is recommended that these roads be considered at second stage review.

Dual Carriageway Roads/Motorway

To establish a threshold for road traffic data which, if exceeded, indicates a need to proceed to second stage review and assessment, the figure of 22.3 $\mu\text{g}/\text{m}^3$ as a 2004 background PM_{10} concentration was applied to Table 7.

Table 7 - Relationship between daily mean traffic flow, annual mean background PM_{10} (2004) and the risk of exceeding the objective. Dual carriageway, 12% HGV, receptor location 10 metres from kerbside; Motorway, 12% HGV, receptor location 15 metres from hard shoulder.



Annual mean background PM_{10} in 2004 ($\mu\text{g}/\text{m}^3$ gravimetric)

An appropriate average speed of 65 kph (40 mph) was chosen for each dual carriageway road giving a threshold of **63,000 vpd**.

Appendix 7.8 indicates there is one dual carriageway road with a predicted traffic flow greater than the threshold (63,000 vpd).

Junctions

An appropriate average speed of 20 kph (12.5 mph) was chosen for each junction giving a threshold of 27,000 vpd.

Appendix 7.9 indicates there are 21 junctions with predicted traffic flows greater than the threshold (27,000 vpd).

Data was not available for the following junctions, which are also considered to have high traffic flows likely to exceed the threshold level:

- Shore Road/Mill Road
- O'Neill Road/Antrim Road
- Antrim Road/Collinbridge Road
- Mallusk Road/Park Road
- Church Road/Antrim Road/Glenwell Road

It is recommended that these junctions be considered at second stage review.

Other Potentially Sensitive Locations

The guidance states that roads with less than 5,000 vpd are unlikely to have a significant impact and can effectively be ignored. However, for roads with vehicle movements between 5,000 and the screening thresholds, sensitive properties within 2 metres of the kerbside of single carriageway roads, 10 metres of the kerbside of dual carriageway roads or 15 metres from the hard shoulder of a motorway should be subjected to a second stage review, that is, kerbside sites such as the pavements of busy shopping streets and property facades.

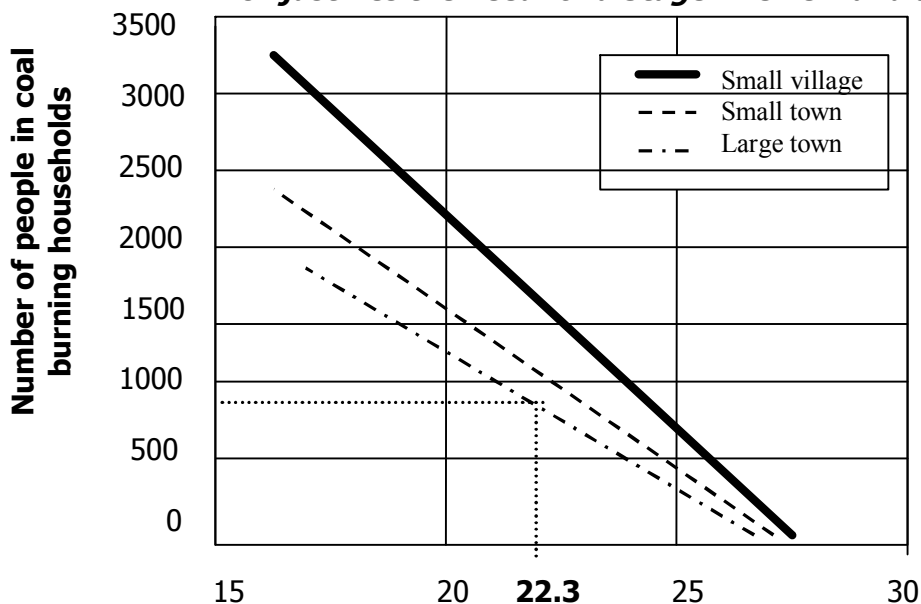
Kerbside/sensitive locations have been identified with traffic flows over the nomogram threshold.

These need to be considered at second stage review. Consideration at second stage review may also have to be given to additional kerbside/sensitive locations.

9.4.3 Domestic Solid Fuel Use

The risk of exceeding PM₁₀ limits within an area may be quickly assessed by calculating the number of people per square kilometre within coal burning households in the area. The calculated number of people in coal burning households may then be compared with the nomogram in Table 8 below.

Table 8 - Estimated density of people in coal burning households per km² which justifies the need for a Stage 2 review and assessment.



Annual mean background PM₁₀ in 2004 (µg/m³ gravimetric)

Residential coal burning data was compiled in accordance with the procedure outlined in Appendix 8.

The density of people in households burning solid fuel is calculated from the equation:

$$D = \frac{P \times C}{(1-L)}$$

where: D = Density of people in households burning solid Fuel.

P = Population of most populated square kilometre in the area.

C = Proportion of households burning coal.

L = Proportion of land occupied by open space.

By applying the values of D (see Appendix 8.2) and the annual mean background PM₁₀ concentration for 2004 (22.3 µg/m³) the nomogram in Table 8 indicates that a density of 850 people living within households burning solid fuel would be necessary to exceed the screening threshold for large towns where the PM₁₀ background concentration is 22.3 µg/m³.

Appendix 8.2 indicates that areas 1,2 and 3 (Ballyclare, Carnmoney and Mossley) exceed this value and there is therefore a need for second stage review and assessment.

9.4.4 Industrial Sources

Appendices 5 and 6 detail the Part A and Part B industrial processes in the Newtownabbey Borough and neighbouring areas.

There are no significant existing or planned Part A processes.

There are 2 significant Part B processes in the Newtownabbey area, James Boyd and Sons (Carnmoney) Limited, 140 Mallusk Road and Home Fuels, Mallusk Park.

One Part A industrial process in Carrickfergus Borough Council area, Kilroot Power Station and one Part A process in the Belfast City Council area, DoE Waste Sludge Incinerator, Dargan Road are potentially significant sources of PM₁₀.

Uncontrolled and Fugitive Emissions

There is a potential for dust emissions within the PM₁₀ size fraction to arise from a variety of uncontrolled and fugitive sources.

Emissions from these sources are not well quantified, and it is therefore difficult to predict PM₁₀ concentrations with any accuracy. The first stage review and assessment is therefore based upon practical experience gained from studies in the vicinity of these types of sources, which provide an indication as to whether a problem is likely to exist or not.

Table 9 - Fugitive Sources of PM₁₀

Fugitive Source	Relevant Locations Within 200 Metres of Working Area	Number of Dust Complaints
Baird's Brae Landfill Site (Phase 1) *	Yes	None
Baird's Brae Landfill Site (Phase 2) **	Yes	Not Applicable
Green Road Landfill Site	No	None
Hightown Quarry Landfill Site	No	None

* Site no longer accepting waste; final capping in progress February 2001. Once seeding and final landscaping completed no potential for dust Complaints.

** This can be considered at future assessments if planning permission is granted.

In all cases it should be noted that these sources will only impact upon the objectives if they are in operation at the end of 2004. Short term construction works do not need to be considered for the purpose of review and assessment. Based on the negligible dust complaints it is unlikely that these fugitive sources of PM₁₀ identified in table 9 are significant but will be kept under review. None are to be considered at second stage review and assessment.

9.4.5 Planned Developments

The Planning Service has indicated there are at least 6 proposed developments within Newtownabbey which are considered to have a potential impact in respect of traffic (Appendix 4).

9.5 **Conclusions on Data Considered**

There is at least one section of single carriageway road, one dual carriageway/motorway and at least 21 junctions which will exceed the projected annual average daily traffic flow thresholds.

There are no significant existing or planned Part A processes within Newtownabbey.

There are 2 significant Part B processes within Newtownabbey.

There is one Part A process identified in the Carrickfergus Borough Council area and one in the Belfast City Council area, which are potentially significant sources of PM₁₀.

There are at least 6 planned developments within Newtownabbey with potential to increase traffic flows by 2004.

The population density in households burning solid fuel is in excess of the Table 8 screening threshold of 850 people in Areas 1, 2 and 3 (Ballyclare, Carnmoney and Mossley).

In view of the above information, there is a risk of the 2004 objective for PM₁₀ being exceeded for road traffic sources which will take account of planned developments, significant Part B processes, 2 neighbouring Part A processes and residential coal burning.

9.5 Recommendations

It is recommended to proceed to a second stage review and assessment for PM₁₀ emissions.

PART TEN – FIRST STAGE REVIEW SUMMARY

POLLUTANT	SIGNIFICANT SOURCES	RECOMMENDATIONS
Carbon Monoxide	<ul style="list-style-type: none"> One Part A process in Belfast City Council area 	Proceed to second stage
Benzene	<ul style="list-style-type: none"> No significant sources 	No further assessment
1,3 Butadiene	<ul style="list-style-type: none"> No significant sources 	No further assessment
Lead	<ul style="list-style-type: none"> Significant Part A process within Newtownabbey Borough 	Proceed to second stage
Nitrogen Dioxide	<ul style="list-style-type: none"> At least 13 sections of single carriageway roads Four dual carriageway/motorways 42 junctions One Part A process in Carrickfergus Borough Council area One Part A process in Belfast City Council area At least 6 planned developments within Newtownabbey 	Proceed to second stage
Sulphur Dioxide	<ul style="list-style-type: none"> At least four 1 x 1 km grid squares within Newtownabbey with potentially more than 300 households burning coal 	Proceed to second stage
PM₁₀	<ul style="list-style-type: none"> One section of single carriageway road One dual carriageway/motorway 26 junctions 2 significant Part B processes within Newtownabbey One Part A process in Carrickfergus Borough Council area One Part A process in Belfast City Council area At least 6 planned developments within Newtownabbey At least three 1 x 1 km squares where the population density in households burning solid fuel is in excess of the screening threshold 	Proceed to second stage

PART ELEVEN – THE WAY FORWARD

The first stage review has identified the following five pollutants which are at risk of exceeding the NAQS objectives by 2005. These pollutants are :-

- Carbon Monoxide (CO)
- Lead
- Nitrogen dioxide (NO₂)
- Sulphur dioxide (SO₂)
- Particulate matter (PM₁₀)

Government guidance indicates that where the risk of exceeding the NAQS objectives has been identified district councils should proceed to carry out a second stage review and assessment.

APPENDIX 1 - GUIDANCE ISSUED BY THE DETR

- **Framework for Review and Assessment of Air Quality. LAQM.GI (00)**
 - sets out the general principles of reviewing and assessing air quality.
- **Developing Local Air Quality Strategies and Action Plans: The Principal Considerations. LAQM.G2 (00)**
 - providing general advice on the principal considerations which should underpin the development of a local air quality strategy and, where necessary, an action plan.
- **Air Quality and Traffic Management. LAQM.G3 (00)**
 - assisting local authorities to extend and refine their traffic management plans so that they contribute to action plans to deal with local poor air quality, and to improve air quality more generally.
- **Air Quality and Land Use Planning. LAQM.G4 (00)**
 - advising on the links between the land use planning system and policies to improve air quality.
- **Review and Assessment: Monitoring Air Quality. LAQM. TG1 (00)**
 - provides guidance on the standards and procedures of ambient air monitoring.
- **Review and Assessment – Estimating Emissions. LAQM. TG2 (00)**
 - focuses on the construction of an atmospheric emissions inventory as a tool which can be used to inform judgements about local air quality.
- **Review and Assessment: Selection and Use of Dispersion Models. LAQM. TG3 (00)**
 - provides guidance on the selection and use of dispersion models.
- **Review and assessment: Pollutant Specific Guidance. LAQM. TG4 (00)**
 - provides advice on approaches that can be adopted to help identify areas at risk of exceeding the air quality objectives.

APPENDIX 2 – THE STAGED APPROACH TO REVIEW AND ASSESSMENT

Stage	Objective	Approach
First Stage Review and Assessment	<p>Identify all significant pollutant sources within or outside of the authority's area.</p> <p>Identify those pollutants where there is a risk of exceeding the objectives, and for which further investigation is needed.</p>	<p>Compile and collate a list of potentially significant pollution sources using the assessment criteria described in this document.</p> <p>Identify sources requiring further investigation.</p>
Second Stage Review and Assessment	<p>Further screening of significant sources to determine whether there is a significant risk of the air quality objectives being exceeded.</p> <p>Identify those pollutants where there is a risk of exceeding the objectives and for which further investigation is needed.</p>	<p>Use of screening models or monitoring methods to assess whether there is a risk of exceeding the air quality objectives.</p> <p>The assessment need only consider those locations where the highest likely concentrations are expected, and where public exposure is relevant.</p>
Third Stage Review and Assessment	<p>Accurate and detailed assessment of both current and future air quality.</p> <p>Assess the likelihood of the air quality objectives being exceeded.</p> <p>Identify the geographical boundary of any exceedances, and description of those areas, if any, proposed to be designated as an AQMA.</p>	<p>Use of validated modelling and quality-assured monitoring methods to determine current and future pollutant concentrations.</p> <p>The assessment will need to consider all locations where public exposure is relevant.</p>

APPENDIX 3 – EXAMPLES OF WHERE THE AIR QUALITY OBJECTIVES SHOULD/SHOULD NOT APPLY

Averaging Period	Objectives Should Apply At	Objectives Should Generally Not Apply At
Annual mean	<p>All background locations where members of the public might be regularly exposed.</p> <p>Building facades of residential properties, schools, hospitals, libraries etc.</p>	<p>Building facades of offices or other places of work where members of the public do not have regular access.</p> <p>Gardens of residential properties.</p> <p>Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.</p>
24 hour mean and 8 hour mean	<p>All locations where the annual mean objective would apply.</p> <p>Gardens of residential properties.</p>	<p>Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.</p>
1 hour mean	<p>All locations where the annual mean and 24 and 8 hour mean objectives apply.</p> <p>Kerbside sites (eg pavements of busy shopping streets).</p> <p>Those parts of car parks and railway stations etc which are not fully enclosed.</p> <p>Any outdoor locations to which the public might reasonably be expected to have access.</p>	<p>Kerbside sites where the public would not be expected to have regular access.</p>
15 minute mean	<p>All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.</p>	

APPENDIX 4 – PLANNED DEVELOPMENTS IN NEWTOWNABBEY AREA

- Abbey Retail Park, Old Church Road – retail
- Ballyhenry Business Park, adjacent to A8 – industrial park
- Maysfield Development, Hightown Road – housing
- Nortel Factory Extension, Monkstown Avenue
- Northcott Development and Link Road, between Antrim Road and Ballyclare Road – redevelopment of shopping centre
- Safeway, Main Street, Ballyclare – new supermarket development

APPENDIX 5 – SIGNIFICANT PART A PROCESSES

The following table gives an indication (X) of those processes most likely to release significant quantities of the specified substances to air.

5.1 Newtownabbey Borough Area

<i>Process</i>	<i>Address</i>	<i>Ben</i>	<i>1,3 But</i>	<i>Pb</i>	<i>CO</i>	<i>SO₂</i>	<i>NO₂</i>	<i>PM₁₀</i>
Lead process	Brett Martin 25 Roughfort Rd Mallusk			X				

5.2 Neighbouring Areas

◆ *Antrim Borough Council*

There are no significant Part A processes.

◆ *Carrickfergus Borough Council*

There are two Part A processes:

Kilroot Power Station

- significant source of NO₂ and PM₁₀ because it is a tall chimney located within 15 km of boundary.

Ulster Industrial Explosives Ltd

- no significance to Newtownabbey area as it is more than 2 km from boundary

◆ *Ballymena Borough Council*

There are no significant Part A processes.

◆ *Belfast City Council*

There are three Part A processes:

DoE Waste Sludge Incinerator

- significant source of CO, NO₂, SO₂ and PM₁₀ because it is a medium sized chimney located less than 5 km from boundary

Irish Fertilizer Industries

- no significance to Newtownabbey area because it is located more than 2 km from boundary.

Belfast West Power Station

- no significance to Newtownabbey area because it is located more than 2 km from boundary

APPENDIX 6 – SIGNIFICANT PART B PROCESSES

6.1 Newtownabbey Borough Area

The following table gives an indication (X) of those processes most likely to release significant quantities of the specified substances to air.

Process	Address	Ben	1,3 But	Pb	CO	SO₂	NO_x	PM₁₀
Quarry	James Boyd & Sons (Carnmoney) Ltd 140 Mallusk Rd, Newtownabbey, BT36 8QN							X
* Blending, packing and loading of bulk cement and associated roadstone coating	RMC Quarries (Ulster) Ltd 1 Sealstown Road Mallusk BT36 8QY					X**		
* Blending, packing and loading of bulk cement	Farrans Ltd Readyuse Concrete Boyds Quarry 140 Mallusk Road Newtownabbey BT36 8QN							
Galvanising	NK Coatings Ltd Michelin Road Mallusk BT36 8PT							
Coal process	Home Fuels Mallusk Park Mallusk Road Newtownabbey BT36 4PP							X

* Located within curtilage of quarry

** Only if process burns heavy fuel oil

It can be seen that one of the blending, packing and loading of bulk cement plants has a roadstone coating plant, for which SO₂ may be a significant pollutant if the process burns coal or heavy fuel oil (NB IPRI have confirmed that no roadstone existing plants use heavy fuel oil in Northern Ireland).

The galvanising plant does not emit any of the specified pollutants.

6.2 Neighbouring Areas

- *Antrim Borough Council*

There is one Part B process:

Ladyhill Quarry

- no significance to Newtownabbey area because it is more than 1 km from boundary

- *Carrickfergus Borough Council*

There are no significant Part B processes.

- *Ballymena Borough Council*

There are four Part B processes:

Clinty Quarry

Craigs Quarry

Tully Quarry

Maxwells Quarry

- no significance to Newtownabbey area because they are all more than 1 km from boundary

- *Belfast City Council*

There are four Part B processes:

Ford

- no significance to Newtownabbey area because it is more than 2 km from boundary

Springvale Foundry

- no significance to Newtownabbey area because it is currently non-operational and unlikely to restart.

Black Mountain Quarry

- no significance to Newtownabbey area because it is more than 1 km from boundary

Shorts, Airport Road

- no significance to Newtownabbey area because it is more than 2 km from boundary

APPENDIX 7 – ROAD TRAFFIC DATA CONSIDERED

Road traffic data has been provided by DoE Roads Service.

Road traffic data 2005 predictions have been based on the DETR National Road Traffic Forecasts (Great Britain) 1997.

Increases from 1998-2001 have been based on a total traffic annual percentage growth rate of 1.74.

Increases from 2001-2005 have been based on a total traffic annual percentage growth rate of 1.69.

These total percentage increases have equated to 8.78% for 2000 data (*) and 12.6% for 1998 road traffic data.

Appendix 7.1 – Traffic Data for Single Carriageway Roads for CO Consideration

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
A2	SN 387	Shore Road South of Jordanstown Road	33,638	-	37,876	48	80,000	No
A6	SN 752	Mallusk Road, West of Scullions Road	21,800*	16	24,547	48	80,000	No
B59	SN 328	Doagh Road at King's Road	21,738	-	24,477	20	80,000	No
	SN 751	Scullions Road	20,764	-	23,380	48	80,000	No
	SN 343	Church Road	20,500	-	23,083	20	80,000	No
	SN 329	Station Road at Old Station Road	17,036	-	19,182	20	80,000	No
	SN 762	Longwood Road	16,102	-	18,131	20	80,000	No
	SN 371	O'Neill Road, Church Road – Doagh Road	14,641	-	16,486	48	80,000	No
B90	SN 377	Old Carrick Road, East of Monkstown Road	13,540	-	15,246	20	80,000	No
B90	SN 715	Old Carrick Road, Monkstown Road – Doagh Road	13,124	-	14,778	48	80,000	No
A2	SN 378	Antrim Road, Northwest of Sandyholme Park	13,060	-	14,706	20	80,000	No
B56	SN 742	Ballyclare Road, South of Manse Road, Glengormley	12,636	-	14,228	20	80,000	No

* 2000 road traffic data.
All other data 1998

Appendix 7.1 (cont'd)

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
A8	SN 753	Larne Road	12,629	-	14,220	48	80,000	No
B59	SN 127	Doagh Road, East of Carntall Road (Earlford Heights)	11,906	-	13,406	20	80,000	No
	SN 743	O'Neill Road, Church Road – Antrim Road	11,767	-	13,250	48	80,000	No
A8	SN 125	Ballynure Road, North of Glen Road	10,561	-	11,892	48	80,000	No
	SN 381	Prince Charles Way, Northwest of Moss Road	10,232	-	11,521	20	80,000	No
B90	SN 397	Manse Road, North of Christine Road	9,658	-	10,875	20	80,000	No
	SN 730	Jordanstown Road, West of Mt Pleasant Road	9,230	-	10,393	20	80,000	No
A8	CP 233	North of Bruslee	9,220	13.0	10,382	48	80,000	No
A57	SN 311	Templepatrick Road, North of Old Ballynure Road	8,279	-	9,322	48	80,000	No
B95	SN 306	Hightown Road at Secondary School	7,875	-	8,867	20	80,000	No
B94	SN 380	Hillhead Road	6,846	-	7,709	48	80,000	No
	SN 011	Upper Hightown Road	6,282*	9.1	6,834	48	80,000	No

* 2000 road traffic data.
All other data 1998

Appendix 7.1 (cont'd)

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
B56	SN 124	Ballyclare Road, East of Mossvale Road	6,259	-	7,048	48	80,000	No
B90	SN 327	Ballyhenry Road, Southwest of Dorchester Drive	6,154	-	6,929	20	80,000	No
B59	SN 747	The Longshot, South of A57	5,893	-	6,635	48	80,000	No
	SN 746	Doagh Road, North of Ballyclare Road at Cemetery	5,202	-	5,857	20	80,000	No
	SN 126	Carnmoney Road North, South of Doagh Road	5,133	-	5,780	20	80,000	No
A2	SN 122	Antrim Road, East of Airport Inn, Templepatrick	4,061	-	4,573	48	80,000	No
B59	SN 379	Doagh Road to Ballyrobert	3,919	-	4,413	48	80,000	No
A6	SN 121	Mallusk Road at Roughfort Village	2,291	-	2,580	48	80,000	No

* 2000 road traffic data.
All other data 1998

Appendix 7.1 (cont'd)

Ballyclare+								
Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
		East Market Square	14,664	-	16,512	20	80,000	No
		Main Street	13,306	-	14,983	20	80,000	No
		Upper Market Square	12,422	-	13,987	20	80,000	No
		Mill Road Main Street	11,026	-	12,415	20	80,000	No
		Market Square	10,953	-	12,333	20	80,000	No
		Lower Market Square	10,159	-	11,439	20	80,000	No
		North End	9,785	-	11,018	20	80,000	No
		Doagh Road (Town Centre)	8,217	-	9,252	20	80,000	No
		Hillhead Road	6,567	-	7,394	20	80,000	No
		Mill Road (Ballynure)	6,466	-	7,274	20	80,000	No
		Lower Rashee Road	5,691	-	6,408	20	80,000	No
		Mill Road from Templepatrick	5,189	-	5,843	20	80,000	No
		Ballynure Road	4,651	-	5,237	20	80,000	No
		Upper Rashee Road	4,068	-	4,581	48	80,000	No
		Green Road	2,563	-	2,886	20	80,000	No
		Avondale Drive	2,188	-	2,464	20	80,000	No

* 2000 road traffic data.
All other data 1998

+ All Ballyclare traffic data provided was 2-way peak hour flow. To obtain the 24 hour AADT the peak hour flow was multiplied as follows:
Peak hour x 0.38 x 24
The factor of 0.38 converts the peak hour flow to an annual average hourly flow (taken from Table 7.2, Transport in the Urban Environment (1997), The Institution of Highways and Transportation)

Appendix 7.2 - Traffic Data for Dual Carriageway Roads/Motorways for CO consideration

Road No.	Census Pt. Or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
M2	CP 016	South of Sandyknowes	65,762*	8.2	71,536	80	140,000	No
M5	CP 017	South of Rushpark	38,470	-	43,317	80	140,000	No
M2	CP 205	Sandyknowes (Junction 4 to Templepatrick)	34,420	-	38,761	80	140,000	No
M5	CP 206	Greencastle to Whiteabbey	30,745	5	34,619	80	140,000	No
A8	SN 130	Ballynure Road, North of Corr's Corner	18,611	-	20,956	80	120,000	No
A8(M)	SN 307	Sandyknowes to Corr's Corner	16,522	-	18,604	80	140,000	No
A8	CP 212	North of Corr's Corner on Dual Carriageway	16,150	-	18,185	80	120,000	No
M2 Onslip	SN 740	M2 Sandyknowes Onslip Inbound	16,152*	12.3	17,570	80	140,000	No
M2 Offslip	SN 741	M2 Sandyknowes Offslip Inbound	15,546*	10	16,911	80	140,000	No

* 2000 road traffic data.
All other data 1998

Appendix 7.3 - Traffic Data for Junctions for CO Consideration

Junction	Roads	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Station Road	Station Road (19,182) Shore Road (M5) (43,317) Shore Road (Jordanstown) (37,876)	62,499	20	80,000	No
Sandyknowes	M2 (32,775) Scullions Road (23,380) Antrim Road (4,573) A8 (M) (18,604) Ballyhenry Road (6,929) Antrim Road (14,706)	50,484*	20	80,000	No
Shore Road/Jordanstown Road	Shore Road (37,876) Jordanstown Road (10,393)	48,269	20	80,000	No
Scullions Road/Mallusk Road	Scullions Road (23,380) Mallusk Road (24,547)	47,857	20	80,000	No
O'Neill Road/Doagh Road	Doagh Road (24,477) Station Road (19,182)	43,659	20	80,000	No
M5	M5 (43,317) Shore Road (Whiteabbey) (No Data)	> 43,317	20	80,000	No
O'Neill Road/Prince Charles Way	Church Road (23,083) O'Neill Road (Doagh Road) (16,486)	39,569	20	80,000	No
A8 Mossley	Doagh Road (13,406) A8 (20,956)	34,362	20	80,000	No
Ballyclare Road/Antrim Road/Hightown Road	Ballyclare Road (14,228) Antrim Road (14,706) Hightown Road (8,867)	28,934	20	80,000	No
A8 Ballyclare Road	A8 (18,185) Ballyclare Road (Mossvale) (7,048)	25,233	20	80,000	No

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flows

☺ Average speed 20 kph used for all junctions

Appendix 7.3 (cont'd)

Junction	Roads	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Mallusk Road/Bernice Road	Mallusk Road (24,547) Bernice Road (No Data)	> 24,547	20	80,000	No
Monkstown Road/Doagh Road	Monkstown Road (No Data) Doagh Road (24,477)	>24,477	20	80,000	No
Ballynure Road/Tempelpatrick Road	Ballynure Road (14,220) Tempelpatrick Road (9,322)	23,542	20	80,000	No
Manse Road/Prince Charles Way	Manse Road (10,875) Prince Charles Way (11,521)	22,396	20	80,000	No
Ballyhenry Roundabout	Ballyclare Road (14,228) Ballyhenry Road (6,929)	21,157	20	80,000	No
Hillhead Road/Ballynure Road	Hillhead Road (7,709) Ballynure Road (11,892)	19,601	20	80,000	No
Doagh Road/Carnmoney Road North	Doagh Road (Earlford Hts) (13,406) Carnmoney Rd North (5,780)	19,186	20	80,000	No
Shore Road/Longwood Road	Shore Road (No Data) Longwood Road (18,131)	> 18,131	20	80,000	No
Carnmoney Road North/Manse Road	Carnmoney Road North (5,780) Manse Road (10,875)	16,655	20	80,000	No
Ballyrobert Road/Tempelpatrick Road	Ballyrobert Road (7,048) Tempelpatrick Road (9,322)	16,370	20	80,000	No
The Longshot/Tempelpatrick Road	The Longshot (6,635) Tempelpatrick Road (9,322)	15,957	20	80,000	No
Monkstown Road/Old Carrick Road	Monkstown Road (No Data) Old Carrick Road (15,246)	> 15,246	20	80,000	No

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flow

☺ Average speed 20 kph used for all junctions

Appendix 7.3 (cont'd)

Junction	Roads	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Templepatrick Road/Mill Road	Templepatrick Road (9,322) Mill Road (5,189)	14,511	20	80,000	No
Ballynure	Ballynure Road (14,220) B58 (No Data)	> 14,220	20	80,000	No
Ballyclare Road/The Longshot	Ballyclare Road (7,048) The Longshot (6,635)	13,683	20	80,000	No
Carntall Road/Doagh Road	Carntall Road (No Data) Doagh Road (13,406)	> 13,406	20	80,000	No
Carntall Road/Ballynure Road	Carntall Road (No Data) Ballynure Road (11,892)	> 11,892	20	80,000	No
Prince Charles Way/Ashgrove Road	Prince Charles Way (11,521) Ashgrove Road (No Data) Burnthill Road (No Data)	> 11,521	20	80,000	No
Manse Road/Doagh Road	Manse Road (10,875) Doagh Road (No Data)	> 10,875	20	80,000	No
Monkstown Road/Jordanstown Road	Monkstown Road (No Data) Jordanstown Road (10,393)	> 10,393	20	80,000	No
Templepatrick Road/Station Road, Doagh	Templepatrick Road (9,322) Station Road (No Data)	>9,322	20	80,000	No
Hightown Road/Mallusk Road	Hightown Road (8,867) Mallusk Road (No Data)	> 8,867	20	80,000	No

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flow

☺ Average speed 20 kph used for all junctions

Appendix 7.3 (cont'd)

Ballyclare				
Junction	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Doagh Road/North End/Market Square	18,587	20	80,000	No
Market Square/Lower Market Square/Main St	18,063	20	80,000	No
Doagh Road/Market Square	17,786	20	80,000	No
Main Street/Mill Road (Main St)/Mill Road (Ballynure)	18,367	20	80,000	No
Hillhead Road/Mill Road (Templepatrick)/Mill Road (Main St)	15,146	20	80,000	No
Doagh – Main Street/Doagh Road/Ballymena Road/Burn Road	> 5,857	20	80,000	No
Green Road/Ballynure Road/Mill Road (Ballynure)	3,748	20	80,000	No

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flow

☺ Average speed 20 kph used for all junctions

Appendix 7.4 - Traffic Data for Single Carriageway Roads for NO₂ consideration

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
A2	SN 387	Shore Road South of Jordanstown Road	33,638	-	37,876	48	22,500	Yes
A6	SN 752	Mallusk Road, West of Scullions Road	21,800*	16	24,547	48	22,500	Yes
B59	SN 328	Doagh Road at King's Road	21,738	-	24,477	20	14,000	Yes
	SN 751	Scullions Road	20,764	-	23,380	48	22,500	Yes
	SN 343	Church Road	20,500	-	23,083	20	14,000	Yes
	SN 329	Station Road at Old Station Road	17,036	-	19,182	20	14,000	Yes
	SN 762	Longwood Road	16,102	-	18,131	20	14,000	Yes
	SN 371	O'Neill Road, Church Road – Doagh Road	14,641	-	16,486	48	22,500	No
B90	SN 377	Old Carrick Road, East of Monkstown Road	13,540	-	15,246	20	14,000	Yes
B90	SN 715	Old Carrick Road, Monkstown Road – Doagh Road	13,124	-	14,778	48	22,500	No
A2	SN 378	Antrim Road, Northwest of Sandyholme Park	13,060	-	14,706	20	14,000	Yes
B56	SN 742	Ballyclare Road, South of Manse Road, Glengormley	12,636	-	14,228	20	14,000	Yes

* 2000 road traffic data.
All other data 1998

Appendix 7.4 (cont'd)

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
A8	SN 753	Larne Road	12,629	-	14,220	48	22,500	No
B59	SN 127	Doagh Road, East of Carntall Road (Earlford Heights)	11,906	-	13,406	20	14,000	No
	SN 743	O'Neill Road, Church Road – Antrim Road	11,767	-	13,250	48	22,500	No
A8	SN 125	Ballynure Road, North of Glen Road	10,561	-	11,892	48	22,500	No
	SN 381	Prince Charles Way, Northwest of Moss Road	10,232	-	11,521	20	14,000	No
B90	SN 397	Manse Road, North of Christine Road	9,658	-	10,875	20	14,000	No
	SN 730	Jordanstown Road, West of Mt Pleasant Road	9,230	-	10,393	20	14,000	No
A8	CP 233	North of Bruslee	9,220	13.0	10,382	48	22,500	No
A57	SN 311	Templepatrick Road, North of Old Ballynure Road	8,279	-	9,322	48	22,500	No
B95	SN 306	Hightown Road at Secondary School	7,875	-	8,867	20	14,000	No
B94	SN 380	Hillhead Road	6,846	-	7,709	48	22,500	No
	SN 011	Upper Hightown Road	6,282*	9.1	6,834	48	22,500	No

* 2000 road traffic data.
All other data 1998

Appendix 7.4 (cont'd)

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
B56	SN 124	Ballyclare Road, East of Mossvale Road	6,259	-	7,048	48	22,500	No
B90	SN 327	Ballyhenry Road, Southwest of Dorchester Drive	6,154	-	6,929	20	14,000	No
B59	SN 747	The Longshot, South of A57	5,893	-	6,635	48	22,500	No
	SN 746	Doagh Road, North of Ballyclare Road at Cemetery	5,202	-	5,857	20	14,000	No
	SN 126	Carnmoney Road North, South of Doagh Road	5,133	-	5,780	20	14,000	No
A2	SN 122	Antrim Road, East of Airport Inn, Templepatrick	4,061	-	4,573	48	22,500	No
B59	SN 379	Doagh Road to Ballyrobert	3,919	-	4,413	48	22,500	No
A6	SN 121	Mallusk Road at Roughfort Village	2,291	-	2,580	48	22,500	No

* 2000 road traffic data.
All other data 1998

Appendix 7.4 (cont'd)

Ballyclare+								
Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
		East Market Square	14,664	-	16,512	20	14,000	Yes
		Main Street	13,306	-	14,983	20	14,000	Yes
		Upper Market Square	12,422	-	13,987	20	14,000	Yes
		Mill Road Main Street	11,026	-	12,415	20	14,000	No
		Market Square	10,953	-	12,333	20	14,000	No
		Lower Market Square	10,159	-	11,439	20	14,000	No
		North End	9,785	-	11,018	20	14,000	No
		Doagh Road (Town Centre)	8,217	-	9,252	20	14,000	No
		Hillhead Road	6,567	-	7,394	20	14,000	No
		Mill Road (Ballynure)	6,466	-	7,274	20	14,000	No
		Lower Rashee Road	5,691	-	6,408	20	14,000	No
		Mill Road from Templepatrick	5,189	-	5,843	20	14,000	No
		Ballynure Road	4,651	-	5,237	20	14,000	No
		Upper Rashee Road	4,068	-	4,581	48	22,500	No
		Green Road	2,563	-	2,886	20	14,000	No
		Avondale Drive	2,188	-	2,464	20	14,000	No

* 2000 road traffic data.
All other data 1998

+ All Ballyclare traffic data provided was 2-way peak hour flow. To obtain the 24 hour AADT the peak hour flow was multiplied as follows:
Peak hour x 0.38 x 24
The factor of 0.38 converts the peak hour flow to an annual average hourly flow (taken from Table 7.2, Transport in the Urban Environment (1997), The Institution of Highways and Transportation)

Appendix 7.5 - Traffic Data for Dual Carriageway Roads/Motorways for NO₂ consideration

Road No.	Census Pt. Or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
M2	CP 016	South of Sandyknowes	65,762*	8.2	71,536	80	30,000	Yes
M5	CP 017	South of Rushpark	38,470	-	43,317	80	30,000	Yes
M2	CP 205	Sandyknowes (Junction 4 to Templepatrick)	34,420	-	38,761	80	30,000	Yes
M5	CP 206	Greencastle to Whiteabbey	30,745	5	34,619	80	30,000	Yes
A8	SN 130	Ballynure Road, North of Corr's Corner	18,611	-	20,956	80	30,000	No
A8(M)	SN 307	Sandyknowes to Corr's Corner	16,522	-	18,604	80	30,000	No
A8	CP 212	North of Corr's Corner on Dual Carriageway	16,150	-	18,185	80	30,000	No
M2 Onslip	SN 740	M2 Sandyknowes Onslip Inbound	16,152*	12.3	17,570	80	30,000	No
M2 Offslip	SN 741	M2 Sandyknowes Offslip Inbound	15,546*	10	16,911	80	30,000	No

* 2000 road traffic data.
All other data 1998

Appendix 7.6 - Traffic Data for Junctions for NO₂ Consideration

Junction	Roads	Total 2005 Prediction	Estimated Average Traffic Speed kph [☺]	Threshold vpd	Second Stage Review Required
Station Road	Station Road (19,182) Shore Road (M5) (43,317) Shore Road (Jordanstown) (37,876)	62,499	20	14,000	Yes
Sandyknowes	M2 (32,775) Scullions Road (23,380) Antrim Road (4,573) A8 (M) (18,604) Ballyhenry Road (6,929) Antrim Road (14,706)	50,484*	20	14,000	Yes
Shore Road/Jordanstown Road	Shore Road (37,876) Jordanstown Road (10,393)	48,269	20	14,000	Yes
Scullions Road/Mallusk Road	Scullions Road (23,380) Mallusk Road (24,547)	47,857	20	14,000	Yes
O'Neill Road/Doagh Road	Doagh Road (24,477) Station Road (19,182)	43,659	20	14,000	Yes
M5	M5 (43,317) Shore Road (Whiteabbey) (No Data)	> 43,317	20	14,000	Yes
O'Neill Road/Prince Charles Way	Church Road (23,083) O'Neill Road (Doagh Road) (16,486)	39,569	20	14,000	Yes
A8 Mossley	Doagh Road (13,406) A8 (20,956)	34,362	20	14,000	Yes
Ballyclare Road/Antrim Road/Hightown Road	Ballyclare Road (14,228) Antrim Road (14,706) Hightown Road (8,867)	28,934	20	14,000	Yes
A8 Ballyclare Road	A8 (18,185) Ballyclare Road (Mossvale) (7,048)	25,233	20	14,000	Yes
Mallusk Road/Bernice Road	Mallusk Road (24,547) Bernice Road (No Data)	> 24,547	20	14,000	Yes

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flows

☺ Average speed 20 kph used for all junctions

Appendix 7.6 (cont'd)

Junction	Roads	Total 2005 Prediction	Estimated Average Traffic Speed kph [☺]	Threshold vpd	Second Stage Review Required
Monkstown Road/Doagh Road	Monkstown Road (No Data) Doagh Road (24,477)	>24,477	20	14,000	Yes
Ballynure Road/Tempelpatrick Road	Ballynure Road (14,220) Tempelpatrick Road (9,322)	23,542	20	14,000	Yes
Manse Road/Prince Charles Way	Manse Road (10,875) Prince Charles Way (11,521)	22,396	20	14,000	Yes
Ballyhenry Roundabout	Ballyclare Road (14,228) Ballyhenry Road (6,929)	21,157	20	14,000	Yes
Hillhead Road/Ballynure Road	Hillhead Road (7,709) Ballynure Road (11,892)	19,601	20	14,000	Yes
Doagh Road/Carnmoney Road North	Doagh Road (Earlford Hts) (13,406) Carnmoney Rd North (5,780)	19,186	20	14,000	Yes
Shore Road/Longwood Road	Shore Road (No Data) Longwood Road (18,131)	> 18,131	20	14,000	Yes
Carnmoney Road North/Manse Road	Carnmoney Road North (5,780) Manse Road (10,875)	16,655	20	14,000	Yes
Ballyrobert Road/Tempelpatrick Road	Ballyrobert Road (7,048) Tempelpatrick Road (9,322)	16,370	20	14,000	Yes
The Longshot/Tempelpatrick Road	The Longshot (6,635) Tempelpatrick Road (9,322)	15,957	20	14,000	Yes
Monkstown Road/Old Carrick Road	Monkstown Road (No Data) Old Carrick Road (15,246)	> 15,246	20	14,000	Yes
Tempelpatrick Road/Mill Road	Tempelpatrick Road (9,322) Mill Road (5,189)	14,511	20	14,000	Yes

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flows

☺ Average speed 20 kph used for all junctions

Appendix 7.6 (cont'd)

Junction	Roads	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Ballynure	Ballynure Road (14,220) B58 (No Data)	> 14,220	20	14,000	Yes
Ballyclare Road/The Longshot	Ballyclare Road (7,048) The Longshot (6,635)	13,683	20	14,000	No
Carntall Road/Doagh Road	Carntall Road (No Data) Doagh Road (13,406)	> 13,406	20	14,000	Yes♣
Carntall Road/Ballynure Road	Carntall Road (No Data) Ballynure Road (11,892)	> 11,892	20	14,000	Yes♣
Prince Charles Way/Ashgrove Road	Prince Charles Way (11,521) Ashgrove Road (No Data) Burnthill Road (No Data)	> 11,521	20	14,000	Yes♣
Manse Road/Doagh Road	Manse Road (10,875) Doagh Road (No Data)	> 10,875	20	14,000	Yes♣
Monkstown Road/Jordanstown Road	Monkstown Road (No Data) Jordanstown Road (10,393)	> 10,393	20	14,000	Yes♣
Templepatrick Road/Station Road, Doagh	Templepatrick Road (9,322) Station Road (No Data)	>9,322	20	14,000	Yes♣
Hightown Road/Mallusk Road	Hightown Road (8,867) Mallusk Road (No Data)	> 8,867	20	14,000	Yes♣

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flow

☺ Average speed 20 kph used for all junctions

Appendix 7.6 (cont'd)

Ballyclare				
Junction	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Doagh Road/North End/Market Square	18,587	20	14,000	Yes
Market Square/Lower Market Square/Main St	18,063	20	14,000	Yes
Doagh Road/Market Square	17,786	20	14,000	Yes
Main Street/Mill Road (Main St)/Mill Road (Ballynure)	18,367	20	14,000	Yes
Hillhead Road/Mill Road (Templepatrick)/Mill Road (Main St)	15,146	20	14,000	Yes
Doagh – Main Street/Doagh Road/Ballymena Road/Burn Road	> 5,857	20	14,000	Yes♣
Green Road/Ballynure Road/Mill Road (Ballynure)	3,748	20	14,000	No

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flow

☺ Average speed 20 kph used for all junctions

Appendix 7.7 - Traffic Data for Single Carriageway Roads for PM₁₀ consideration

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
A2	SN 387	Shore Road South of Jordanstown Road	33,638	-	37,876	48	27,000	Yes
A6	SN 752	Mallusk Road, West of Scullions Road	21,800*	16	24,547	48	27,000	No
B59	SN 328	Doagh Road at King's Road	21,738	-	24,477	20	27,000	No
	SN 751	Scullions Road	20,764	-	23,380	48	27,000	No
	SN 343	Church Road	20,500	-	23,083	20	27,000	No
	SN 329	Station Road at Old Station Road	17,036	-	19,182	20	27,000	No
	SN 762	Longwood Road	16,102	-	18,131	20	27,000	No
	SN 371	O'Neill Road, Church Road – Doagh Road	14,641	-	16,486	48	27,000	No
B90	SN 377	Old Carrick Road, East of Monkstown Road	13,540	-	15,246	20	27,000	No
B90	SN 715	Old Carrick Road, Monkstown Road – Doagh Road	13,124	-	14,778	48	27,000	No
A2	SN 378	Antrim Road, Northwest of Sandyholme Park	13,060	-	14,706	20	27,000	No
B56	SN 742	Ballyclare Road, South of Manse Road, Glengormley	12,636	-	14,228	20	27,000	No

* 2000 road traffic data.
All other data 1998

Appendix 7.7 (cont'd)

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
A8	SN 753	Larne Road	12,629	-	14,220	48	27,000	No
B59	SN 127	Doagh Road, East of Carntall Road (Earlford Heights)	11,906	-	13,406	20	27,000	No
	SN 743	O'Neill Road, Church Road – Antrim Road	11,767	-	13,250	48	27,000	No
A8	SN 125	Ballynure Road, North of Glen Road	10,561	-	11,892	48	27,000	No
	SN 381	Prince Charles Way, Northwest of Moss Road	10,232	-	11,521	20	27,000	No
B90	SN 397	Manse Road, North of Christine Road	9,658	-	10,875	20	27,000	No
	SN 730	Jordanstown Road, West of Mt Pleasant Road	9,230	-	10,393	20	27,000	No
A8	CP 233	North of Bruslee	9,220	13.0	10,382	48	27,000	No
A57	SN 311	Templepatrick Road, North of Old Ballynure Road	8,279	-	9,322	48	27,000	No
B95	SN 306	Hightown Road at Secondary School	7,875	-	8,867	20	27,000	No
B94	SN 380	Hillhead Road	6,846	-	7,709	48	27,000	No
	SN 011	Upper Hightown Road	6,282*	9.1	6,834	48	27,000	No

* 2000 road traffic data.
All other data 1998

Appendix 7.7 (cont'd)

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
B56	SN 124	Ballyclare Road, East of Mossvale Road	6,259	-	7,048	48	27,000	No
B90	SN 327	Ballyhenry Road, Southwest of Dorchester Drive	6,154	-	6,929	20	27,000	No
B59	SN 747	The Longshot, South of A57	5,893	-	6,635	48	27,000	No
	SN 746	Doagh Road, North of Ballyclare Road at Cemetery	5,202	-	5,857	20	27,000	No
	SN 126	Carnmoney Road North, South of Doagh Road	5,133	-	5,780	20	27,000	No
A2	SN 122	Antrim Road, East of Airport Inn, Templepatrick	4,061	-	4,573	48	27,000	No
B59	SN 379	Doagh Road to Ballyrobert	3,919	-	4,413	48	27,000	No
A6	SN 121	Mallusk Road at Roughfort Village	2,291	-	2,580	48	27,000	No

* 2000 road traffic data.
All other data 1998

Appendix 7.7 (cont'd)

Ballyclare+								
Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
		East Market Square	14,664	-	16,512	20	27,000	No
		Main Street	13,306	-	14,983	20	27,000	No
		Upper Market Square	12,422	-	13,987	20	27,000	No
		Mill Road Main Street	11,026	-	12,415	20	27,000	No
		Market Square	10,953	-	12,333	20	27,000	No
		Lower Market Square	10,159	-	11,439	20	27,000	No
		North End	9,785	-	11,018	20	27,000	No
		Doagh Road (Town Centre)	8,217	-	9,252	20	27,000	No
		Hillhead Road	6,567	-	7,394	20	27,000	No
		Mill Road (Ballynure)	6,466	-	7,274	20	27,000	No
		Lower Rashee Road	5,691	-	6,408	20	27,000	No
		Mill Road from Templepatrick	5,189	-	5,843	20	14,000	No
		Ballynure Road	4,651	-	5,237	20	27,000	No
		Upper Rashee Road	4,068	-	4,581	48	27,000	No
		Green Road	2,563	-	2,886	20	27,000	No
		Avondale Drive	2,188	-	2,464	20	14,000	No

* 2000 road traffic data.
All other data 1998

+ All Ballyclare traffic data provided was 2-way peak hour flow. To obtain the 24 hour AADT the peak hour flow was multiplied as follows:
Peak hour x 0.38 x 24
The factor of 0.38 converts the peak hour flow to an annual average hourly flow (taken from Table 7.2, Transport in the Urban Environment (1997), The Institution of Highways and Transportation)

Appendix 7.8 - Traffic Data for Dual Carriageway Roads/Motorways for PM₁₀ Consideration

Road No.	Census Pt. or Site No.	Location	24 hr AADT	% HGV	2005 Prediction	Estimated Average Traffic Speed kph	Threshold vpd	Second Stage Review Required
M2	CP 016	South of Sandyknowes	65,762*	8.2	71,536	65	63,000	Yes
M5	CP 017	South of Rushpark	38,470	-	43,317	65	63,000	No
M2	CP 205	Sandyknowes (Junction 4 to Templepatrick)	34,420	-	38,761	65	63,000	No
M5	CP 206	Greencastle to Whiteabbey	30,745	5	34,619	65	63,000	No
A8	SN 130	Ballynure Road, North of Corr's Corner	18,611	-	20,956	65	63,000	No
A8(M)	SN 307	Sandyknowes to Corr's Corner	16,522	-	18,604	65	63,000	No
A8	CP 212	North of Corr's Corner on Dual Carriageway	16,150	-	18,185	65	63,000	No
M2 Onslip	SN 740	M2 Sandyknowes Onslip Inbound	16,152*	12.3	17,570	65	63,000	No
M2 Offslip	SN 741	M2 Sandyknowes Offslip Inbound	15,546*	10	16,911	65	63,000	No

* 2,000 road traffic data
All other data 1998

Appendix 7.9 - Traffic Data for Junctions for PM₁₀ Consideration

Junction	Roads	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Station Road	Station Road (19,182) Shore Road (M5) (43,317) Shore Road (Jordanstown) (37,876)	62,499	20	27,000	Yes
Sandyknowes	M2 (32,775) Scullions Road (23,380) Antrim Road (4,573) A8 (M) (18,604) Ballyhenry Road (6,929) Antrim Road (14,706)	50,484*	20	27,000	Yes
Shore Road/Jordanstown Road	Shore Road (37,876) Jordanstown Road (10,393)	48,269	20	27,000	Yes
Scullions Road/Mallusk Road	Scullions Road (23,380) Mallusk Road (24,547)	47,857	20	27,000	Yes
O'Neill Road/Doagh Road	Doagh Road (24,477) Station Road (19,182)	43,659	20	27,000	Yes
M5	M5 (43,317) Shore Road (Whiteabbey) (No Data)	> 43,317	20	27,000	Yes
O'Neill Road/Prince Charles Way	Church Road (23,083) O'Neill Road (Doagh Road) (16,486)	39,569	20	27,000	Yes
A8 Mossley	Doagh Road (13,406) A8 (20,956)	34,362	20	27,000	Yes
Ballyclare Road/Antrim Road/Hightown Road	Ballyclare Road (14,228) Antrim Road (14,706) Hightown Road (8,867)	28,934	20	27,000	Yes
A8 Ballyclare Road	A8 (18,185) Ballyclare Road (Mossvale) (7,048)	25,233	20	27,000	No

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flows

☺ Average speed 20 kph used for all junctions

Appendix 7.9 (cont'd)

Junction	Roads	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Mallusk Road/Bernice Road	Mallusk Road (24,547) Bernice Road (No Data)	> 24,547	20	27,000	Yes
Monkstown Road/Doagh Road	Monkstown Road (No Data) Doagh Road (24,477)	>24,477	20	27,000	Yes
Ballynure Road/Tempelpatrick Road	Ballynure Road (14,220) Tempelpatrick Road (9,322)	23,542	20	27,000	No
Manse Road/Prince Charles Way	Manse Road (10,875) Prince Charles Way (11,521)	22,396	20	27,000	No
Ballyhenry Roundabout	Ballyclare Road (14,228) Ballyhenry Road (6,929)	21,157	20	27,000	No
Hillhead Road/Ballynure Road	Hillhead Road (7,709) Ballynure Road (11,892)	19,601	20	27,000	No
Doagh Road/Carnmoney Road North	Doagh Road (Earlford Hts) (13,406) Carnmoney Rd North (5,780)	19,186	20	27,000	No
Shore Road/Longwood Road	Shore Road (No Data) Longwood Road (18,131)	> 18,131	20	27,000	Yes
Carnmoney Road North/Manse Road	Carnmoney Road North (5,780) Manse Road (10,875)	16,655	20	27,000	No
Ballyrobert Road/Tempelpatrick Road	Ballyrobert Road (7,048) Tempelpatrick Road (9,322)	16,370	20	27,000	No
The Longshot/Tempelpatrick Road	The Longshot (6,635) Tempelpatrick Road (9,322)	15,957	20	27,000	No

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flows

☺ Average speed 20 kph used for all junctions

Appendix 7.9 (cont'd)

Junction	Roads	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Monkstown Road/Old Carrick Road	Monkstown Road (No Data) Old Carrick Road (15,246)	> 15,246	20	27,000	Yes♣
Templepatrick Road/Mill Road	Templepatrick Road (9,322) Mill Road (5,189)	14,511	20	27,000	No
Ballynure	Ballynure Road (14,220) B58 (No Data)	> 14,220	20	27,000	Yes♣
Ballyclare Road/The Longshot	Ballyclare Road (7,048) The Longshot (6,635)	13,683	20	27,000	No
Carntall Road/Doagh Road	Carntall Road (No Data) Doagh Road (13,406)	> 13,406	20	27,000	Yes♣
Carntall Road/Ballynure Road	Carntall Road (No Data) Ballynure Road (11,892)	> 11,892	20	27,000	Yes♣
Prince Charles Way/Ashgrove Road	Prince Charles Way (11,521) Ashgrove Road (No Data) Burnthill Road (No Data)	> 11,521	20	27,000	Yes♣
Manse Road/Doagh Road	Manse Road (10,875) Doagh Road (No Data)	> 10,875	20	27,000	Yes♣
Monkstown Road/Jordanstown Road	Monkstown Road (No Data) Jordanstown Road (10,393)	> 10,393	20	27,000	No
Templepatrick Road/Station Road, Doagh	Templepatrick Road (9,322) Station Road (No Data)	>9,322	20	27,000	Yes♣
Hightown Road/Mallusk Road	Hightown Road (8,867) Mallusk Road (No Data)	> 8,867	20	27,000	Yes♣

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flows

☺ Average speed 20 kph used for all junctions

Appendix 7.9 (cont'd)

Ballyclare				
Junction	Total 2005 Prediction	Estimated Average Traffic Speed kph☺	Threshold vpd	Second Stage Review Required
Doagh Road/North End/Market Square	18,587	20	27,000	No
Market Square/Lower Market Square/Main St	18,063	20	27,000	No
Doagh Road/Market Square	17,786	20	27,000	No
Main Street/Mill Road (Main St)/Mill Road (Ballynure)	18,367	20	27,000	No
Hillhead Road/Mill Road (Templepatrick)/Mill Road (Main St)	15,146	20	27,000	No
Doagh – Main Street/Doagh Road/Ballymena Road/Burn Road	> 5,857	20	27,000	Yes♣
Green Road/Ballynure Road/Mill Road (Ballynure)	3,748	20	27,000	No

* 50% of total 2-way traffic flows

♣ Traffic data not available for all road junctions but considered to have high traffic flows

☺ Average speed 20 kph used for all junctions

APPENDIX 8 – RESIDENTIAL COAL BURNING DATA

Residential coal burning data was compiled by:

1. Selecting eight 1 x 1 km squares throughout the Borough.
2. From this eight, selecting four 1 x 1 km squares which were considered the most densely populated.
3. Counting the total number of houses in each area from maps and location visits.
4. Extracting from Northern Ireland Housing Executive data fuel usage within NIHE properties.
5. Applying a figure of 25% to privately owned domestic property to obtain a coal burning estimate.
6. Determining open space percentage from a visual assessment of the maps.

Appendix 8.1 – Number of Houses Burning Coal within 1 x 1 km grid squares

1 x 1 km Grid No.	Area Covered	Total Number of Houses			Coal Burning		
		NI Housing Executive	Other	Total	NI Housing Executive	Other	Total
1	Ballyclare	403	947	1350	183	237	420
2	Carnmoney	100	1854	1954	54	464	518
3	Mossley	756	566	1322	380	142	522
4	Rathcoole	1668	362	2030	758	91	849

Appendix 8.2 – Assessment of Domestic Solid Fuel Burning

1x1 km Grid No.	Area Covered	Population of sq km in the area (P) (P = Total Houses x 2.7#)	Proportion of Open Land Space (L)	Proportion of households burning coal (C)	Density of people in households burning solid fuel (D) (D = $\frac{P \times C}{1-L}$)	Threshold from Fig.9.3 max. density	Does max. density exceed actual density (D)	Proceed to second/ third stage R & A.
1	Ballyclare	3645	0.4	0.31	1883	850	Yes	Yes
2	Carnmoney	5276	0.1	0.265	1553	850	Yes	Yes
3	Mossley*	3569	0.65	0.22	2243	850	Yes	Yes
4	Rathcoole**	5481	0.2	0.042	288	850	No	No

* Partial smoke control area

** Total smoke control area

Figure applied by similar large provincial town in Northern Ireland

In smoke control areas it was assumed that 10% of households that burn solid fuel in the area burn unauthorised coal

