THE ENVIRONMENT ACT 1995

AIR QUALITY ACTION PLAN FOR THE

DISTRICT OF BOLSOVER

AIR QUALITY MANAGEMENT AREA

ANGELA BOSTOCK

POLLUTION CONTROL OFFICER

Environmental Health and Housing Department
The District of Bolsover
Sherwood Lodge
Bolsover
Derbyshire
S44 6NF

August 2004

Contact Details

The District of Bolsover

Author and Officer contact:-

Angela Bostock
Pollution Control Officer
Environmental Health and Housing Department
Sherwood Lodge
Bolsover
Derbyshire
S44 6NF

Tel:- 01246-242304
Fax:- 01246-242424
e-mail:- angela.bostock@bolsover.gov.uk

www.bolsover.gov.uk

CONTENTS PAGE NO

EXECUTIVE SUMMARY

Part IV of the Environment Act 1995 requires Local Authorities to review and assess Local Air Quality.

The National Air Quality Strategy fulfils the requirement under the Environment Act 1995 for a national air quality strategy which sets out policies for managing ambient air quality.

The Strategy sets out a series of standards and objectives to enable air quality to be measured and assessed. The Air Quality Regulations 2000 prescribe air quality objectives for key pollutants.

In areas where it is predicted that air quality objectives will be exceeded, Local Authorities are required to declare an Air Quality Management Area (AQMA).

The Authority's Stage 3 Local Air Quality Review and Assessment highlighted an area where the annual mean objective for nitrogen dioxide was predicted to be exceeded by the target date, 2005. In December 2001, an area encompassing nine residential properties on Carter Lane East, South Normanton, adjacent to the M1 motorway was designated an Air Quality Management Area.

Section 84(1) of the Act requires an Authority which has designated an Air Quality Management Area (AQMA) to undertake a further assessment, Stage 4, of air quality within the AQMA.

The Stage 4 assessment confirms the Stage 3 findings. However, the predicted area of exceedance has increased from nine to twelve residential properties. The report recommends that the boundary of the existing AQMA is extended to include the additional 3 properties.

In parallel with the Stage 4 assessment Local Authorities are required to produce an Action Plan detailing the measures it intends to take in pursuit of the air quality objectives.

Within this report we have considered four options for improving air quality within the AQMA. Options have been assessed in terms of cost effectiveness, feasibility, air quality improvements and non air quality impacts.

Actions have been identified which Bolsover District Council will take in pursuit of the air quality objective.

1. INTRODUCTION AND AIMS OF ACTION PLAN

1.1 Introduction

Under Part IV of the Environment Act 1995 Local Authorities are required to undertake a review and assessment of local air quality.

The National Air Quality Strategy fulfils the requirements under the Environment Act 1995 for a national air quality strategy which sets out policies for managing ambient air quality. The primary objective of the strategy is to ensure a level of ambient air quality in public places which poses no significant risk to health or quality of life. It sets health-based standards for 8 key pollutants and objectives for achieving them:-

1. benzene
2. 1,3 butadiene
3. carbon monoxide
4. lead
5. nitrogen dioxide
6. particles (PM_{10})
7. sulphur dioxide
8. ozone

Local Authorities are required to consider pollutants 1 to 7 where as the eight pollutant, ozone, is to be addressed at national level.

Section 82 of the Environment Act 1995 requires Local Authorities to review and assess current and future air quality against the standards and objectives. Section 83 requires Local Authorities to declare Air Quality Management Areas (AQMAs) where it is predicted that air quality objectives will not be met by the target date. Section 84 requires Local Authorities to undertake a further detailed assessment (Stage 4) within the (AQMAs) and to produce an Action Plan detailing the measures it intends to take in pursuit of the air quality objectives.

The Authority's Stage 3 Local Air Quality Review and Assessment highlighted an area where the annual mean objective for nitrogen dioxide was predicted to be exceeded by the target date 2005. In December 2001 an area encompassing nine residential properties on Carter Lane East, South Normanton, Derbyshire adjacent to the M1 motorway was designated an Air Quality Management Area (AQMA), Figure 1.

Following declaration of the AQMA the Authority undertook a further detailed assessment, Stage 4, of air quality within the AQMA. The Stage 4 report confirms the findings of the Stage 3 report but in addition highlights a further area of exceedance on Carter Lane East, South Normanton. It recommends that the existing boundary of the AQMA is extended to include a further 3 properties.

In accordance with Section 84 of the Environment Act 1995 the Authority is required to prepare an Action Plan. This report represents Bolsover District Council's Action Plan which details the measures it intends to take in pursuit of the air quality objectives.

1.2 Aims and Objectives

Action planning provides the practical opportunity for improving local air quality in an area where the assessment has shown that national measures will be insufficient to meet relevant air quality objectives.

Guidance produced by the Department for Environment Food and Rural Affairs, DEFRA[1] states that an air quality action plan must include the following:

- quantification of the source contributions to the predicted exceedances of the objectives; this will allow the action plan measures to be effectively targeted;
- evidence that all available options have been considered on the grounds of cost – effectiveness and feasibility;
- how the local authority will use its powers and also work in conjunction with other organisations in **pursuit** of the Air Quality Objectives;
- quantification of the expected impacts of the proposed measures and, where possible, an indication as to whether the measures will be sufficient to meet the Air Quality Objectives; and
- how the local authority intends to monitor and evaluate the effectiveness of the plan.

Air quality action plans ultimately provide the mechanism by which local authorities, in collaboration with national agencies and others, will state their intentions for working towards the air quality objectives through the use of the powers they have available.

[1] Local Air Quality Management Policy Guidance LAQM PG (03)

The objective of the Action Plan is to reduce ambient levels of nitrogen dioxide (NO_2) within the District of Bolsover Air Quality Management Area to a level which will achieve the air quality objective by 31st December 2005.

2. SOURCES OF AIR POLLUTION WITHIN THE AQMA

An Air Quality Management Area was declared due to a predicted exceedance of the annual mean objective for nitrogen dioxide (NO_2).

2.1 Summary of Stage 4 Findings

- the maximum predicted concentration of annual average NO_2 within the AQMA at a building façade is 49.0 μgm^{-3} in 2005. The air quality objective is 40μgm^{-3}.

- a 9 μgm^{-3} improvement to the annual mean is required in order to comply with the NO_2 objective.

- results of source apportionment work show that HDV class vehicles (heavy duty vehicles) are the largest contributors to oxides of nitrogen (NO_x) in the AQMA area, contributing 81% with the LDV vehicle class (light duty vehicles) contributing 19%.

- the dominant source of NO_2 at the AQMA is motorway traffic. At the point of worst impact motorway type traffic contributes 97% of traffic generated NO_x, 90% of which originated from the main carriageways.

- the maximum reduction of NO_x required within the AQMA is 42μgm^{-3} which represents a reduction of 28%.

Road traffic emissions are the dominant source of NO_x affecting the AQMA and should therefore be the primary focus for the Action Plan.

2.2 Health Effects of Nitrogen Dioxide

Nitrogen dioxide (NO_2) and nitric oxide (NO) are both oxides of nitrogen and are collectively referred to as nitrogen oxides (NO_x). All combustion processes produce 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. It is nitrogen dioxide that is associated with adverse effects upon human health .

At relatively high concentrations, nitrogen dioxide causes inflammation of the airways. There is evidence to show that long-term exposure to nitrogen dioxide may affect lung function and that exposure to nitrogen dioxide enhances the response to allergens in sensitised individuals.

The principal source of nitrogen oxide emissions is road transport, accounting for around 49% of total UK emissions in 2000. Major roads carrying large volumes of high speed traffic (such as motorways and other primary routes) are a predominant source, as are conurbations and city centres with congested traffic.

3. IMPROVEMENT OF AIR QUALITY WITHIN THE AQMA

3.1 Liaison with the Highways Agency

As referred to in section 2.1 the dominant source of NO_2 at the AQMA is motorway traffic. The Highways Agency is the network operator for England's trunk roads, including motorways, being responsible for operating, maintaining and improving the network. Actions to reduce contributions of NO_2 from motorway traffic fall outside the Local Authority's remit. The role of the Authority is to liaise and work with the Highways Agency in developing an Action Plan.

Meetings with Highways Agency representatives took place in July and August 2003 with a view to briefing the Highways Agency of the Stage 4 findings and to discuss a way forward for the Action Plan. Consultation on the draft Stage 4 report took place from the end of July to the end of September 2003. The Highways Agency's response to the consultation and discussions regarding the Action Plan is shown in Appendix 1.

3.2 Options considered for air quality improvement within the AQMA

Four options have been considered for reducing the levels of ambient nitrogen dioxide within the AQMA.

3.2.1 Option 1 – Motorway Speed Strategy

Objectives

To reduce emissions through speed regulation, rather than flow of vehicles. To be implemented on either a blanket speed limit or a variable limit depending on traffic flow and time of day.

Non Air Quality Impacts

- May reduce ambient noise levels
- May improve safety along the stretch of M1
- Reduced fuel consumption and beneficial effects on carbon dioxide emissions and fossil fuel reserves.
- Possible increased journey times, economic consequences particularly for businesses.

Cost effectiveness

Dependent on actual strategy employed. Variable speed limits costly to implement and enforce. Blanket speed limit likely to be more cost effective but would still require effective enforcement.

Air Quality Improvements

May have some beneficial effects on concentrations during free flow periods but if periods of congestion remain this is likely to have limited effect on the annual average NO_2 concentration. Junction 28 is often subject to queuing traffic therefore coupled with the costs of implementing this option, it would not be feasible. Potential to increase capacity therefore having the opposite effect to what was desired.

Perceptions

May be perceived as a restriction on freedom to travel and will only be effective where enforcement is undertaken and resources are made available.

Cost and Feasibility

Requires enforcement to be effective. Unlikely to be implemented due to costs incurred by Highways Agency in light of proposals to widen the motorway (see Highways Agency correspondence, Appendix 1).

3.2.2 Option 2 – Reductions in Traffic Volume

Objectives

To reduce overall emissions and thereby assist in improving ambient air quality.

Non Air Quality Impacts

- May reduce ambient noise levels
- May improve safety along the stretch of M1
- May reduce climate change gas emissions
- Displaced traffic to other routes may have adverse safety, air quality or climate change impacts in other areas.

Cost effectiveness

Variable depending on actual measures implemented.

Air Quality Improvements

Likely to be reasonably good **if** reductions are achieved. However, reductions in emissions will not be proportionate with pollutant concentration reductions.

Perceptions

May be regarded as a restriction on freedom to travel. May be positively perceived if the improvement is noticeable and alternatives to car use are made available.

Cost and Feasibility

Stage 4 findings show that HDV's are the largest contributors, 81% of NO_x. Not feasible in practice to achieve large reductions in HDV's on the M1. Potential knock on effects due to displaced traffic. Reductions in traffic volume on other nearby roads would have little impact on reducing levels in the AQMA since 97% of the traffic generated NO_x arises from the motorway.

3.2.3 **Option 3 – Compulsory Purchase Order (CPO)**

Objectives

To remove specific exposure.

Non Air Quality Impacts

- Socio – economic impacts
- May be beneficial to residents if factors such as noise are evident

Cost effectiveness

One-off cost implication, however, 12 properties involved so considerable cost incurred, if acquired by the Local Authority.

Air Quality Improvements

None

Perceptions

Likely to be negative if occupants do not wish to move from current location. Impact on remaining properties on Carter Lane East.

Cost and Feasibility

Not feasible for the Local Authority to execute CPO's on 12 properties. Costs would be excessive when set against the impact on residents in terms of general upheaval, stress levels, social impact and affect on their general well being. In addition plans to widen the M1 motorway to four lanes (see Highways Agency correspondence, Appendix 1) is likely to further, unacceptably, exacerbate the air quality problem. Any remaining properties on Carter Lane East could potentially lie in an area of exceedance.

The Local Authority will therefore lobby strongly for the Highways Agency to include in the M1 widening scheme the acquisition of any properties where exceedance of the air quality objectives is likely.

3.2.4 Option 4 – Liaise with Highways Agency

The Highways Agency is the operator of the trunk roads and it is therefore essential that the Local Authority continues to liaise with them with regard to any current or future plans for junction 28 of the M1. Discussions have already taken place and a response received from the Highways Agency (Appendix 1) with regard to our Action Plan. At this stage it appears that there are no Highways Agency plans to implement any measures which would significantly reduce the levels of NO_2 such that the air quality objective would be achieved by the target date of 2005.

Of particular importance is the widening of the M1 motorway to four lanes and the associated air quality assessment, referred to in the Highways Agency response (Appendix 1). Close liaison on an ongoing basis is essential in order to enable the Local Authority to pursue the air quality objectives for NO_2.

3.3 Prioritisation of Options

A simplified qualitative approach has been used for prioritising and ranking the four options in terms of their cost effectiveness, air quality improvement achieved and the percentage of people positively affected by the option, see table 1.

Table 1 Prioritisation of Options

Option	Criteria for Consideration				Overall Ranking
	Cost Effectiveness	AQ Improvement	% People positively affected by Option		
			Within AQMA	Outside AQMA	
1 Motorway Speed Strategy	LOW	LOW	HIGH	LOW	4
2 Reduction in Traffic Volume	MEDIUM difficult to assess	MEDIUM difficult to assess	HIGH	LOW	2
3 Compulsory Purchase Order	LOW – if L.A purchase HIGH – if H.A purchase as part of M1 widening scheme	LOW	HIGH	LOW	3
4 Liaise with Highways Agency	HIGH	Currently unable to specify	HIGH	LOW	1

4 ACTIONS AND TIMESCALES

Actions to be taken by the Local Authority in pursuit of achieving the annual mean air quality objective for nitrogen dioxide, along with timescales, are as follows:-

- Liaise and work with the Highways Agency – ONGOING.
- Close consultation with and lobbying the Highways Agency re: M1 widening scheme – DEPENDANT UPON SUBMISSION OF SCHEME.
- Continue to monitor NO_2 levels within and adjacent to the AQMA using existing diffusion tube network – ONGOING.
- Review existing diffusion tube network and extend in order to monitor the effects of the 3m high noise barrier (see Highways Agency correspondence – Appendix 1) – IMMEDIATE.
- Consultation with other relevant groups, departments, agencies, neighbouring local authorities – ONGOING.
- Monitor Highways Agency investigation into use of traffic signs for local air quality management (see Highways Agency correspondence – Appendix 1) – ONGOING.

5 CONCLUSION

An AQMA was declared due to a predicted exceedance of the annual mean objective for nitrogen dioxide (NO_2). The dominant source of NO_2 is motorway traffic. Control of the source of pollution is outside the Local Authority's remit and lies with the Highways Agency. Liaison with the Highways Agency has taken place in the formulation of the Action Plan.

Options have been considered for reducing the levels of NO_2 within the AQMA. It is unlikely that the air quality objective will be achieved by the target date of 2005. Actions have been identified which the Local Authority intends to take to fulfil its statutory duty 'to pursue the air quality objective'.

APPENDIX 1

Highways Agency Correspondence