



Wycombe District Council

**First Stage Review and Assessment of
Air Quality**

Executive Summary

The Environment Act 1995 introduced the legislation for local management of air quality. Part IV of the Act introduced a statutory duty for local authorities to review and assess the air quality within their districts and to identify those areas where further local measures will be required to achieve the air quality standards and objectives.

The National Air Quality Strategy was published in March 1997, establishing standards for eight key pollutants and outlining national and international policies to reduce air pollution levels.

The Air Quality Regulations 1997 set the statutory objectives for seven air pollutants, with ozone being omitted, to be achieved by 2005. The objectives have been set based on the pollutant effect on human health. Thus the result of the regulations is to diminish the impact of air pollution on humans and particularly those susceptible to elevated pollution levels by 2005.

Local authorities are required to review and assess the air quality within their boundaries. The primary objectives for the review and assessment is to identify those areas where national policies alone appear unlikely to deliver the national air quality objectives by 2005 and to ensure that air quality considerations are integrated into local authority policies and decision making processes.

The review and assessment requires a three phased approach. The first stage involves identifying sources of the pollutants, which may affect national objectives being met within the District. For any pollutants identified as possibly being a problem, then a more detailed second stage is required which would identify any requirements for advanced monitoring and modelling in a third stage review.

The first stage review has indicated that there is a need for a second stage assessment for carbon monoxide, sulphur dioxide, nitrogen dioxide and PM₁₀. There is no need for a second stage assessment for benzene, 1,3-butadiene and lead.

The conclusion of this report is that Wycombe District Council will need to undertake a second stage review and assessment for air quality.

Chapter 1

1.1 Wycombe District Council

Wycombe District Council covers an area of approximately 125 square miles (Appendix 1) and has a population of 158 000. The River Thames runs along the southern boundary, with the Oxfordshire plain to the west, the Chilterns to the east and Aylesbury Vale to the north. It includes the towns of High Wycombe, Marlow, Bourne End and Princes Risborough along with a number of villages. The area is however principally rural with over three-quarters of the District lying in the Chiltern Area of Outstanding Natural Beauty or Green Belt where development is strongly restrained. This combined with the presence of the M40 and rail links and the proximity to London make it a popular place to live, but brings a large amount of pressure for development.

Wycombe District has a large commuter population and due to the high cost of property in the area, a large working population that lives outside the District. Thus, transport is essential for people living and working in the District.

1.2 National Air Quality Strategy

The publication of The United Kingdom National Air Quality Strategy in March 1997 established a national framework for reducing hazards to health from air pollution in the UK. The strategy sets standards and objectives for the control and reduction of the eight main health-threatening pollutants. The transport sector, local authorities and industry are identified as key contributors to meeting the Strategy's success.

1.3 Legislative Framework

The Environment Act 1995 introduced the legislation for local management of air quality. Part IV of the Act introduced a statutory duty for local authorities to review and assess the air quality within their districts and to identify those areas where further local measures will be required to achieve the air quality standards and objectives. The Air Quality Regulations 1997 provided the statutory basis for seven pollutants whose standards and objectives must be achieved by 2005. Ozone is exempt from the regulations due to its trans-boundary nature requiring international action rather than local action.

Pollutant	Air Quality Objective Levels
Benzene	5ppb or less, when expressed as a running annual mean
1,3-Butadiene	1ppb or less, when expressed as a running annual mean
Carbon Monoxide	10ppm or less, when expressed as a running 8 hour mean
Lead	0.5ug/m ³ or less, when expressed as an annual mean
Nitrogen Dioxide	150ppb or less, when expressed as an hourly mean, and 21ppb or less, when expressed as an annual mean
PM ₁₀	50ug/m ³ or less, when expressed as the 99 th percentile of daily maximum running 24 hour means
Sulphur Dioxide	100ppb or less, when expressed as the 99.9 th percentile of 15 minute means

1.4 Review and Assessment of Air Quality

The timescale for review and assessment is that the process must be completed by December 1999. A second review and assessment process must then be undertaken again before 2005.

1.5 First Stage Review and Assessment

Every authority is expected to undertake a first stage review and assessment for all pollutants of concern as set out in the Air Quality Regulations 1997. Information needs to be compiled and collated on any existing or proposed significant source of pollutants of concern within its area, and consider whether a person might be reasonably be expected to be exposed over the averaging period of the appropriate standard. Significant pollutant sources outside the District, which could lead to an exceedance of a prescribed air quality objective within its area, should also be included.

The first stage should allow the authority to identify the pollutants for which further investigation is required, and highlight the position of pollutant sources, which should be the focus of the second stage review and assessment.

1.6 Second Stage Review and Assessment

The aim of the second stage review and assessment is to provide a further screening of pollutant concentrations. Where there is a significant risk of an area not achieving any of the air quality objectives in 2005, as highlighted in the first stage, then further detailed study needs to be made for the area. This should include using screening models and basic monitoring where feasible.

1.7 Third Stage Review and Assessment

The third stage of review and assessment will be required where the second stage review has indicated that there is a significant risk of an air quality objective not being achieved. In the third stage, the authority is expected to undertake an accurate and detailed review and assessment of the current and future air quality. It is likely that more sophisticated modelling and monitoring techniques will be required. The main aim is to predict whether there will be a failure to achieve an air quality objective by the end of 2005. This will be the crucial factor that will trigger the designation of Air Quality Management Areas.

1.8 Air Quality Management Areas

Should an AQMA be designated then an action plan will need to be devised within 12 months of designation. The plan will indicate how the authority intends to achieve the air quality standards and objectives in the designated area. The plan should include a statement of the timescales in which local authorities propose to implement the provisions of the plan. A further assessment of air quality will be required in the area to supplement information already obtained.

Chapter 2

2.1 First Stage Review and Assessment

Every local authority shall undertake a first stage review and assessment. Each local authority is required to compile and collate information on any existing or proposed sources of pollutants of concern, which could lead to an exceedance of a prescribed air quality objective within the area. This report will look at the seven key pollutants and decide if any person may be reasonably exposed over the relevant averaging period of the appropriate objective pollutant level now or in the future. A decision will then be made if further assessment is required.

2.2 Aims and objectives of the study

The primary objectives of the review and assessment of air quality by local authorities are to:

- Identify those areas at the local level where national policies and instruments appear unlikely, of themselves, to deliver the national air quality objectives by the end of 2005 set out in the Air Quality Regulations 1997; and
- Ensure that air quality considerations are integrated into local authorities' decision making processes, such as land use planning and traffic management.

Within this context it is important to address the issue of the purpose of the air quality objectives which is to protect human health. What is clearly crucial here, given the priority accorded to the protection of human health, is the concept of exposure. Accordingly the Air Quality Regulations 1997 provide that compliance with the air quality objectives is to be determined by reference to the quality of air at outdoor locations where members of the public are regularly present.

The following approach will be undertaken in the review and assessment process:

- For objectives with short averaging times (the sulphur dioxide objective and the hourly objective for nitrogen dioxide) reviews and assessments should be focussed on any non-occupational, near ground level outdoor location given that exposures over such short averaging times are potentially likely;
- For objectives with longer averaging times (the objectives for benzene, 1,3-butadiene, carbon monoxide, PM₁₀, lead, and the annual objective for nitrogen dioxide) reviews and assessments should be focussed on the following non-occupational, near ground level outdoor locations: background locations; roadside locations; and other areas of elevated pollutant concentrations where a person might reasonably be expected to be exposed (e.g. in the vicinity of housing, schools or hospitals etc) over the relevant averaging time of the objective.

Chapter 3

3.1 The Benzene Standard

The standard for benzene is 5ppb expressed as a running annual mean.

3.2 Sources of Benzene in the UK

In the UK the main atmospheric source is the combustion and distribution of petrol, of which it is a minor constituent, currently it comprises on average about 2% by volume in the UK. Diesel fuel is a relatively small source. Motor vehicle exhaust gases contain some of this unburned benzene, but they also contain benzene formed from the combustion of other aromatic components of petrol. Motor vehicles are the most important source on a national basis, which in 1996 accounted for 64% of the total UK annual emission of 41ktonnes, with most of this total arising from petrol vehicles. Six tonnes, 15% of the total, were emitted from industrial processes.

3.3 National Measures for the Control of Benzene

Existing national policies are expected to deliver the prescribed air quality objective for benzene by the end of 2005. The Government forecasts that roadside levels of benzene next to even the most busy or congested roads are expected to be well below the objective by the year 2005. It is likely that only those authorities with major industrial processes which either handle, store or emit benzene, which have the potential, in conjunction with other sources, to result in elevated levels of benzene in relevant locations are expected to need to undertake a second or third stage review and assessment.

3.4 Review of Information

The first stage review and assessment for benzene requires the following information for consideration:

- Details of Part A authorised processes present within the authority's area;
- Details of Part B authorised processes present within the authority's area;
- Planned developments of the above mentioned types in the locality;
- Details of any significant sources of benzene in neighbouring areas which could impact significantly within the authority's area;
- Details of any surveys or investigations undertaken;
- Information on estimated background concentrations.

Part A and B authorised processes in Wycombe District were investigated to ascertain whether emissions from these processes would contribute to overall benzene levels.

Information was gathered from neighbouring local authorities of any Part B processes that may impact on levels of benzene within Wycombe District.

The Environment Agency was contacted to provide information of Part A processes that may have significant effects on levels of benzene within the District.

Bucks County Council and the Planning Department have been consulted to as whether there are any planned developments that may impact on benzene levels.

Information was taken from the DETR Internet page regarding background concentrations of benzene.

3.5 Local Sources of Benzene

For all existing and proposed activities identified from above there needs to be an assessment of whether they have the potential, singly or together, to emit significant quantities of benzene and are expected to be in existence by the end of 2005. Sources are chosen where there is a potential for exposure of individuals in relevant locations.

For the purposes of the First Stage review and assessment the sources can be assumed to be:

- Part A or Part B processes with the potential to be a significant source of benzene (Table 1)
- Planned developments of the above mentioned types in the locality.

Significant Sources of Benzene	
Part A Process	
1.1c & d Gasification	-
1.2 Pyrolysis, carbonisation etc	-
1.4 Crude oil handling, refining & conversion	-
4.1 Petrochemicals	-
4.2 Organic chemicals	-
5.2 Oil and solvent recovery	-
6.3 Tar and Bitumen	-
Part B Process	
Processes for the storage, loading and unloading of petrol at terminals	-

Table 1 Part A & B Processes Identified as significant sources of benzene (LAQM TG4/98)

The Government is currently investigating ambient levels of benzene in the vicinity of petrol stations and thus they have not been included in the list of Part B processes which may give significant emissions of benzene. Future guidance will address this situation.

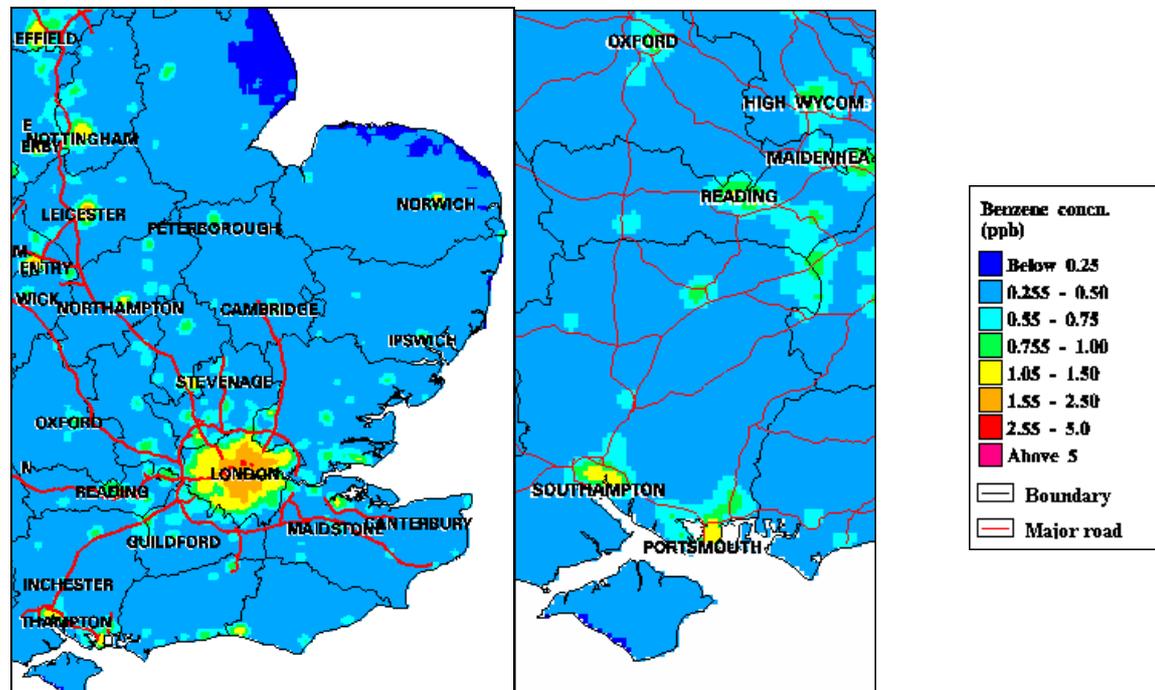


Figure 1 Estimated urban background concentrations of benzene taken from national maps (DETR)

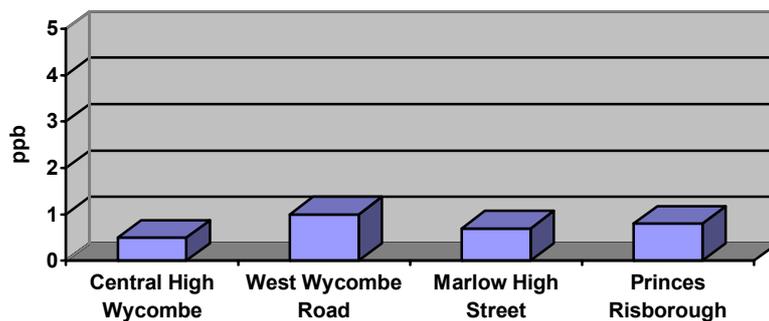


Figure 2 Annual average benzene diffusion tube results for 1998

3.6 Assessment

This first stage of review and assessment has not identified any significant sources of benzene within or around the District that could lead to the exposure of the public over a year. Thus the risk of the air quality objective for benzene being exceeded by the end of 2005 is negligible. This view is consistent with the benzene diffusion tube monitoring that has undertaken in a joint exercise between Wycombe DC and Bucks County Council.

The Government states that if none of the above processes exist or are planned within the authority's area which could lead to exposure of the public over a year (or in a neighbouring authority in a location which could lead to exceedance of the objective within the authority's own area) then the risk of the air quality objective for benzene being exceeded by 2005 should be considered negligible, and the authority need not consider the possibility of an air quality management area for benzene.

The first stage review and assessment has indicated that the risk of exceedance is negligible and so there is no need to undertake a second stage review of benzene.

Chapter 4

4.1 The 1,3 - Butadiene Standard

The standard for 1,3 – Butadiene is 1ppb expressed as a running annual mean.

4.2 Sources of 1,3 - Butadiene in the UK

1,3 – Butadiene in the atmosphere is mainly derived from the combustion of petrol and other materials. Although neither petrol nor diesel fuel contains 1,3 – Butadiene it is formed in the combustion process from olefins in the fuel. 1,3 – Butadiene is also an important industrial chemical, and it is handled in bulk at a small number of industrial locations in the UK. Other than in the vicinity of such locations, the dominant source of 1,3 – butadiene in the UK atmosphere is the motor vehicle. The UK national atmospheric inventory for 1,3 – Butadiene showed that, in 1995, 67% of national annual emissions arose from petrol vehicle and 13% arose from industrial sources.

4.3 National Measures for the Control of 1,3 – Butadiene

Existing national policies are expected to deliver the prescribed air quality objective for 1,3-Butadiene by the end of 2005. The Government forecasts roadside levels of 1,3 – Butadiene, next to even the most busy or congested roads are expected to be well below the air quality objective. It is likely that only those authorities with major industrial processes, which either handle, store or emit 1,3 – Butadiene and which have the potential, in conjunction with other sources, to result in elevated levels in relevant locations, are expected to need to undertake a second or third stage review and assessment.

4.4 Review of Information

The first stage review and assessment for 1,3 – Butadiene requires the following information for consideration:

- Details of Part A authorised processes present within the authority's area;
- Details of Part B authorised processes present within the authority's area;
- Planned developments of the above mentioned types in the locality;
- Details of any significant sources of 1,3 – Butadiene in neighbouring areas which could impact significantly within the authority's area;
- Details of any surveys or investigations undertaken;
- Information on estimated background concentrations.

Part A and B authorised processes in Wycombe District were investigated to ascertain whether emissions from these processes would contribute to overall 1,3 – Butadiene levels.

Information was gathered from neighbouring local authorities of any Part B processes that may impact on levels of 1,3 – Butadiene within Wycombe District.

The Environment Agency was contacted to provide information of Part A processes that may have significant effects on levels of 1,3 – Butadiene within the District.

Bucks County Council and the Planning Department have been consulted to as whether there are any planned developments that may impact on 1,3 – Butadiene levels.

Information was taken from the DETR Internet page regarding background concentrations of 1,3 – Butadiene.

4.5 Local Sources of 1,3 – Butadiene

For all existing and proposed activities identified from above there needs to be an assessment of whether they have the potential, singly or together, to emit significant quantities of 1,3 – Butadiene and are expected to be in existence by the end of 2005. Sources are chosen where there is a potential for exposure of individuals in relevant locations.

For the purposes of the First Stage review and assessment the sources can be assumed to be:

- Part A or Part B processes with the potential to be a significant source of 1,3 – Butadiene (Table 2)
- Planned developments of the above mentioned types in the locality.

Significant Sources of 1,3 – Butadiene	
Part A Process	
1.2 Pyrolysis, carbonisation etc	-
1.4 Crude oil handling, refining & conversion	-
4.1 Petrochemicals	-
4.2 Organic chemicals	-
6.3 Tar and Bitumen	-
Part B Process	
Rubber Processes	-

Table 2 Part A & B Processes Identified as significant sources of 1,3 – Butadiene (LAQM TG4/98)

4.6 Assessment

This first stage of review and assessment has not identified any significant sources of 1,3 – Butadiene within or around the District, which could lead to the exposure of the public over a year. Thus the risk of the air quality objective for 1,3 – Butadiene being exceeded by the end of 2005 is negligible.

The Government states that if none of the above processes exist or are planned within the authority's area which could lead to exposure of the public over a year (or in a neighbouring authority in a location which could lead to exceedance of the objective within the authority's own area) then the risk of the air quality objective for 1,3 – Butadiene being exceeded by 2005 should be considered negligible, and the authority need not consider the possibility of an air quality management area for 1,3 – Butadiene.

The first stage review and assessment has indicated that the risk of exceedance is negligible and so there is no need to undertake a second stage review of 1,3 – Butadiene.

Chapter 5

5.1 The Lead Standard

The standard for lead is $0.5\mu\text{g}/\text{m}^3$ as an annual mean.

5.2 Sources of Lead in the UK

Lead is the most widely used non-ferrous metal and has a large number of industrial applications, both in its elemental form and in alloys and compounds. The single largest use globally is in the manufacture of batteries, but other uses are as a pigment in paints and glazes, in alloys, in radiation shielding, tank lining and piping. As the compound tetraethyl lead, it has been used as a petrol additive to enhance the octane rating. With the recognition of the adverse effects of lead on human health and the growing use of catalytic converters, which are poisoned by lead, this use is declining rapidly. Most of the current emissions of lead in the UK arise from petrol-engined motor vehicles.

5.3 National Measures for the Control of Lead

Existing national policies are expected to deliver the prescribed objective for lead at all rural, urban background sites and roadside locations by the year 2005. The Government suggests that only local authorities with significant industrial sources, which have the potential to result in elevated levels of lead in relevant locations, are expected to need to undertake a second or third stage review and assessment.

5.4 Review of Information

The first stage review and assessment for lead requires the following information for consideration:

- Details of Part A authorised processes present within the authority's area;
- Details of Part B authorised processes present within the authority's area;
- Planned developments of the above mentioned types in the locality;
- Details of any significant sources of lead in neighbouring areas which could impact significantly within the authority's area;
- Information on current and 2005 forecasted annual traffic flows for the major road networks within the District;
- Details of any surveys or investigations undertaken;
- Information on estimated background concentrations.

Part A and B authorised processes in Wycombe District were investigated to ascertain whether emissions from these processes would contribute to overall lead levels.

Information was gathered from neighbouring local authorities of any Part B processes that may impact on levels of lead within Wycombe District.

The Environment Agency was contacted to provide information of Part A processes that may have significant effects on levels of lead within the District.

Bucks County Council and the Planning Department have been consulted to as whether there are any planned developments that may impact on lead levels.

Information was taken from the DETR Internet page regarding background concentrations of lead.

5.5 Local Sources of Lead

For all existing and proposed activities identified from above there needs to be an assessment of whether they have the potential, singly or together, to emit significant quantities of lead and are expected to be in existence by the end of 2005. Sources are chosen where there is a potential for exposure of individuals in relevant locations.

For the purposes of the First Stage review and assessment the sources can be assumed to be:

- Part A or Part B processes with the potential to be a significant source of lead (Table 3)
- Planned developments of the above mentioned types in the locality.

Significant Sources of lead	
Part A Process	
1.3c Waste oil burning	-
1.4 Crude oil handling, refining & conversion	-
2.2 Non-ferrous	-
3.5 Glass	-
4.5 Inorganics	-
Part B Process	
Furnaces for extraction of non-ferrous metals from scrap	-
Electrical and rotary furnaces	-
Hot and cold blast cupolas	-
Aluminium and aluminium alloy processes	Vencast Foundries
Copper and copper alloy processes	Burleighfield Arts
Zinc and zinc alloy processes	-
Lead glass manufacturing	-

Table 3 Part A & B Processes Identified as significant sources of lead (LAQM TG4/98)

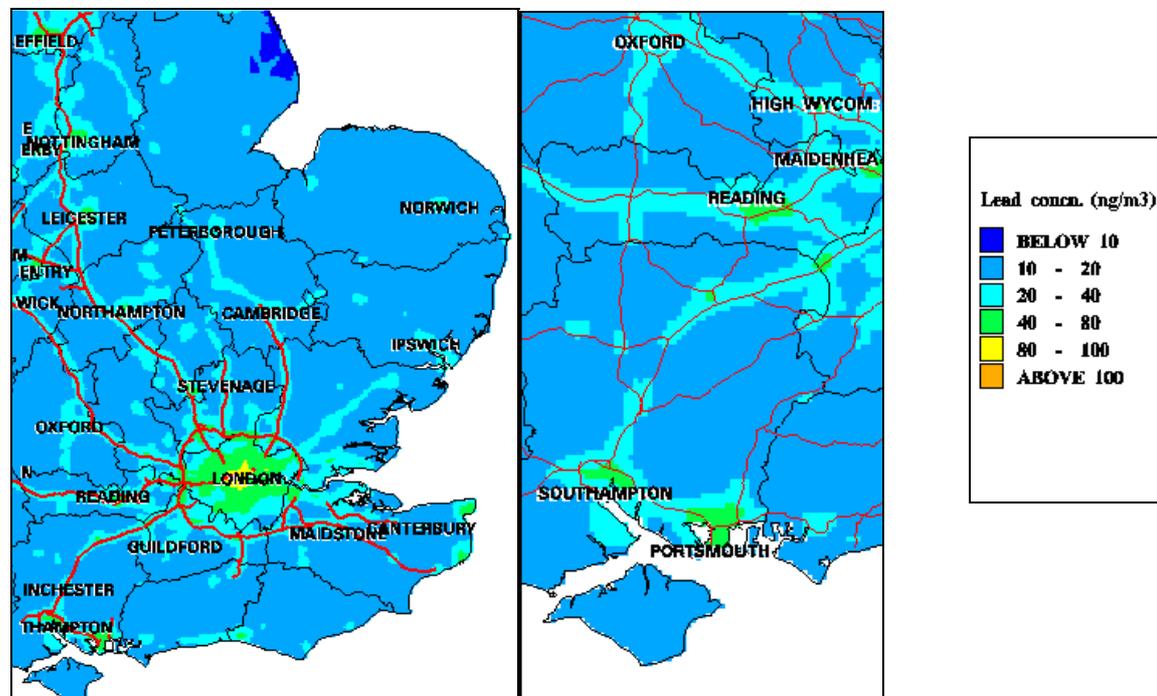


Figure 3 Estimated urban background concentrations of lead taken from national maps (DETR)

5.6 Assessment

Review of the above information has indicated no significant levels of lead were identified from these sources that would have an effect on reaching the prescribed objective within the District.

It is recommended that there is no need to undertake a second stage review and assessment for lead.

Chapter 6

6.1 The Nitrogen Dioxide Standard

Two methods have been adopted to express the nitrogen dioxide standard. There is a standard of 150ppb expressed as an hourly mean and a standard of 21ppb expressed as an annual mean.

6.2 Sources of Nitrogen Dioxide in the UK

Nitrogen dioxide (NO₂) and nitric oxide (NO) are both oxides of nitrogen and together they are referred to as NO_x. All combustion processes produce some NO_x but only NO₂ is associated with adverse health effects on human health. The main sources of NO_x in the UK are road transport, which in 1996 accounted for 47% of emissions with 2.1 million tonnes per year as NO₂, power generation 22% and domestic sources 4%. In urban areas the proportion of local emissions due to road transport sources is larger. NO₂ is produced by the oxidation of NO in the atmosphere and there is a complex relationship between emissions of NO_x and the resulting concentrations of NO₂, dependent on the proportion of NO in the primary emissions and the availability of atmospheric oxidant, especially ozone, to oxidise NO to NO₂. Exceedances of the 1-hour air quality objective for NO₂, if they occur are most likely to be associated with either winter episodes of poor dispersion, such as that in London in December 1991, or during summer oxidant episodes.

6.3 National Measures for the Control of Nitrogen Dioxide

Government analysis set out in the National Air Quality Strategy suggest that for nitrogen dioxide a reduction in NO_x emissions over and above that achieved by national measures will be required to ensure that air quality objectives are achieved everywhere by the end of 2005. The Government recommends that local authorities with major roads, or highly congested roads, which have the potential to result in elevated levels of nitrogen dioxide in relevant locations, are expected to identify a need to progress to the second or third stage review and assessment for this pollutant.

6.4 Review of Information

The first stage review and assessment for nitrogen dioxide requires the following information for consideration:

- Details of Part A authorised processes present within the authority's area;
- Details of Part B authorised processes present within the authority's area;
- Planned developments of the above mentioned types in the locality;
- Details of any significant sources of nitrogen dioxide in neighbouring areas which could impact significantly within the authority's area;
- Information on current and 2005 forecasted annual traffic flows for the major road networks within the District;
- Details of any surveys or investigations undertaken;
- Information on estimated background concentrations.

Part A and B authorised processes in Wycombe District were investigated to ascertain whether emissions from these processes would contribute to overall nitrogen dioxide levels.

Information was gathered from neighbouring local authorities of any Part B processes that may impact on levels of nitrogen dioxide within Wycombe District.

The Environment Agency was contacted to provide information of Part A processes that may have significant effects on levels of nitrogen dioxide within the District.

Bucks County Council and the Planning Department have been consulted to as whether there are any planned developments that may impact on nitrogen dioxide levels.

Information was taken from the DETR Internet page regarding background concentrations of nitrogen dioxide.

Information is available on nitrogen dioxide levels from the diffusion tube survey and continuous monitoring programme.

6.5 Local Sources of Nitrogen Dioxide

For all existing and proposed activities identified from above there needs to be an assessment of whether they have the potential, singly or together, to emit significant quantities of nitrogen dioxide and are expected to be in existence by the end of 2005. Sources are chosen where there is a potential for exposure of individuals in relevant locations.

For the purposes of the First Stage review and assessment the sources can be assumed to be:

- Part A or Part B processes with the potential to be a significant source of nitrogen dioxide (Table 4)
- Where an indication that a number existing sources acting in combination to exceed a current annual mean NO₂ concentration of 30ppb.
- Any area with an annual mean urban background NO₂ measurement in 1996 greater than 30ppb.
- One or more existing or planned roads with a projected annual average daily traffic flow of greater than 20000 movements in 2005.

The following significant sources of nitrogen dioxide have been identified within and around Wycombe District, which are likely to prevent the prescribed objective being achieved.

The Technical Guidance TG4/98 required the identification of roads with a projected annual average daily traffic flow of greater than 20,000 by the year 2005. These roads have been identified as the M40, the A40 through High Wycombe, the A404 through High Wycombe and the A404 Marlow Bypass.

There are no identified sources of NO₂ from the Part A and Part B processes in the District or in neighbouring authorities.

The use of the annual NO₂ concentration map produced by the DETR has indicated that no area within Wycombe District currently exceeds the 30ppb annual mean level. This is confirmed by background monitoring undertaken by using diffusion tubes.

There are however, exceedances of the 21ppb annual average as an air quality standard. This will be investigated and the monitoring expanded in Stage 2 of the review and assessment.

Significant Sources of Nitrogen Dioxide	
Part A Process	
1.1a Reforming NG	-
1.1b Refining NG	-
1.1c & d Gasification	-
1.2 Pyrolysis, carbonisation etc.	-
1.3a Boilers and furnaces	-
1.3b Gas Turbines	-
1.3b CI Engines	-
1.3c Waste oil burning	-

1.3c Other Waste Burning	-
1.4 Crude oil handling, refining & conversion	-
2.1 Iron Steel & Alloys	-
2.2 Non-ferrous	-
3.1 Cement & Lime	-
3.3 Other Fibres	-
3.5 Glass	-
3.6 Ceramics (helton bricks)	-
4.1 Petrochemicals	-
4.2 Organic Chemicals	-
4.3 Acids	-
4.5 Inorganics	-
4.6 Fertilisers	-
5.1 Incineration	-
5.3 Fuel from Waste	-
6.1 Paper	-
6.3 Tar & Bitumen	-
Part B Process	
Glass (excluding lead glass) manufacturing process	-

Table 4 Part A & B Processes Identified as significant sources of NO₂ (LAQM TG4/98)

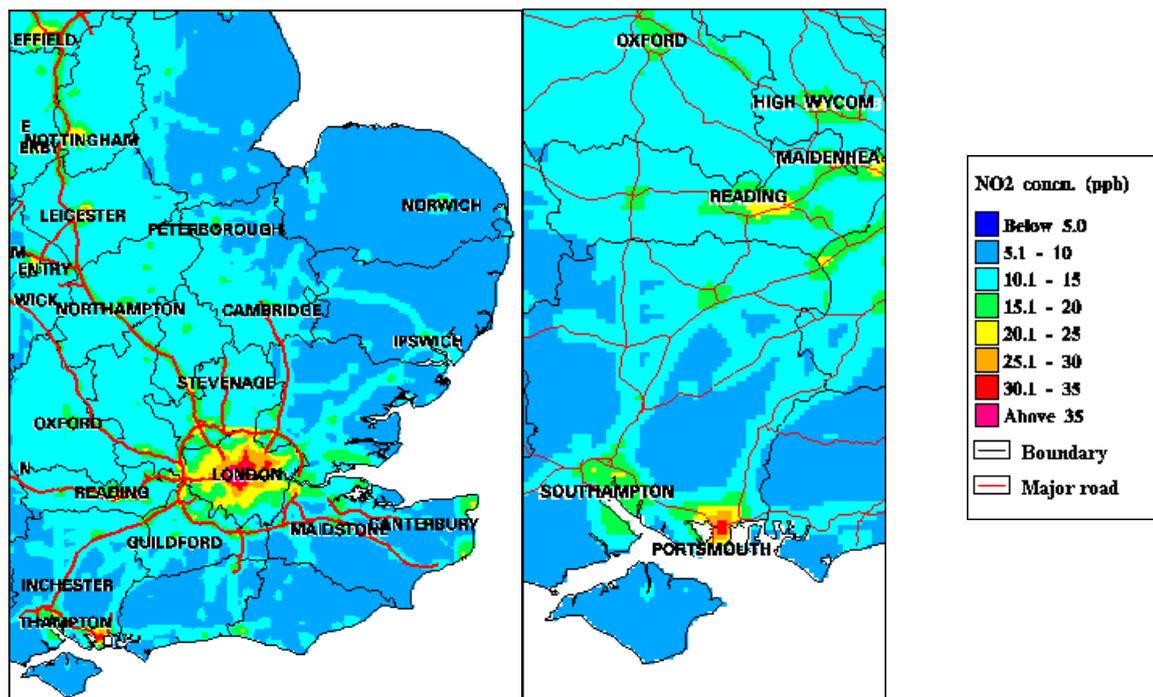


Figure 4 Estimated urban background concentrations of nitrogen dioxide taken from national maps (DETR)

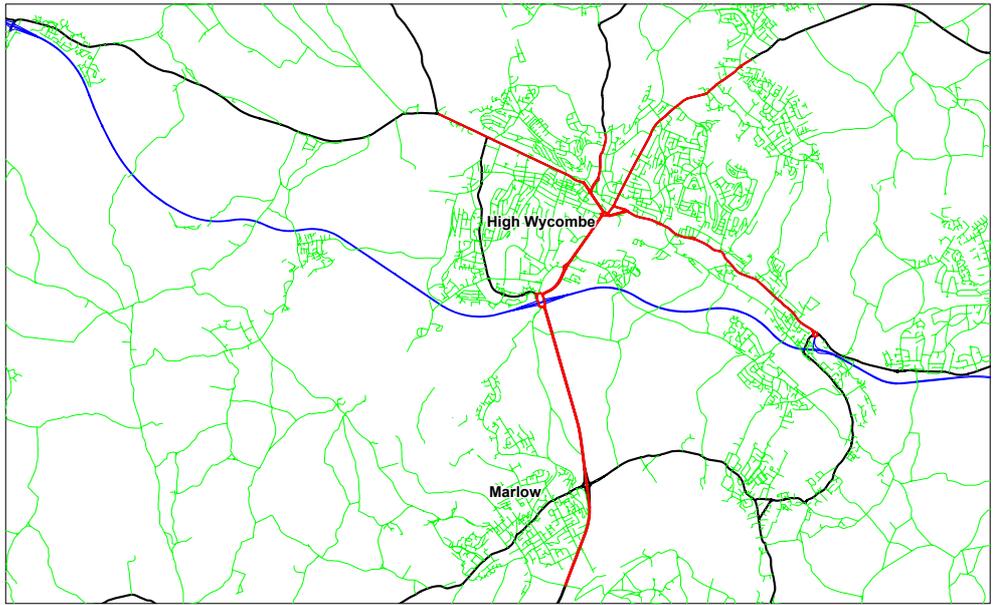


Figure 5 Map showing roads of concern regarding nitrogen dioxide levels (motorway in blue and A-roads in red)

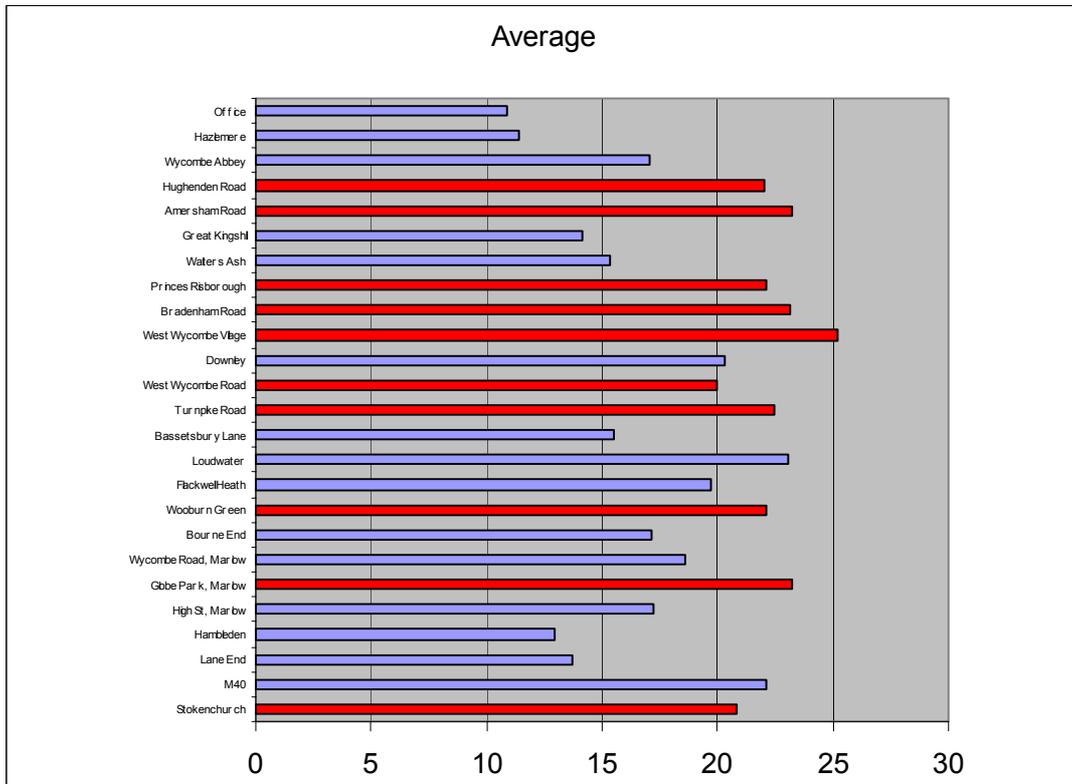


Figure 6 Annual average nitrogen dioxide diffusion tube results for 1998

6.6 Assessment

Review of the above information has identified significant sources of Nitrogen Dioxide that could have an effect on reaching the prescribed objectives within the District.

It is recommended that a second stage review and assessment for Nitrogen Dioxide is required.

Chapter 7

7.1 The PM₁₀ Standard

The standard for PM₁₀ is 50µgm³ expressed a 24 hour running mean.

7.2 Sources of PM₁₀ in the UK

National UK emissions of primary PM₁₀ have been estimated as totalling 213,000 tonnes in 1996. Of this total, around 24% was derived from road transport sources, 38% from industrial sources, 16% from power stations and 17% from domestic and other low-power combustion. A significant proportion of the current annual average PM₁₀ is due to the secondary formation of particulate sulphates and nitrates, resulting from the oxidation of sulphur and nitrogen oxides. These are regional scale pollutants and the annual concentrations do not vary greatly over a scale of tens of kilometres. There are also natural and semi-natural sources such as wind-blown dust and sea salt particles. The impact of local sources is superimposed on this regional background. Such local sources are generally responsible for winter episodes associated with poor dispersion.

7.3 National Measures for the Control of PM₁₀

The Government has indicated that many sources of PM₁₀ are out of the control of individual local authorities. The estimation of future concentrations of PM₁₀ is part dependent on predictions of the secondary particle component. The PM₁₀ standard is currently exceeded at all of the national monitoring sites. This shows that this will be the most difficult of the objectives to achieve for most local authorities. The majority of the national monitoring network sites are in cities where road transport and domestic combustion are the main sources in the immediate vicinity.

7.4 Review of Information

The first stage review and assessment for PM₁₀ requires the following information for consideration:

- Details of Part A authorised processes present within the authority's area;
- Details of Part B authorised processes present within the authority's area;
- Planned developments of the above mentioned types in the locality, including those which will increase traffic flow;
- Details of any significant sources of PM₁₀ in neighbouring areas which could impact significantly within the authority's area;
- Information on current and 2005 forecasted annual traffic flows for the major road networks within the District;
- Details of any surveys or investigations undertaken;
- Information on current annual average urban background concentrations;
- Information on current annual average background concentrations of secondary particulate;
- Information on approximate emission densities from road transport and other low-level dispersed sources of PM₁₀.

Part A and B authorised processes in Wycombe District were investigated to ascertain whether emissions from these processes would contribute to overall PM₁₀ levels.

Information was gathered from neighbouring local authorities of any Part B processes that may impact on levels of PM₁₀ within Wycombe District.

The Environment Agency was contacted to provide information of Part A processes that may have significant effects on levels of PM₁₀ within the District. Bucks County Council and the Planning Department have been consulted to as whether there are any planned developments that may impact on PM₁₀ levels. Information was taken from the DETR Internet page regarding background concentrations of PM₁₀. Information is available on PM₁₀ levels from the continuous monitoring programme.

7.5 Local Sources of PM₁₀

For the purpose of the first stage review and assessment the DETR Technical Guidance Note TG4/98 recommends the following:

- Urban areas for which the annual average regional background due to secondary particle is currently greater than 8µg/m³.
- Emissions from low level dispersed sources (including road traffic) greater than 10 tonnes in any single 1km x 1km grid square or an average of 5 tonnes in several adjacent squares.
- One or more existing or planned roads with a projected annual average daily traffic flow of greater than 25,000.
- One or more Part A or Part B processes of the type indicated to be a potential significant source of PM₁₀ (Table 5).
- Any industrial process that emits significant quantities of dust in the form of PM₁₀ from uncontrolled or fugitive sources within the plant.

Significant Sources of PM₁₀	
Part A Process	
1.1c &d Gasification	-
1.2 Pyrolysis, carbonisation etc.	-
1.3a Boilers and furnaces	-
1.3b CI Engines	-
1.3c Waste oil burning	-
1.4 Crude oil handling, refining & conversion	-
2.1 Iron Steel & Alloys	-
2.2 Non-ferrous	-
3.1 Cement & Lime	-
3.3 Other Fibres	-
3.5 Glass	-
3.6 Ceramics (helton bricks)	-
4.1 Petrochemicals	-
4.2 Organic Chemicals	-
4.3 Acids	-
4.5 Inorganics	-
4.6 Fertilisers	-
5.1 Incineration	-
5.3 Fuel from Waste	-
6.1 Paper	-
6.3 Tar & Bitumen	-
Part B Process-	
Combustion plant 20-50 MWth	-
Reheat furnaces 20-50 MWth	-
Coal, coke, coal product and petroleum processes	-
Quarry processes	-
Roadstone coating	-
China & ball clay processes including the spray drying of ceramics	-
Manufacture of coating powder	-
Coil coating (where nitrogen containing solvents are used)	-
Rubber processes	-

Table 5 Part A & B Processes Identified as significant sources of lead (LAQM TG4/98)

The gravel quarry (Fig 7) sited within the District could be a significant source of PM₁₀. Roads identified as sources are the M40, A40 and A404. All these sources will have some effect on reaching the prescribed objective in certain areas of the District.

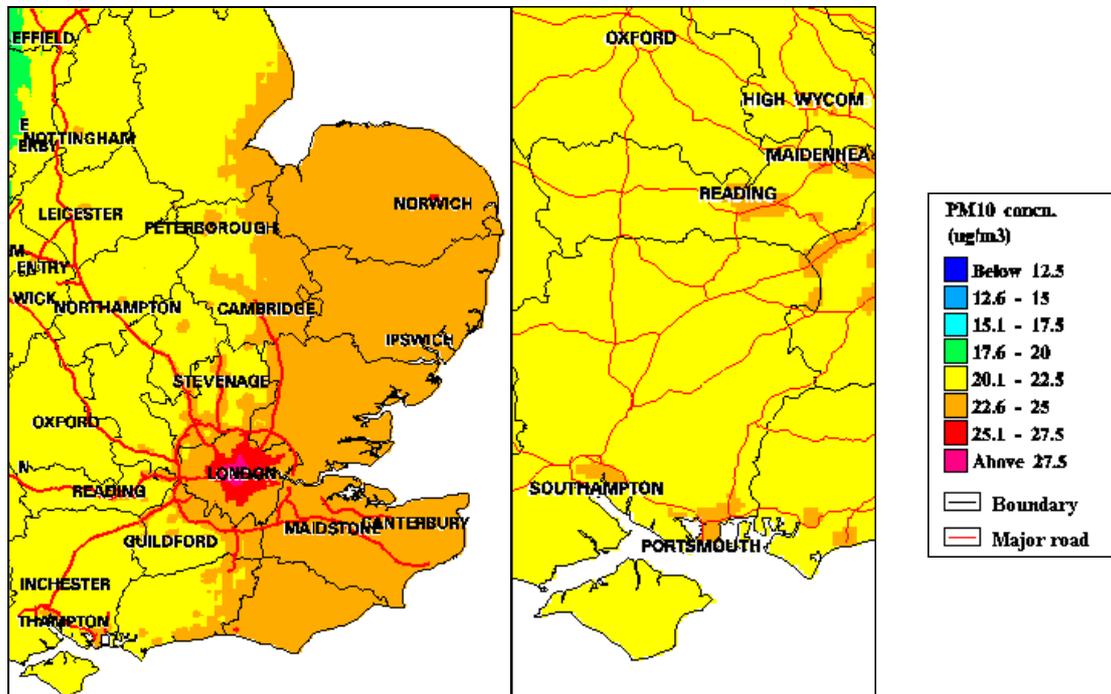


Figure 7 Estimated regional background concentrations of PM₁₀ due to secondary particles taken from national maps (DETR)

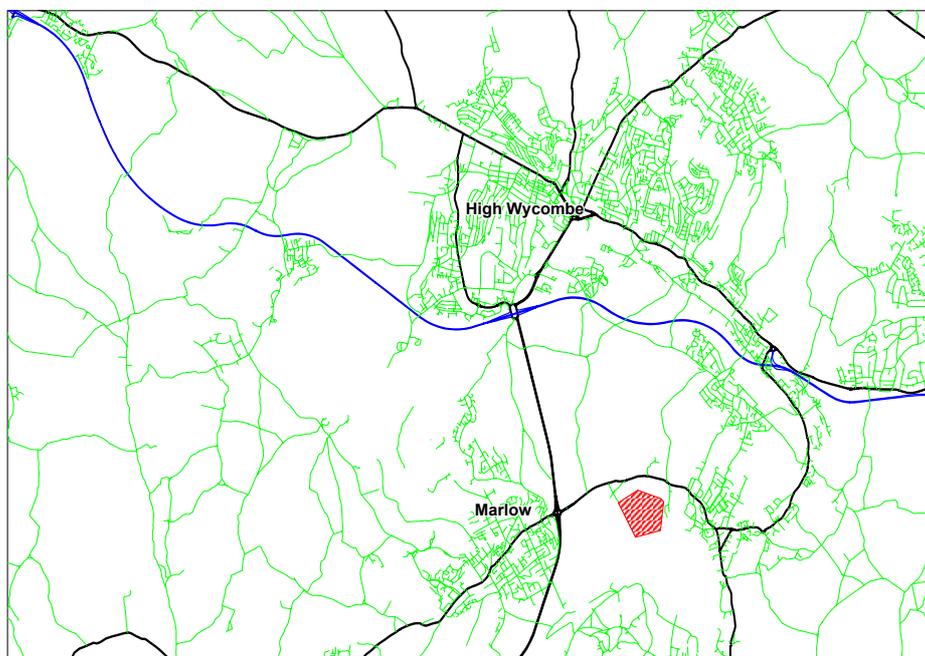


Figure 8 Location of quarrying process at Little Marlow (Quarry in red)

7.6 Assessment

Review of the above information has identified significant sources of PM₁₀ that could have an effect on reaching the prescribed objectives within the District.

It is recommended that a second stage review and assessment for PM₁₀ is required.

Chapter 8

8.1 The Sulphur Dioxide Standard

The standard for sulphur dioxide is 100ppb expressed as a 15 minute mean.

8.2 Sources of Sulphur Dioxide in the UK

Sulphur dioxide is emitted in the combustion of coal and oil. The total UK emission in 1996 was 2 million tonnes. The main sources were: power generation (65%), other industry (24%), commercial and domestic heating (6%) and road transport (2%).

8.3 National Measures for the Control of Sulphur Dioxide

The Government expects exceedances of the air quality standard to occur only in the vicinity of industrial processes for which the stack heights were designed to meet previous air quality standards and in areas where significant quantities of coal are used for space heating. Sulphur dioxide concentrations are elevated at the kerbside but not sufficiently to exceed the air quality standard in the absence of other sources. Since the major source of sulphur dioxide of sulphur dioxide emissions in the UK is the electricity supply industry and other large plant, the EC Large Combustion Plant Directive is an important instrument for delivering commitments the UK signed up to in the second Sulphur Protocol at Oslo in 1994.

8.4 Review of Information

The first stage review and assessment for sulphur dioxide requires the following information for consideration:

- Details of Part A authorised processes present within the authority's area;
- Details of Part B authorised processes present within the authority's area;
- Information on approximate emission densities from domestic combustion and other low level dispersed sources of SO₂.
- Information on current background concentrations from national maps;
- Information on the existence of combustion systems with thermal power rating greater than 5MW using fuels containing significant quantities of sulphur.
- Planned developments of the above mentioned types in the locality, including those which will increase traffic flow;
- Significant sources of SO₂ in neighbouring areas which could impact significantly within the District;
- Details of any surveys or investigations undertaken to obtain information to compile the report.

Part A and B authorised processes in Wycombe District were investigated to ascertain whether emissions from these processes would contribute to overall SO₂ levels.

Information was gathered from neighbouring local authorities of any Part B processes that may impact on levels of SO₂ within Wycombe District.

The Environment Agency was contacted to provide information of Part A processes that may have significant effects on levels of SO₂ within the District.

Bucks County Council and the Planning Department have been consulted to as whether there are any planned developments that may impact on SO₂ levels.

Information was taken from the DETR Internet page regarding background concentrations of SO₂.

Information is available on SO₂ levels from the continuous monitoring programme.

8.5 Local Sources of Sulphur Dioxide

For all existing and proposed activities identified from above there needs to be an assessment of whether they have the potential, singly or together, to emit significant quantities of nitrogen dioxide and are expected to be in existence by the end of 2005. Sources are chosen where there is a potential for exposure of individuals in relevant locations.

For the purposes of the First Stage review and assessment the sources can be assumed to be:

- One or more Part A or Part B processes of the type indicated to be a potential significant source of SO₂ (Table 6).
- A solid-fuel or fuel oil combustion system with thermal power greater than 5MW.
- A 1km x 1km grid square in the authority's area for which maximum low-level (i.e. domestic combustion and other short stack) emissions are greater than 25kg per hour or 40 tonnes per year. Where domestic emissions are the main source of concern, this can be assumed to approximate to 300 houses burning coal in a 1km x 1km grid square.

Significant Sources of SO₂	
Part A Process	
1.1a Reforming NG	-
1.1b Refining NG	-
1.1c & d Gasification	-
1.2 Pyrolysis, carbonisation etc.	-
1.3b Gas Turbines	-
1.3b CI Engines	-
1.3c Waste oil burning	-
1.3c Other waste burning	-
1.4 Crude oil handling, refining & conversion	-
2.1 Iron Steel & Alloys	-
2.2 Non-ferrous	-
3.1 Cement & Lime	-
3.3 Other Fibres	-
3.5 Glass	-
3.6 Ceramics (helton bricks)	-
4.1 Petrochemicals	-
4.2 Organic Chemicals	-
4.3 Acids	-
4.4 Halogens	-
4.5 Inorganics	-
4.6 Fertilisers	-
5.1 Incineration	-
5.2 Oil and solvent recovery	-
6.1 Paper	-
6.3 Tar & Bitumen	-
Part B Process	
Combustion plant 20-50 MWth	-
Reheat furnaces 20-50 MWth	-
Hot and cold blast cupolas	-

Aluminium and aluminium alloy processes	-
Zinc and zinc alloy processes	-
Copper and copper alloy processes	-
Manufacture of heavy clay goods and refractory goods	-
Glass (excluding lead glass) manufacturing processes	-
Lead glass manufacturing processes	-
Roadstone coating	-

Table 6 Part A & B Processes Identified as significant sources of lead (LAQM TG4/98)

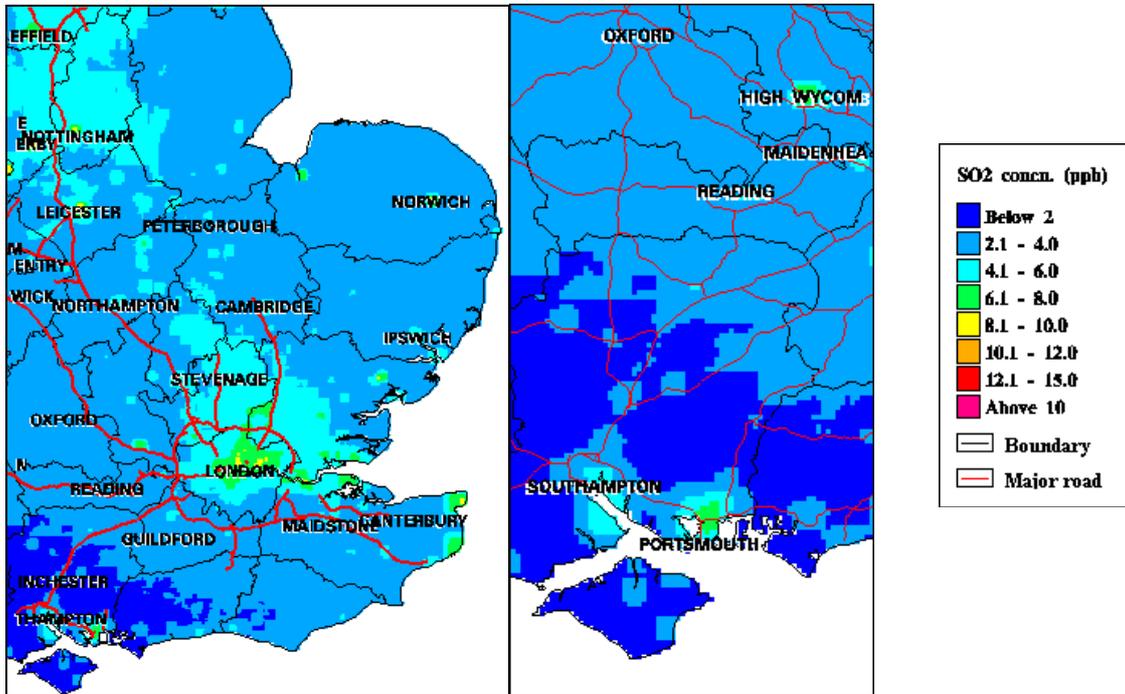


Figure 9 Estimated urban background concentrations of sulphur dioxide taken from national maps (DETR)

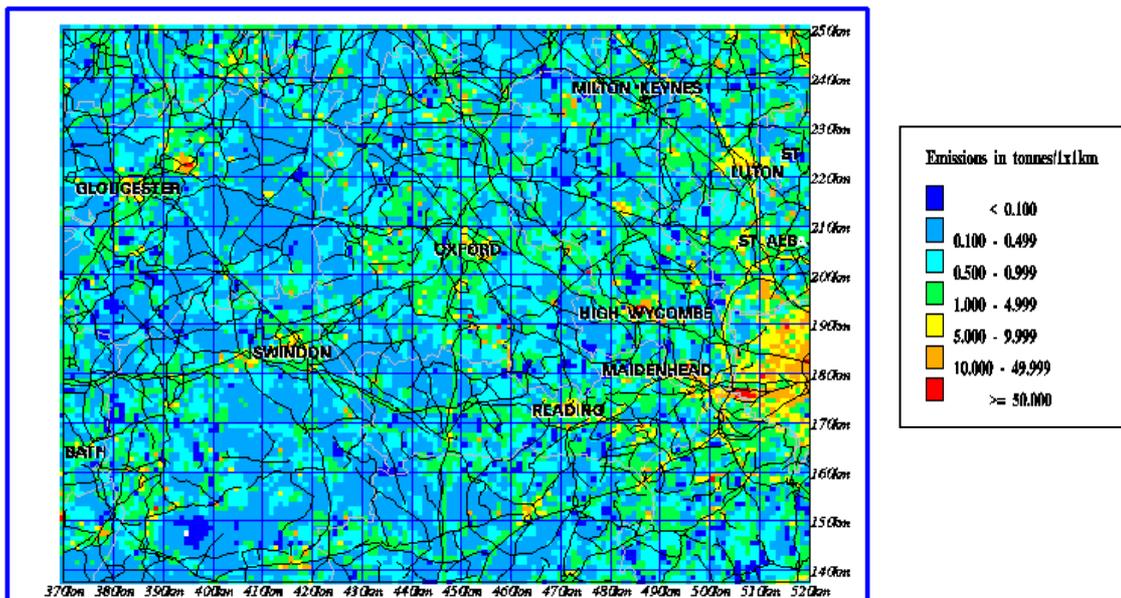


Figure 10 Estimated emissions of sulphur dioxide based on 1km x 1km grid squares (DETR)

8.6 Assessment

This first stage of review and assessment has not identified any significant industrial sources of SO₂ within or around the District that could lead to the exposure of the public over a year. However, the SO₂ emissions map indicates that there are emissions of SO₂ over the 40 tonnes per year level within the High Wycombe area. The urban background concentrations for High Wycombe are elevated compared to the surrounding area.

This pollutant will need to be looked at further to find evidence of why estimates of SO₂ in the High Wycombe area are as high as they are. The estimates will need to be compared to monitoring data.

It is recommended that a second stage review and assessment for SO₂ is required.

Chapter 9

9.1 The Carbon Monoxide Standard

The standard for carbon monoxide is 10ppm expressed as a running 8 hour mean.

9.2 Sources of Carbon Monoxide in the UK

The main source of carbon monoxide in the UK is road transport, which accounted for 71% of the total emission of 4.6 million tonnes in 1996. Road transport sources constitute a larger proportion of the total in most cities and therefore expected near busy, especially congested, roads.

9.3 National Measures for the Control of Carbon Monoxide

The Government states that there is a year to year variability in the maximum running 8-hour average and exceedances of the CO standard. Levels have decreased over the period 1990 to 1997 however, the number of exceedances varies yearly.

The Government expects national policies to deliver the national air quality objective by the end of 2005 with the possible exception, in some years, of the near vicinity of heavily trafficked roads or in the vicinity of certain statutory sources. The Government states that only those authorities with such sources, which have the potential to result in elevated levels of CO in relevant locations, are expected to proceed to a second stage of review and assessment. The Government expects that most local authorities will not need to progress past the first stage.

9.4 Review of Information

The first stage review and assessment for carbon monoxide requires the following information for consideration:

- Details of Part A authorised processes present within the authority's area;
- Details of Part B authorised processes present within the authority's area;
- Planned developments of the above mentioned types in the locality;
- Details of any significant sources of carbon monoxide in neighbouring areas which could impact significantly within the authority's area;
- Details of any surveys or investigations undertaken;
- Information on current and 2005 forecast annual average daily traffic flows for existing or proposed roads where the traffic flow is greater than 50,000 per day;
- Information on current urban background concentrations from national maps;
- Details of any surveys or investigations undertaken to obtain information to compile the report.

Part A and B authorised processes in Wycombe District were investigated to ascertain whether emissions from these processes would contribute to overall CO levels.

Information was gathered from neighbouring local authorities of any Part B processes that may impact on levels of CO within Wycombe District.

The Environment Agency was contacted to provide information of Part A processes that may have significant effects on levels of CO within the District.

Bucks County Council and the Planning Department have been consulted to as whether there are any planned developments that may impact on CO levels.

Information was taken from the DETR Internet page regarding background concentrations of CO. Information is available on CO levels from the continuous monitoring programme.

9.5 Local Sources of Carbon Monoxide

For all existing and proposed activities identified from above there needs to be an assessment of whether they have the potential, singly or together, to emit significant quantities of carbon monoxide and are expected to be in existence by the end of 2005. Sources are chosen where there is a potential for exposure of individuals in relevant locations.

For the purposes of the First Stage review and assessment the sources can be assumed to be:

- Road links with current or projected annual average daily traffic flow greater than 50000;
- Part A authorised processes with the potential to emit significant quantities of CO (Table 7);
- Planned developments of the above mentioned types in the locality, including those which will increase traffic flow.

Significant Sources of Carbon Monoxide	
Part A Process	
1.1a Reforming NG	-
1.3b CI Engines	-
2.1 Iron, Steel & Alloys	-
2.2 Non ferrous	-
4.1 Petrochemicals	-
4.5 Inorganics	-
5.1 Incineration	-

Table 7 Part A Processes Identified as significant sources of carbon monoxide (LAQM TG4/98)

The significant source of CO that may have an effect on reaching the prescribed objective in Wycombe District is the M40 dissecting the District.

The urban background concentrations of CO within the District are well below the prescribed standard. Even roadside levels in urban areas are below the prescribed standard.

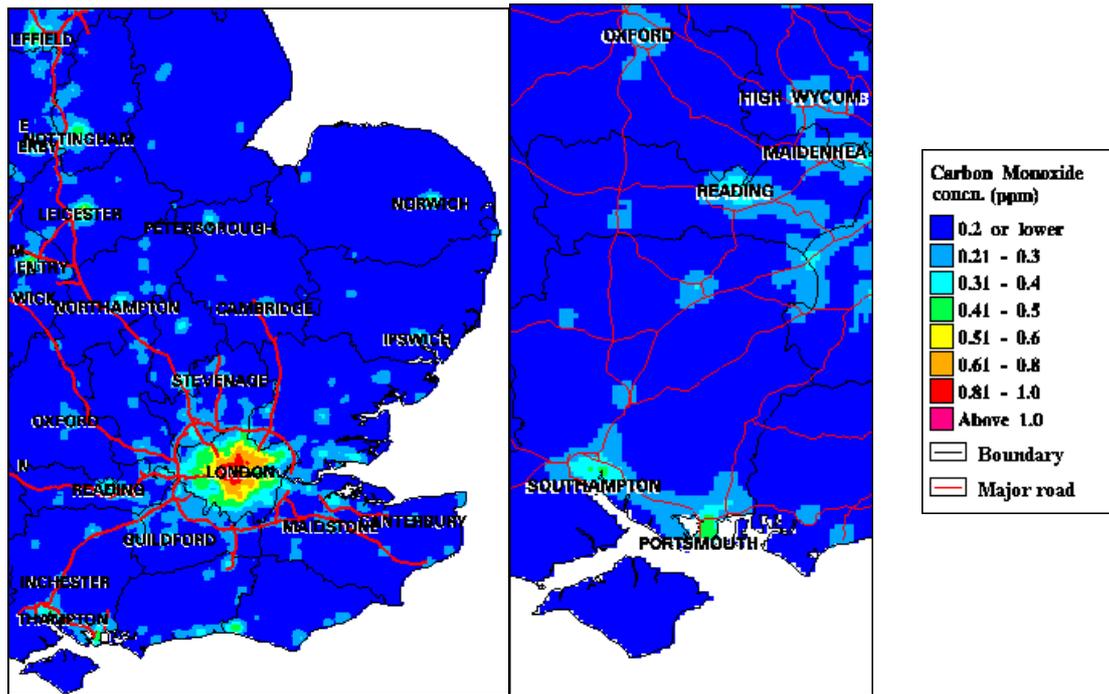


Figure 11 Estimated urban background concentrations of carbon monoxide taken from national maps (DETR)

9.6 Assessment

Review of the above information has identified significant sources of CO that could have an effect on reaching the prescribed objectives within the District.

It is recommended that a second stage review and assessment for CO is required.

Tables and Figures

Table 1 Part A & B Processes Identified as significant sources of benzene (LAQM TG4/98)
Figure 1 Estimated urban background concentrations of benzene taken from national maps (DETR)

Figure 2 Annual average benzene diffusion tube results for 1998

Table 2 Part A & B Processes Identified as significant sources of 1,3 – Butadiene (LAQM TG4/98)

Table 3 Part A & B Processes Identified as significant sources of lead (LAQM TG4/98)

Figure 3 Estimated urban background concentrations of lead taken from national maps (DETR)

Table 4 Part A & B Processes Identified as significant sources of NO₂ (LAQM TG4/98)

Figure 4 Estimated urban background concentrations of nitrogen dioxide taken from national maps (DETR)

Figure 5 Map showing roads of concern regarding nitrogen dioxide levels (motorway in blue and A-roads in red)

Figure 6 Annual average nitrogen dioxide diffusion tube results for 1998

Table 5 Part A & B Processes Identified as significant sources of lead (LAQM TG4/98)

Figure 7 Estimated regional background concentrations of PM₁₀ due to secondary particles taken from national maps (DETR)

Figure 8 Location of quarrying process at Little Marlow (Quarry in red) Table 6 Part A & B Processes Identified as significant sources of lead (LAQM TG4/98)

Figure 9 Estimated urban background concentrations of sulphur dioxide taken from national maps (DETR)

Figure 10 Estimated emissions of sulphur dioxide based on 1km x 1km grid squares (DETR)

Table 7 Part A Processes Identified as significant sources of carbon monoxide (LAQM TG4/98)

Figure 11 Estimated urban background concentrations of carbon monoxide taken from national maps (DETR)

References

Framework for Review and Assessment of Air Quality. (LAQM.G1(97)). *HMSO*

The United Kingdom National Air Quality Strategy 1997. *HMSO*

Air Pollution in the United Kingdom, 1996. *DETR*

Review and Assessment: Pollutant Specific Guidance. (LAQM.TG4(98)). *HMSO*

The Handbook on Air Pollution and Health (1997). *HMSO*

Appendix 2

Environmental Protection Act 1990, Part 1 Authorised Processes

Wycombe District

Process Name	Process Type	Part A or B	Location - High Wycombe unless otherwise stated	Grid Reference
Hazlemere Motor Co	Waste Oil Burner <0.4mw	B	Eastern Dene Hazlemere	894958
Whiteleaf Service Station	"	B	Place Farm Way, Monks Risborough	809046
Desborough Motor Co	"	B	Desborough Avenue, High Wycombe	858934
Furnwood	"	B	Westbourne St, High Wycombe	856934
M & J Motors	"	B	Downley, High Wycombe	848953
Pilbeam Motors	"	B	Chapel Lane, High Wycombe	843937
Chapel Lane Motors	"	B	Chapel Lane, High Wycombe	843937
J W Services	"	B	Chairborough Road, High Wycmbe	850934
Burleighfield Arts	Metal (Non-Ferrous)	B	Loudwater	906906
Brophy Castings	"	B	Soho Mills, Wooburn Green	908878
Vencast Foundries	"	B	Lincoln Road	851926
Ready Mix (Transite)	Cement & Lime	B	Hillbottom Road	837935
Redland Readymix	"	B	Marlow Road, Little Marlow	878880
Tarmac Topmix	"	B	Marlow Road, Little Marlow	869872
Greenwood Recycling	Other Minerals	B	Marlow Road, Little Marlow	869872
Orion	Di-isocyanate	B	Halifax Road	844921
Vitramon	Coating	B	Wycombe Lane, Wooburn Green	913891
J C & M P Smith	"	B	Spring Gardens	876927
Ercol Furniture	"	B	Spring Gardens	876927
LPK (JH) Ltd	"	B	Abercrombie Avenue	853936
Teal Furniture	"	B	Wycombe Road, Stokenchurch	763962
Goodearl Risborough	"	B	Picts Lane, Princes Risborough	801026
William Bartlett	"	B	Grafton Street	849938
Foam Engineers	"	B	Dashwood Avenue	851935
Molins	"	B	Haw Lane, Saunderton	807985

Process Name	Process Type	Part A or B	Location - High Wycombe unless otherwise stated	Grid Reference
Glory Mill Paper	"	B	Glory Mill Lane, Wooburn Green	912896
Vitafoam	"	B	Victoria Street	857935
Hypnos	"	B	Station Approach, Princes Risborough	801027
Touchwood Industries	"	B	Copyground Lane	849934
Antocks Lairn	"	B	Lancaster Road	853919
T & L Furniture	"	B	The Row, Lane End	809920
Vercos Furniture	"	B	Chapel Lane, High Wycombe	843939
Harrison & Sons	"	B	Coates Lane, High Wycombe	864944
Lenson Heath	"	B	Thames Estate, Marlow	857866
Orion	"	B	Halifax Road	844921
Rye Mill	Car Respraying	B	London Road	875926
Evans Halshaw	"	B	London Road	890919
West Wycombe Coachwork	"	B	Piddington	809942
Risborough Coachworks	"	B	Duke Street, Princes Risborough	809034
Wycombe Marsh	"	B	London Road	885920
Carcare	"	B	Abercrombie/Industrial Estate	852936
Markhams	"	B	Desborough Park Road	858934
Hazlemere Coachwork	"	B	Inkerman Drive, Hazlemere	898963
LPK (JH) Ltd	Timber	B	Abercrombie Avenue	853936
Deanes	"	B	Wycombe Lane, Wooburn Green	913891
Goodearl-Risborough	"	B	Picts Lane, Princes Risborough	801026
Evans International	"	B	Lincoln Road	852924
Ercol	"	B	London Road	876927
JC & MP Smith	"	B	London Road	876927
Touchwood	"	B	Copyground Lane	849934
Wycombe Panels	"	B	Coronation Road	847920
Molins	"	B	Haw Lane, Saunderton	807985
Elga	Regeneration of Ion Exchange Resins	A	Lane End	809918
Railko	Asbestos	A	Boundary Road, Loudwater	902903