IPSWICH BOROUGH COUNCIL

ENVIRONMENTAL PROTECTION SERVICES

Report on the Updating and Screening Assessment for Air Quality in the Borough of Ipswich

December 2003

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EXECUTIVE SUMMARY

The Government published its revised Air Quality Strategy for England, Scotland, Wales and Northern Ireland in January 2000, as a direct response to the requirements of the Environment Act 1995. The Air Quality Strategy set health based standards and objectives for seven pollutants, namely Benzene, 1,3-Butadiene, Carbon Mon oxide, Lead, Nitrogen Dioxide, Particulate Matter (PM_{10}) and Sulphur Dioxide.

All local authorities are required to periodically review and assess air quality, as required by Part IV of the Environment Act 1995, to determine whether the Air Quality Objectives will be met by specified target dates. Ipswich Borough carried out the first round of review and assessments between 2000 and 2001, producing three stage reports over this period.

The updating and screening assessment report is the second round of review and assessment undertaken by the Council, and is intended to update the previous studies by screening for the potential sources of pollutants detailed in the Air Quality Strategy in Ipswich Borough. Where screening has identified a significant risk of the potential emission source which would lead to an exceedance of the Air Quality Objective, the Council must proceed to a Detailed Assessment.

The Updating and Screening Assessment carried out for Benzene, Carbon Monoxide, 1,3-Butadiene, Lead and Sulphur Dioxide confirm that the risk of Air Quality Objectives are unlikely to be exceeded, therefore no further assessment of these pollutants is required.

In contrast, the Updating and Screening Assessment for Nitrogen Dioxide indicate that the Council will fail to meet Air Quality Objectives in three areas, based on our current screening method. Therefore, detailed assessment is required to confirm the findings of this report. At Detailed Assessment the Council may consider declaring Air Quality Management Areas in those areas that fail to meet the Air Quality targets.

The Updating and Screening Assessment for Particulate Matter confirms that Detailed Assessment for potential sources is required in respect of traffic flow and of existing industrial sources in the Port area of Ipswich. Ipswich Borough Council will report the findings of its Detailed Assessment for the potential emission sources in 2004.

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1. INTRODUCTION

1.1 Air Quality Strategy

The UK Government and devolved administrations for Scotland, Wales and Northern Ireland published the Air Quality Strategy in January 2000. Within the strategy there are seven health-based standards for pollutants of greatest local concern. These are for Benzene, 1,3-butadiene, carbon monoxide, nitrogen dioxide, particulate matter (PM_{10}), sulphur dioxide and lead. In addition to the air quality standards, air quality objectives have been derived. These are specified in the Air Quality Regulations 2000, and the Air Quality (Amendment) Regulations 2002. The EU has set limit values for certain pollutants but there is currently no statutory obligation to assess air quality against these values.

1.2 Review and Assessment

The Environment Act 1995 provides the framework for local air quality management across England and Wales. Part IV of the Act placed a duty on local authorities to periodically review and assess air quality within their area. The review and assessment of air quality is the first step in the local air quality management process. This process identifies those areas where it is likely that the Air Quality objectives will be exceeded. If any of these areas are identified, the Local Authority must designate the area as an Air Quality Management Area (AQMA).

Ipswich Borough Council has already carried out the first round of review and assessment. This was completed in March 2001 and its aim was to determine the need for designation of Air Quality Management Areas. The review and assessment for Ipswich concluded that it was unlikely that the Air Quality objectives for the seven pollutants for which objectives had been set would be exceeded at any location within the Ipswich Borough by the objective years and therefore it was not necessary to declare any Air Quality Management Areas at this stage. There were, however, some areas of concern where levels of Nitrogen Dioxide were expected to be close to the objective level and the need to look at these further was recognised.

For further information on the first round of review and assessment, reference should be made to the Stage 1, 2 and 3 reports. These are available from Environmental Protection Services, Ipswich Borough Council, Civic Centre, Civic Drive, Ipswich, IP1 2EE.

All Local Authorities are now required to carry out a second round of review and assessment. The Government has issued guidance to assist Local Authorities in this, namely Technical Guidance (LAQM.TG(03)). It has been recommended that Local Authorities use a planned approach and only undertake a level of assessment that is commensurate with the risk of an Air Quality objective being exceeded.

The first stage of the review and assessment is an updating and screening assessment which is to be undertaken by all authorities. This is based on a checklist to identify those matters that have changed since the first round was completed, and which may now require further assessment. This updating and screening assessment should cover: new monitoring data; new objectives; new sources or significant changes to existing sources, either locally or in neighbouring authorities; other local changes that might affect air quality etc. If there is a risk that these changes may be significant, then a simple screening assessment should be carried out.

Where the updating and screening assessment has identified a risk that an Air Quality objective will be exceeded at a location with relevant public exposure, the authority will be required to undertake a Detailed Assessment following the guidance set out in the guidance document. The aim of this Detailed Assessment should be to identify with reasonable certainty whether or not a likely exceedance will occur. The assumptions within the Detailed Assessment will need to be considered in depth, and the data that are collected or used, should be quality-assured to a high standard. This is to ensure that authorities are confident in the decisions they reach. Where a likely exceedance is identified, then the assessment should be sufficiently detailed to determine both its magnitude and geographical extent. Local Authorities should not declare an AQMA unless a Detailed Assessment has been completed.

Statutory guidance in the form of LAQM PG(02) and LAQM TG(02) is issued to assist local authorities in fulfilling their air quality duties.

2. AIR QUALITY AND HEALTH

There is now a better understanding of the link between poor air quality and its effect on human health. Short-term increases in particles, sulphur dioxide and nitrogen dioxide are associated with increased deaths brought forward and increased respiratory or cardiovascular hospital admissions in the elderly or sick. These pollutants are also known to worsen symptoms in those with asthma. Long term exposure to particles is associated with reduced life expectancy, mainly from heart disease. Carbon Monoxide increases symptoms in those with heart disease, and lead affects brain development in children. Benzene and 1,3-butadiene can both cause cancer.

3. AIR QUALITY OBJECTIVES

The air quality objectives set out in the Air Quality Regulations provide the statutory basis for the system of local air quality management. They are listed in Table 1.

Table 1: Air Quality Objectives

Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management			
	Air Quality Objective		
Pollutant	**Concentration**	**Measured as**	**Date to be Achieved by**
Benzene			
All authorities	16.25 µg/m^3	running annual mean	3.12.2003
Authorities in England and Wales only	5.00 µg/m^3	annual mean	31.12.2010
Authorities in Scotland and Northern Ireland only	3.25 µg/m^3	running annual mean	31.12.2010
1,3-butadiene	2.25 µg/m^3	running annual mean	31.12.2003
Carbon Monoxide			
Authorities in England, Wales and Northern Ireland only[a]	10.0 mg/m^3	maximum daily running 8-hour mean	31.12.2003
Authorities in Scotland only	10.0 mg/m^3	running 8-hour mean[b]	31.12.2003
Lead	0.5 µg/m^3 0.25 µg/m^3	annual mean annual mean	31.12.2004 31.12.2008
Nitrogen dioxide[c]	200 µg/m^3 not to be exceeded more than 18 times a year 40 µg/m^3	1-hour mean annual mean	31.12.2005 31.12.2005
Particles (PM_{10}) (gravimetric)[d]	50 µg/m^3 not to be exceeded more than 7 times a year 18 µg/m^3	24-hour mean annual mean	31.12.2010 31.12.2004
All authorities	40 µg/m^3	annual mean	31.12.2004
Authorities in Scotland only[e]	50 µg/m^3 not to be exceeded more than 7 times a year 18 µg/m^3	24-hour mean annual mean	31.12.2010 31.12.2010
Sulphur Dioxide	350 µg/m^3 not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3 not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3 not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

[a] In Northern Ireland none of the objectives are currently in regulation. Air Quality (Northern Ireland) Regulations are scheduled for consultation early in 2003

[b] The Air Quality Objective in Scotland has been defined in Regulations as the running 8-hour mean, in practice this is equivalent to the maximum daily running 8-hour mean.

[c] The objectives for nitrogen dioxide are provisional.

[d] Measured using the European gravimetric transfer sampler or equivalent.

[e] These 2010 Air Quality Objectives for PM_{10} apply in Scotland only, as set out in the Air Quality (Scotland) Amendment Regulations 2002

Local Authorities are not yet statutorily required to assess levels of particles for 2010.

Ipswich Borough Council is required to make a judgement as to whether the air quality objectives are likely to be achieved within the borough boundary by the relevant deadline. Where objectives are likely to be met, it will not be necessary to designate an AQMA. Where they are not likely to be achieved in any relevant locations, an AQMA must be declared.

4. PUBLIC EXPOSURE

It is clear from the statutory guidance that likely exceedences of the objectives should be assessed in relation 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'. Local Authorities should base their reviews and assessments on 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. Exceedences of the objectives should not be considered at any location where relevant public exposure would not be realistic. The statutory guidance gives further information on this subject and for the purpose of assisting local authorities, some examples of where the objectives should, and should not apply, are summarised. These examples are given in Table 2.

Table 2: 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	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc	Building facades of offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean and 8-hour mean	All locations where the annual mean objective would apply. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (eg pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more. Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

5. CARBON MONOXIDE

5.1 Air Quality Standard and Objective

Standard: 11.6mg/m^3 based on an 8-hour running mean
Objective: 10mg/m^3 maximum daily 8-hour mean concentration to be achieved by the end of 2003

5.2 National Perspective

The main source of Carbon Monoxide in the United Kingdom is from road transport. This accounted for 67% of the total releases in the year 2000. Annual emissions of carbon monoxide have been falling steadily since the 1970's and are expected to continue to do so. Current projections indicate that road transport emissions will decline by a further 42% between 2000 and 2005. It is expected that existing policies will reduce levels to below the objective by about 2003.

5.3 Updating and Screening Assessment

5.3.1 Previous Review and Assessment

Local Authorities should maximise and build on data collation and assessments completed during the first round of review and assessment. The Council concluded that it was unlikely that there would be any exceedances of the Air Quality objective at that time for carbon monoxide.

This review and assessment is based upon a checklist approach which is detailed in TG(03). This is summarised in Table 3. This describes the information that authorities should collate for the review and assessment against the 2003 objective.

Table 3: Summary of the Updating and Screening Checklist Approach for Carbon Monoxide

Report Paragraph No.	Source, Location or data that need to be assessed.
5.3.3	Monitoring Data
5.3.4	Very busy roads

5.3.2 Background Concentrations

Estimated Annual Mean background concentrations for 2001 have been mapped for the UK and were obtained via the Internet (www.airquality.co.uk/archive/laqm/tools.php). Correction factors to estimate concentrations for the objective year of 2003 are provided in the guidance.

The estimated annual mean concentration of carbon monoxide in 2001 for Ipswich Borough ranges from 0.288mg/m^3 on the outskirts of the town and 0.401mg/m^3 in the centre. If corrected for 2003, the concentrations range from 0.24 (0.288x0.826) – 0.33 (0.401x0.826) mg/m^3.

5.3.3 Monitoring Data

There is no monitoring data for Carbon Monoxide available for the Ipswich area. There are a number of monitoring sites within the Eastern region which form part of the national monitoring network. Table 4 summarises results for two of these sites.

Table 4: Summary of Maximum Daily Running 8-Hour Mean Carbon Monoxide Concentrates Measured At 2 National Network Monitoring Sites (1999-2001)

Site	Site Classification	Maximum daily running 8-hour mean concentration		
		1999 mg/m^3	2000 mg/m^3	2001 mg/m^3
Norwich Centre	Urban Centre	3.4	3.2	4.1
Southend-on-Sea	Urban background	-	-	2.9

There are no exceedances of the Air Quality Objective at any of the National Network Sites closest to Ipswich.

No further assessment is required.

5.3.4 Road Traffic Sources

The guidance states that 'very busy roads and junctions' should be identified in areas where the 2003 background is expected to be above 1mg/m^3. Very busy roads and junctions are defined as follows:

- single carriageway roads with daily average traffic flows exceeding 80,000 vehicles per day;
- dual carriageway (2 or 3 lane) roads with daily average traffic flows which exceed 120,000 vehicles per day;
- motorways with daily average traffic flows which exceed 140,000 vehicles per day.

At junctions, flows should be added.

There are no roads meeting the above criteria within the Ipswich district. In addition, there are no locations where the 2003 background is expected to be above 1 mg/m^3 (Paragraph 5.3.2 has details of background levels). No further assessment is required.

5.4 Conclusions

Using the methods set out in the statutory guidance there have been no significant sources of carbon monoxide identified within the Ipswich borough. The objective concentration of 10mg/m^3 maximum daily 8-hour mean is therefore expected to be achieved by the end of 2003.

6. BENZENE

6.1 Air Quality Standards and Objectives

Standard: 16.25 µg/m^3 based on a running annual mean
Objective: 16.25 µg/m^3 running annual mean to be achieved by the end of 2003
5 µg/m^3 annual mean to be achieved by the end of 2010

6.2 National Perspective

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

A number of policy measures already in place, or planned for future years, will continue to reduce emissions of benzene.

EU legislation has reduced the maximum benzene content of petrol to 1% since January 2000, from a previous upper limit of 5%. The European auto-oil programme will reduce emissions for cars and light-duty vehicles further, and vapour recovery systems reduce emissions of benzene from the storage and distribution of petrol.
Forecasts based on national mapping suggest that the policy measures currently in place will achieve the 2003 objective at all urban background and roadside/kerbside locations. Whilst the 2010 objectives are expected to be met at all urban background, and most roadside locations, there is the possibility for some remaining exceedances which will require additional measures at a local level.

6.3 Updating and Screening Assessment

6.3.1 Previous Review and Assessment

In completing the updating and screening assessment, authorities are encouraged to maximise and build upon the data and assessments completed during the first round of review and assessment.

The Council concluded that it was unlikely that there would be any exceedances of the Air Quality objective at that time for benzene.

This review and assessment is based upon a checklist approach which is detailed in TG(03) and summarised in Table 5. This describes the information that authorities should collate for updating and Screening Assessment against the 2003 and 2010 objective.

Table 5: Summary of the Updating and Screening Checklist approach for Benzene.

Report Paragraph No.	Source, location or data that need to be assessed
6.3.3 6.3.4 6.3.5 6.3.6 6.3.7	Monitoring data Very busy roads or junctions in built-up areas Industrial sources Petrol stations Major fuel storage depots (petroleum only)

6.3.2 Background Concentrations

Estimated Annual Mean background concentrations for 2003 and 2010 have been mapped for the UK and were obtained via the Internet (www.airquality.co.uk/archive/laqm/tools.php).

The estimated annual mean background concentration of Benzene for 2003 for Ipswich ranges between 0.36 and 0.692 µg/m^3. The predicted concentration for 2010 ranges between 0.285 and 0.54 µg/m^3.

6.3.3 Monitoring Data

There is no monitoring data for Benzene available for the Ipswich area.

6.3.4 Road Traffic Sources

The guidance states that 'very busy roads and junctions' should be identified in areas where the 2010 background is expected to be above 2 µg/m^3. 'Very busy roads and junctions' are defined as follows:

- single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day;
- dual carriageway (2 or 3 lane) roads with a daily average traffic flow which exceeds 120,000 vehicles per day;
- motorways with daily average traffic flows which exceed 140,000 vehicles per day

At junctions flows should be added.

There are no roads meeting the above criteria within the Ipswich district. In addition, background concentrations of Benzene are not expected to exceed 5 µg/m^3 for the year 2010. The highest estimated annual mean benzene concentration in the Ipswich Borough derived from the internet is 0.54 ug/m^3 (see para 6.3.2). This is significantly below the 2 µg/m^3 criteria specified and it is not necessary to progress further with the updating and screening checklist for roads.

6.3.5 Industrial Sources

A list of industrial processes with the potential to emit significant quantities of benzene in 2003 and 2010 is set out in Annex 2 of the guidance. (TG(03)).

There is just one process within the Ipswich borough with the potential to emit significant quantities of benzene. This is Vopak Terminal, Cliff Quay, Ipswich and is a petrol terminal authorised under the Environmental Protection Act 1990, Part B. This process was not identified as one with the potential to emit significant quantities of benzene during the last review and assessment but has recently increased the throughput of petrol.

Emissions from this process are likely/possible from fugitive sources such as the vapour recovery unit, via the tank seals and via the pressure release valve. No emission monitoring has taken place of the fugitive emissions from this process. As such the emission factor database was used to estimate emissions. As a worst case scenario an emission factor of 0.036 T/yr was obtained and assessed within the nomogram provided for fugitive emissions in the guidance. The distance of the nearest relevant receptor to the source (at 61m) is greater than that where ground level concentrations are predicted to be 1.625 µg/m^3 (for assessment against the 2003 objective) or 0.22 µg/m^3 (for assessment against the 2010 objective). As such no further investigation is required.

There are no industrial sources with the potential to emit significant quantities of benzene in neighbouring authority areas.

6.3.6 Petrol Stations

There is some evidence that petrol stations can emit benzene in sufficient quantities to put the 2010 objective level at risk of being exceeded.

The guidance (TG(03)) requires that petrol stations which meet the following criteria should be investigated further:

(i) Petrol stations with an annual throughput of more than 2,000 m^3 of petrol (2 million litres per annum); and

(ii) Near to a busy road (more than 30,000 vehicles per day); and

(iii) With relevant exposure (eg residential flats, schools, hospitals) within 10m of the pumps.

Ipswich Borough Council authorises petrol stations with a throughput of greater than 1,000 m^3/annum under the EPA 1990. Of these, none had relevant exposure within 10m of the pump. No further investigation is required.

6.3.7 Major Fuel Storage Depots (petrol only)

A list of major fuel storage depots is given in the guidance. There are none listed within the Ipswich borough or neighbouring authority areas. Vopak Terminal on Cliff Quay stores petrol and has been discussed in section 6.3.5 of this report.

6.4 Conclusions

Using the methods set out in the statutory guidance there have been no significant sources of Benzene identified within the Ipswich Borough. The objective concentration of 16.25 µg/m^3 running annual needs to be achieved by end of 2003, and 5 µg/m^3 annual needs to be achieved by end of 2010 is therefore expected to be achieved.

7. 1,3-BUTADIENE

7.1 Air Quality Standard and Objective

Standard: 2.25 µg/m^3 based on a running annual mean
Objective: 2.25 µg/m^3 running annual mean to be achieved by end of 2003

7.2 National Perspective

The main source of 1,3-butadiene in the United Kingdom is vehicle emissions. In addition, it is an important industrial chemical and is handled in bulk at a small number of premises.

The increasing numbers of vehicles equipped with three way catalysts will significantly reduce emissions of 1,3-butadiene in future years. Recently agreed further reductions in vehicle emissions and improvements to fuel quality, including those 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 of 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 updating and screening assessment.

It is expected that the air quality objective will be achieved nationally by the end of 2003. Concentrations measured at a limited number of national network sites already indicate that maximum running annual mean concentrations of 1,3-butadiene are below the objective at urban background/centre and roadside locations.

7.3 Updating and Screening Assessment

7.3.1 In completing the updating and screening assessment, authorities are encouraged to maximise and build upon the data and assessments completed during the first round of review and assessment.

The Council concluded that it was unlikely that there would be any exceedances of the Air Quality Objective at that time for 1,3-butadeine.

This review and assessment is based upon a checklist approach which is detailed in TG(03) and summarised in Table 6. This describes the information that authorities should collate for updating and Screening Assessment against the 2003 objective.

Table 6: Summary of the Updating and Screening Checklist approach for 1,3-butadiene

Report Paragraph No.	Source, Location or data that need to be assessed
7.3.3 7.3.4 7.3.4	Monitoring data New Industrial Sources Existing industrial sources with significantly increased emissions

7.3.2 Background Concentrations

Estimated Annual Mean background concentrations 2003 have been mapped for the UK and were obtained from the Internet (www.airquality.co.uk/archive/lagm/tools.php).

The estimated annual mean concentration of 1,3-butadiene for Ipswich range from 0.132 – 0.231 µg/m^3 in 2003.

7.3.3 Monitoring Data

There is no monitoring data for 1,3-butadiene available for the Ipswich area. There are no monitoring sites in the Eastern area which form part of DEFRA's National Monitoring Network.

7.3.4 Industrial Sources

A list of industrial processes with the potential to emit significant quantities of 1,3-butadiene in 2003 is set out in Annex 2 of the guidance. There are no relevant processes within the Ipswich borough.

There are no such processes within neighbouring authority areas that could impact on the Ipswich Borough.

7.4 Conclusions

Using the methods set out in the statutory guidance there have been no significant sources of 1,3-butadiene identified within the Ipswich Borough. The objective level of 2.25 µg/m^3 running annual mean by the end of 2003 is therefore expected to be achieved.

8. LEAD

8.1 Air Quality Standard and Objective

Standard: 0.5 µg/m^3 annual mean
Objective: 0.5 µg/m^3 annual mean to be achieved by end of 2004
0.25 µg/m^3 annual mean to be achieved by end of 2008

8.2 National Perspective

Emissions of lead are released from a variety of industrial activities such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding and tank lining/piping.

Most of the national airborne emissions of lead have arisen from petrol-engined vehicles. However, the agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel fuels (part of the Auto-oil Programme) has led to the ban on sales of leaded petrol in the United Kingdom, with effect from 1 January 2000. Emissions of lead are now restricted to a variety of industrial activities.

There have been no AQMAs designated in respect of the 2004 or 2008 Air Quality Objectives, as a result of the first round of review and assessments. The guidance advises that only those authorities with relevant locations in the vicinity of major industrial processes that emit significant quantities of lead, will need to progress beyond the Updating and Screening Assessment.

At background and kerbside sites measuring lead nationally, concentrations are well below the objectives for both 2004 and 2008. However, locations in proximity to non-ferrous metal production and foundry processes are deemed to be at risk and should be investigated as part of this review.

8.3 Updating and Screening Assessment

8.3.1 In completing the Updating and Screening Assessment, authorities are encouraged to maximise and build upon the data and assessments completed during the first round of review and assessment. The Council concluded that it was unlikely that there would be any exceedances of the Air Quality Objective at that time for lead.

This review and assessment is based upon a checklist approach which is detailed in TG(03) and summarised in Table 7. This describes the information that authorities should collate for updating and screening assessment against the 2004-2008 objectives.

Table 7: Summary of the Updating and Screening Checklist Approach for Lead

Report Paragraph No.	Source, Location or data that need to be assessed
8.3.3 8.3.4 8.3.5	Monitoring data outside an AQMA New Industrial Sources Industrial sources with significantly increased emissions

8.3.2 Background Concentrations

There is currently no information on background concentrations of lead in the Ipswich area.

8.3.3 Monitoring Data

There is no monitoring data for lead available for the Ipswich area.

There are no monitoring sites locally which form part of the National Monitoring Network.

8.3.4 New Industrial Sources

There are no new industries in the Ipswich area and therefore no new industrial sources of lead since the first round of review and assessments.

8.3.5 Industrial Sources

A list of industrial processes with the potential to emit significant quantities of lead is set out in the guidance. (TG(03)).

There are 6 processes within the Ipswich area which are identified within the guidance as having the potential to emit significant quantities of lead. These are:

Part A Processes –
Ipswich Hospital Clinical Waste Incinerator
Cerro Manganese Bronze
Agilent Technology

Part B Processes –
Compair UK Ltd
Manganese Bronze
Crane Ltd

Ipswich Hospital Clinical Waste Incinerator:
The guidance recommends that processes require further investigation if they have substantially increased emissions (greater than 30%) since the last round of review and assessment.

Emissions of lead from this process have reduced since the last round of review and assessment. As such there is no need for further investigation.

Cerro Manganese Bronze
Emissions of lead from this process have reduced since the last round of review and assessment. As such there is no need for further investigation.

Agilent Technology
This process has ceased. No further investigation is required.

Compair UK Ltd
This process is a foundry with emissions through roof vents. Emissions of lead have not been measured from this process and so as a worst case the total amount of lead in the process is assumed to be emitted.

The estimate of annual lead melted with raw materials is 2.7 kg or 0.0027t. If this figure is used in the nonogram for fugitive and low level sources, and a stack height of 0m (worst case) used, then at 48m from the source the maximum annual mean concentration is less than 0.025 µg/m^3. This is equivalent to 10% of the 2008 Air Quality Objective and if not exceeded at relevant receptor locations then there is no need for further detailed assessment.

There are no relevant receptor locations within 48m of the process and as such no further investigation is necessary.

Manganese Bronze
Emissions of lead are not measured from this process. Using the Air Quality helpline a conservative annual lead throughput for the process was estimated as 0.003621 kg/annum. This figure is well below the guidance figures of emission of lead which will give rise to an annual mean ground level concentration of 0.025 µg/m^3. No further investigation is therefore required.

Crane Ltd
This process consists of a copper alloy process, galvanising processes, electric iron melting and malleable iron and bronze foundry.

Unfortunately, emissions of lead are not monitored from this process. A conservative estimate of 0.15t lead per annum is input into the process. A percentage of this will be emitted. There is no suitable emission factor available to use with this figure. Advice from the Government's air quality helpline is that based on this figure it is unlikely that actual emission would be significant and that there is no need to proceed with further investigation into this source.

8.4 **Conclusion**

Using the methods set out in the statutory guidance there have been no significant sources of lead identified within the Ipswich Borough. The objective levels of 0.5 µg/m^3 annual mean to be achieved by the end of 2004 and 0.25 ug/m^3 annual mean to be achieved by the end of 2008 are therefore expected to be achieved.

9. NITROGEN DIOXIDE

9.1 Air Quality Standards & Objectives

Standard: 200 µg/m^3 1 hour mean
40 µg/m^3 Annual Mean Concentration

Objective: 200 µg/m^3 1 hour mean not to be exceeded more than 18 times a year to be achieved by end of 2005.
40 µg/m^3 annual mean concentration to be achieved by end of 2005.

The first Air Quality Daughter Directive also sets limit values for nitrogen dioxide, which have been transposed into UK legislation. The Directive includes:

- A 1-hour limit value of 200 µg/m^3, not to be exceeded more than 18 times a year, to be achieved by 1 January 2010.
- An annual mean limit value of 40 µg/m^3 to be achieved by 1 January 2010.

9.2 National Perspective

The major source of nitrogen oxides is road transport. Predominant sources include major roads carrying large volumes of high speed traffic and city centres with congested traffic. As a result of various policy measures the contribution of road transport to nitrogen oxides emissions has declined in recent years. Further reductions are expected up until 2010 and beyond.

Other significant sources of nitrogen oxides emissions include the electricity supply industry and other industrial and commercial sectors. However, emissions from these sources have also declined due to the fitting of low nitrogen oxide burners and the increased use of natural gas plant.

The annual mean objective level of 40 µg/m^3 is currently widely exceeded at roadside sites throughout the United Kingdom. The number of exceedances of the 1-hour objective show considerable year to year variation, and are driven by meteorological conditions which give rise to winter episodes of poor dispersion and summer oxidant episodes. Exceedances of the short term objective have generally only been recorded at roadside or kerbside sites in close proximity to heavily trafficked roads in major conurbations.

9.3 Updating and Screening Assessment

9.3.1 In completing the Updating and Screening Assessment, authorities are encouraged to maximise and build upon the data and assessments completed during the first round of review and assessment.

The Council concluded that it was unlikely that there would be any exceedances of the Air Quality Objectives at that time for Nitrogen Dioxide. However, there were areas of concern in relation to emissions from road transport at a number of locations around the borough where concentrations were predicted to be close to objective levels.

This review and assessment is based upon a checklist approach which is detailed in TG(03) and summarised in Table 8. This describes the information that authorities should collate for updating and screening assessment against the 2005 and 2010 objectives.

Table 8: Summary of the Updating and Screening Checklist Approach for Nitrogen Dioxide

Report Paragraph No.	Source, Location or data that need to be assessed
9.3.3	Monitoring data outside an AQMA
9.3.4	Monitoring data within an AQMA
9.3.5	Narrow congested streets with residential properties close to the kerb
9.3.5	Junctions
9.3.5	Busy streets where people may spend 1-hour or more close to traffic
9.3.5	Roads with high flow of buses and/or HGVs
9.3.5	New roads constructed or proposed since first round of review and assessment
9.3.5	Roads close to the objective during the first round of review and assessment
9.3.6	Roads with significantly changed traffic flows
9.3.7	Bus stations
9.3.8	New industrial sources
9.3.8	Industrial sources with substantially increased emissions
9.3.9	Aircraft

9.3.2 Background Concentrations

Estimated annual mean background nitrogen oxides and nitrogen dioxide concentrations for 2005 and 2010 have been mapped for the UK and were obtained from the internet (www.airquality.co.uk/archive/laqn/tools.php).

The estimated annual mean background concentration of nitrogen oxides across the borough is:

2005: 31.8 – 46.3 µg/m^3
2010: 25.4 – 42.7 µg/m^3

The estimated annual mean background concentration of nitrogen dioxide is:

2005: 20.9 – 27.1 µg/m^3
2010: 17.9 – 25.6 µg/m^3

In addition, Ipswich Borough Council has carried out diffusion tube monitoring at a background location as part of its diffusion tube study. These results are summarised in Table 9 and the full set of results can be located in Appendix 1, with an Annual bias correction listed at the end of the table. For more information on the method used for the bias correction is given in more detail in paragraph 9.3.3.

Table 9: Original and Bias-corrected Annual Average Results from Diffusion Tube Monitoring Results, Alexandra Park, Ipswich, Jan-Dec 2002

	Annual Average NO_2 ($\mu g/m^3$)			
	Original Result	**Bias-Corrected Result**	**Predicted to 2005 (bias corrected)**	**Predicted to 2010 (bias corrected)**
Alexandra Park (Kings Avenue)	(8.8ppb x 1.91) 16.81	22.9	(x 0.93) 21.3	(x 0.8) 18.3

NB: These annual average results are based on 11 months worth of data – February results were unreliable due to laboratory error.

9.3.3 Monitoring Data Outside an AQMA

Diffusion Tube Survey

Ipswich Borough Council has monitored levels of Nitrogen Dioxide around the borough at 12 locations, using diffusion tubes since the last round of review and assessment. The tubes are provided and prepared by Gradko International Ltd and are 50% TEA in Actone. Diffusion tubes are widely used in the United Kingdom to give indicative concentrations of nitrogen dioxide. However, for the purpose of review and assessment the guidance advises that results must be 'bias-corrected'. Ideally a co-location study should be carried out to calculate a bias correction figure. Ipswich Borough Council has not yet carried out this study (one is currently ongoing with the recently purchased and installed real time monitor) and is therefore reliant on factors from the Netcen Intercomparison study and a factor from the report Compilation of Diffusion Tube Collation Studies carried out by Local Authorities', prepared by Professor Duncan Laxen and Penny Wilson, on behalf of Defra and the Devolved Administrations, Nov 2002.

The Netcen Intercomparison study is based on 9 months data and 1 site. The report is based on a larger dataset (10-12 months data) from 5 sites. The bias correction figures from these two sources are very different :0.88 from the Netcen study and 1.36 from the report. It has been decided to base the bias correction figure on the worst case scenario of 1.36 for the sake of the screening review and assessment. This bias correction figure will be reviewed at Detailed Assessment.

The results from the diffusion tube survey undertaken for 2002 are detailed in Appendix 1. This data shows the Annual Mean for the survey period and the bias corrected Annual Mean figure.

A summary of the Annual Average bias-corrected results is given in Table 10. TG(03) provides correction factors to apply to monitoring data to enable annual mean roadside nitrogen dioxide concentrations to be predicted for future years. The results have therefore been predicted to 2005 and 2010 at those locations where tubes are placed 1-5 metres of the kerbside. The roadside correction factors quoted are:

2005 Annual Mean Objective : 0.92 (derived from 0.892/0.969)
2010 Annual Mean Objective: 0.76 (derived from 0.734/0.969)

Where relevant, a background correction factor has been applied. This has also been obtained from the guidance

2005 Annual Mean Objective: 0.93 (derived from 0.908/0.973)
2010 Annual Mean Objective: 0.8 (derived from 0.778/0.973)

Table 10: Annual Average Nitrogen Dioxide Concentrations in 2002 and Predicted to 2005 and 2010 (µg/m^3)

Location	Bias Corrected 2002	Predicted 2005	Predicted 2010
Wherstead Road	35.6	33.1	28.5
Civic Drive	30.1	28.0	24.1
Civic Drive (co-locate)	33.6	31.2	26.9
Tavern Street	27.4	25.5	21.9
Chevalier Street	41.7	38.8	33.3
Kings Avenue	22.9	21.3	18.3
Nacton Road	34.4	32.0	27.5
A14 Junction	39.1	36.4	31.3
A14 Junction (co-locate)	38.6	35.9	30.9
Heath Road	38.5	35.8	30.8
Crown Street	54.5	50.7	43.6
Crown Street (co-locate)	59.8	55.6	47.8
Star Lane	50.3	46.8	40.2
Stoke Bridge	36.6	34.0	29.3
Norwich Road	50.9	47.3	40.7

The predicted results suggest that three locations will fail to meet the 2005 & 2010 annual mean objective levels.

Crown Street Star Lane, Norwich Road

These locations will need to be reviewed further in the Detailed Assessment and are likely to be considered for AQMA (Air Quality Management Area)

Continuous Monitoring

Ipswich Borough council has recently purchased a real time monitor which is located at Pipers Court on St Margaret's Street, in the location which was identified as having the Nitrogen Dioxide concentrations closest to the objective level at the last round of review and assessment. The monitor is located at the façade of residential properties in a street canyon type location.

Unfortunately it has not been in place for a long enough period of time to yet give usable data. The Council will report the results of this monitoring and the associated diffusion tube collation study at the Detailed Assessment.

9.3.4 Monitoring Data Within an AQMA

There were no AQMAs declared at the last round of review and assessment.

9.3.5 Road Traffic Sources

It is recognised that road traffic accounts for the majority of exceedances of the objective levels for Nitrogen Dioxide. As such, the guidance requires that a number of road type sources be considered: Narrow congested streets with residential properties close to the kerb; junctions; busy streets where people may spend 1-hour or more close to traffic; roads with high flow of buses and/or HGVs; new roads constructed or proposed since first round of review and assessment; roads close to the objective during the first round of review and assessment; roads with significantly changed traffic flow.

The council has recognised that there are large numbers of roads that fall within the categories within the borough, and that there is a shortage of traffic data available. As such, and with advice from the Government's helpline, a decision has been made to obtain more reliable traffic data and assess road traffic sources at the Detailed Assessment stage. A sample of roads has been screened using DMRB and predictions of the annual Nitrogen Dioxide concentration are shown not to exceed the objective figures. A summary of the DMRB-predicted Annual Mean Nitrogen Dioxide Concentrations for these roads is given in Table 11. The data required for the DMRB model and the results of the assessments are detailed in full in Appendix 2.

It must be noted that traffic growth factors were not available at the time of this report. Therefore, the Predicted Nitrogen Dioxide Annual Mean Concentrations for 2005 and 2010 have not taken into account traffic growth factors and are therefore incorrect. This will be corrected at Detailed Assessment.

Table 11: DMRB – Summary of Predicted Nitrogen Dioxide (NO_2) Annual Mean Concentrations

Name		Year 2001	Year 2005	Year 2010
1	London Road	37.87	33.49	27.71
2.	Handford Road	34.87	31.23	26.73
3.	Norwich Road (A1156) Barrack Corner	39.56	35.64	29.97
4.	Bury Road	33.87	30.02	24.58
5.	Woodbridge Road (A1071) Nr Colchester Road	33.58	30.12	25.28
6	Woodbridge Road (A1071) Nr Argyle Street	34.78	31.30	26.53
7.	Bourne Hill (Wherstead Road)	39.90	35.71	29.47
8.	Bridge Street (Wherstead Road)	38.53	34.42	28.68
9.	Felixstowe Road (A1156) Kings Way	34.35	30.61	25.67
10.	Fore Street (A1156) Felixstowe Road	39.46	35.56	29.82
11.	Valley Road (A1214)	29.82	36.32	32.60
12.	Park Road	31.54	28.32	24.36
13.	Star Lane	36.57	32.87	27.80
14.	Fonnereau Road	31.19	27.96	24.15
15.	Crown Street	38.19	34.51	29.02
16.	College Street	35.69	32.06	27.17

9.3.6 Roads with Significantly Changed Traffic Flows

Due to development, Ipswich Borough Council has since introduced a new gyratory system, which has changed the traffic flow and data in the town centre area. These changes were not identified in the last round of review and assessment, and we are therefore starting again to look at the roads and obtain new reliable data. The collection and collation of sufficient data is a time consuming process, hence this information will be incorporated at the detailed assessment stage.

9.3.7 Bus Stations

The guidance advises that there is potential for NO_x emissions arising from bus stations to cause an exceedence of the 1-hour objective. The guidance clarifies that these exceedances would only be expected from bus stations that are not enclosed, where the flow of vehicles is greater than 1,000 buses per day, and where there is relevant exposure within 10m of the bus station.

There are five bus stations that are not enclosed within the Ipswich borough. These are:

- Tower Ramparts Bus Station, Crown Street
- Anglia Retail Park and Ride, Bury Street
- Constantine Road depot
- Star Lane depot
- Cattle Market Bus Station

Of these, the flow of vehicles is greater than 1,000 buses per day through the Tower Ramparts bus station. However, it is not considered likely that relevant exposure will take place within 10m of the bus station at this location (relevant exposure being a location where members of the public are likely to be exposed for 1-hour or more).

No further assessment is therefore necessary.

9.3.8 <u>New Industrial Sources and Existing Industrial Sources with Substantially Increased Emissions</u>

The guidance TG(03) lists those processes regulated under the Environmental Protection Act 1990 or the Pollution Prevention and Control Act 1999 which have the potential to emit significant quantities of Nitrogen Dioxide.

There are no new industrial sources within the Ipswich borough that are identified as having the potential to emit significant quantities of nitrogen dioxide.

There are two existing potential sources within the borough. These are:

- Ipswich Hospital Clinical Waste Incinerator, Heath Road – Part A
- Cerro Manganese Bronze

Ipswich Hospital Incinerator
Emissions of Nitrogen Dioxide from this process have reduced since the last round of review and assessment. There is no need for further investigation.

Cerro Manganese Bronze
Emissions of Nitrogen Dioxide from this process have not substantially increased since the last round of review and assessment. There is no need for further detailed assessment.

At the last round of review and assessment Agilent Technology was identified as having the potential to emit significant levels of nitrogen dioxide. This process has now ceased operating.

There are no processes within neighbouring boroughs with the potential to emit significant concentrations of nitrogen dioxide which will impact on the Ipswich borough.

9.3.9 Aircraft

The guidance recommends that aircraft have the potential to emit significant levels of nitrogen dioxide where relevant receptors are within 1,000m of the airport boundary and the total number of passenger throughput exceeds 5,000,000 per annum in 2005, or total freight throughput exceeds 50,000 tonnes per annum.

There are no airports meeting these criteria within the Ipswich borough or within 1km of the borough boundary.

9.4 Conclusions

This updating and screening assessment has confirmed that further detailed assessment is required to study the impact of traffic on concentrations of nitrogen dioxide across the borough. The Council is continuing monitoring studies and obtaining extensive road traffic data in preparation for carrying out the detailed assessment.

10. SULPHUR DIOXIDE

10.1 Air Quality Standard and Objective

Standard: 266 µg/m^3 based on a 15-minute mean
Objective: 266 µg/m^3 15 minute mean not to be exceeded more than 35 times a year to be achieved by the end of 2005

350 µg/m^3 1-hour mean not to be exceeded more than 24 times a year to be achieved by the end of 2004

125 µg/m^3 24-hour mean not to be exceeded more than 3 times a year to be achieved by the end of 2004

10.2 National Perspective

The main source of sulphur dioxide in the United Kingdom is power stations, which accounted for more than 71% of emissions in year 2000. There are also significant emissions from other industrial combustion sources. Domestic sources now only account for 4% of emissions, but can be locally much more significant. Road transport currently accounts for less than 1% of emissions. Measured sulphur dioxide concentrations at UK national network sites for the period 1999 – 2001 have fallen and the objectives were only exceeded at one site (Belfast). This exceedance was associated with coal burning. Local exceedances of the objectives (principally the 15-minute mean objective) may occur in the vicinity of small combustion plant (less than 20MW) which burn coal or oil, in areas where solid fuels are the predominant form of domestic heating, and in the vicinity of major ports. During the first round of review and assessment, there were a small number of AQMAs declared. These related to emissions from coal-fired boilers at a cellophane process, and a food processing plant, a coal-fired boiler at a hospital, domestic coal burning and shipping at a major port.

10.3 Updating and Screening Assessment

10.3.1 Previous Review and Assessment

Local Authorities should maximise and build on data collation and assessments completed during the first round of review and assessment. The Council concluded that it was unlikely that there would be any exceedances of the Air Quality objective at that time for Sulphur Dioxide.

This review and assessment is based upon a checklist approach which is detailed in TG(03). This is summarised in Table 12. This describes the information that authorities should collate for the review and assessment against the 2003 objective.

Table 12 : Summary of the Updating and Screening Checklist Approach for Sulphur Dioxide

Report Paragraph No.	Source, Location or data that need to be assessed
10.3.3	Monitoring data outside an AQMA
10.3.4	Monitoring data within an AQMA
10.3.5	New industrial sources
10.3.5	Industrial sources with substantially increased emissions
10.3.6	Areas of domestic coal burning
10.3.7	Small boilers (>5MW(thermal) burning coal or oil
10.3.8	Shipping
10.3.9	Railway locomotives

10.3.2 Background Concentrations

Estimated Annual Mean background concentrations for 2001 have been mapped for the UK and were obtained via the Internet (www.airquality.co.uk/archive/laqm/tools.php). Estimated annual mean background concentrations range from 2.94 – 5.68 µg/m^3. For the purpose of review and assessment, authorities are advised to assume that background annual mean sulphur dioxide concentrations at the end of 2004 and 2005 will be 75% of the 2001 values. 75% of 5.68 is 4.26 µg/m^3.

10.3.3 Monitoring Data Outside of an AQMA

There has been no monitoring of sulphur dioxide within the Ipswich borough.

10.3.4 Monitoring Data Within an AQMA

There are no AQMAs designated within the Ipswich borough.

10.3.5 New Industrial Sources and Existing Industrial Sources with Substantially Increased Emissions

The guidance provides a list of industrial processes with the potential to emit significant quantities of sulphur dioxide. Industries within the Ipswich Borough regulated under the Environmental Protection Act 1990 or the Pollution Prevention and Control Act 1999 have been compared to this list. There are no new industrial sources of sulphur dioxide since the first round of review and assessment.

There are two potential existing sources within the Ipswich Borough, as identified in Guidance TG(03). These are:-

- Ipswich Hospital Clinical Waste Incinerator, Heath Road
- Cerro Manganese Bronze Ltd, Hadleigh Road Industrial Estate

Ipswich Hospital
Data from the Environment Agency confirms that emissions of sulphur dioxide have reduced since the last round of review and assessment. This potential source was assessed at this time and not found to be significant. There is no need for further assessment in this review.

Cerro Manganese
Data provided by the Environment Agency confirms that emissions of sulphur dioxide from this potential source have not changed significantly since the last round of review and assessment. At that time it was investigated and not found to be significant and so there is no need for further assessment at this time.

10.3.6 Areas of Domestic Coal Burning

Areas of domestic coal burning can be a significant source of sulphur dioxide. The guidance requires local authorities to identify areas where significant coal burning still takes place (as a primary source of heating). The guidance suggests that if necessary, local authorities can use professional judgement to identify such areas, for example experience of coal burning odours in the area on a winter's evening.

Officer experience of the Ipswich Borough suggests that there are no areas of the town where there is significant coal burning taking place. It is unlikely that there are any areas within the Ipswich Borough where the burning of solid fuel for domestic purposes is likely to give rise to an exceedence of the objectives for sulphur dioxide.

No further investigation of this source is necessary.

10.3.7 Small Boilers > 5MW (thermal) that Burn Coal or Oil

The guidance advises that the larger boiler plant > 5MW (thermal) can give rise to high short-term concentrations, with the risk that the 15-minute objective may be exceeded. The guidance suggests that such plant could be in buildings such as universities, hospitals and other large institutions and commercial buildings.

A survey was conducted of the Borough and the following places contacted: Ipswich Hospital, Willis, AXA, Suffolk College, St Clements Hospital, Northgate School, Crown House, Civic Centre.

There was no relevant plant identified and therefore no need for further investigation.

10.3.8 Shipping

Large ships generally burn oils with a high sulphur content in their main engines (bunker oils). If there is sufficient movements within a port they can give rise to short-term concentrations above the objectives. Auxiliary engines used while berthed (hotelling) usually use a lower sulphur fuel, and are unlikely to be significant.

The guidance advises where there are more than 5,000 ship movements per year of large ships (such as cross-channel ferries, Ro-Ro, container ships, cruise liners) and there is relevant exposure within 1 km of the berths and main areas of manoeuvring, the Council should carry out a detailed assessment.

The Port of Felixstowe is within the Suffolk Coastal district and is the largest container port in the UK. It is, however, well over 1km from the Ipswich borough boundary.

The Port of Ipswich is located in the centre of Ipswich town. Shipping movement within this port (of large ships) for 2002 were 1806 as supplied by Associated British Ports. Whilst there is relevant exposure within 1 km of the Port, the actual number of ship movements is well below that give in the guidance as requiring further investigation. No further assessment is therefore required.

10.3.9 Railway Locomotives

Diesel and coal-fired locomotives emit sulphur dioxide. Moving locomotives do not make a significant contribution to short-term concentrations and do not need to be considered further. Exposure to stationery locomotives may be more significant, but only in terms of the 15-minute objective.

The guidance advises that local authorities identify locations where diesel locomotives are regularly stationary for periods of 15 minutes or more and there is potential for regular outdoor exposure of members of the public within 15m of the locomotives.

Locomotives entering/leaving the Ipswich station are unlikely to be regularly stationary for periods of 15 minutes or more. Information from Anglia Railways confirms that the diesel trains have an automatic 'shut down' at 10 – 15 minutes idling time. This can be over-ridden for maintenance/cleaning purposes.

There are two locations where Freightliner operates diesel top yard (an area of sidings beyond the station towards Norwich) and Ipswich fuel point (adjacent to the station). There is no potential for regular outdoor exposure of members of the public within 15m of the locomotives where engines are stationary for 15 minutes or more with engines running.

10.4 **Conclusion**

Using the methods set out in the statutory guidance there have been no significant sources of sulphur dioxide identified within the Ipswich Borough. The air quality objective is therefore expected to be achieved.

11. PARTICULATES (PM_{10})

11.1 Air Quality Objective

Objectives: 40 µg/m^3 as an annual mean to be achieved by the end of 2004
50 µg/m^3 as a fixed 24 hour mean not to be exceeded more than 35 days per year, to be achieved by the end of 2004

A provisional objective to be achieved by the end of 2010 has been set:– 50 µg/m^3 as a 24-hour mean, not to be exceeded more than 7 times a year, and an annual mean of 20 µg/m^3.

11.2 National Perspective

A wide range of emission sources contribute to PM_{10} concentrations in the United Kingdom. These can be divided into three main categories. Primary particle emissions are derived directly from combustion sources, including road traffic, power generation, industrial processes etc. Secondary particles are formed by chemical reactions in the atmosphere, and comprise principally of sulphates and nitrates. Coarse particles comprise of emissions from a wide range of sources, including resuspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles.

During the first round of review and assessment, a number of AQMAs were declared nationally, that have included exceedances of the 2004 24-hour mean PM_{10} objective. The majority of these have been in combination with nitrogen dioxide and are associated with road traffic sources.

11.3 Updating and Screening Assessment

11.3.1 Local Authorities are expected to maximise and build upon data and assessments completed during the first round of review and assessment. The Council concluded that it was unlikely that there would be any exceedances of the Air Quality Objective at that time for particulates.

The guidance advises that all local authorities should undertake the Updating and Screening Assessment for the 2004 objectives. Although not a statutory requirement, authorities are also encouraged to undertake the Updating and Screening Assessment for the 2010 objective. It does advise that the 2010 objectives are significantly more stringent. Authorities cannot assume that the 2010 objectives will be met if there are no predicted exceedances of the 2004 objective.

This review and assessment is based upon a checklist approach which is detailed in TG(03). This is summarised in Table 12. This describes the information that authorities should collate for the review and assessment against the 2003 objective.

Table 13: Summary of the Updating and Screening Checklist Approach for PM_{10}

Report Paragraph No	Source, Location or Data that needs to be Assessed
12.3.3	Monitoring data outside an AQMA
12.3.4	Monitoring data within an AQMA
12.3.5	Junctions
12.3.5	Roads with high flow of buses and/or HGVs
12.3.5	New roads constructed or proposed since first round of review and assessment
12.3.5	Roads close to the objective during the first round of review and assessment
12.3.6	Roads with significantly changed traffic flows
12.3.7	New industrial sources
12.3.7	Industrial sources with substantially increased emissions
12.3.8	Areas with domestic solid fuel burning
12.3.9	Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc
12.3.10	Aircraft

11.3.2 Background Concentrations

Estimated Annual Mean background concentrations for 2004 and 2010 have been mapped for the UK and were obtained via the Internet (www.airquality.co.uk/archive/laqm/tools.php).

The estimated annual mean background concentrations for the Ipswich are detailed in Table 14.

Table 14: Summary of Estimated Background Levels for PM_{10} in Ipswich Borough

	Grid Ref: X	Grid Ref: Y	2001	2004	2010
1	613500	246500	21.1	20.3	18.6
2.	613500	247500	20.6	19.7	18.1
3.	614500	242500	21.8	20.8	19
4.	614500	243500	22.2	21.3	19.5
5.	614500	244500	23.5	22.8	21
6.	614500	245500	22.8	22	20.2
7.	614500	246500	21.7	20.8	19.1
8.	614500	247500	20.8	19.9	18.3
9	615500	242500	21.7	20.7	18.9
10.	615500	243500	21.9	21	19.2
11.	615500	244500	22.1	21.2	19.4
12.	615500	245500	22.2	21.3	19.6
13.	615500	246500	21.7	20.9	19.1
14.	615500	247500	20.8	19.9	18.3
15.	615500	248500	20.2	19.4	17.8
16.	616500	242500	21.8	20.8	19
17.	616500	243500	21.9	21	19.2
18.	616500	244500	22.2	21.3	19.4
19.	616500	245500	22.2	21.3	19.4
20.	616500	246500	21.9	21	19.2
21.	616500	247500	20.9	20	18.3
22.	617500	241500			
23.	617700	242500	21.4	20.5	18.7
24.	617700	243500	21.7	20.7	18.9
25.	617700	244500	21.9	20.9	19.1
26.	617700	245500	21.8	20.9	19
27.	617700	246500	21.5	20.6	18.8
28.	618500	241500	20.5	19.7	18.1
29.	618500	242500	21.2	20.3	18.6
30.	618500	243500	21.5	20.6	18.8
31.	618500	244500	21.5	20.6	18.8
32.	618500	245500	21.4	20.4	18.7
33.	618500	246500	21.1	20.2	18.5
34.	619500	241500	20.4	19.5	18
35.	619500	242500	20.8	19.9	18.3
36.	619500	243500	21.1	20.2	18.5
37.	619500	244500	21.1	20.2	18.4
38.	619500	245500	21	20.1	18.4
39.	620500	241500	20.3	19.5	17.9

11.3.3 Monitoring data outside an AQMA

There is no monitoring data for PM_{10} concentrations for the Ipswich area.

11.3.4 Monitoring data within an AQMA

There have been no AQMAs declared within the Ipswich Borough relating to PM_{10}.

11.3.5 Road Traffic Sources

It is recognised that particulate emissions from road traffic are a primary source of combustion and contribute to PM_{10} levels. The guidance LAQM TG (03) requires that a number of road types sources be considered including: junctions; roads with high flow of buses/HGVs; new roads constructed or proposed since first round of review and assessment; roads close to the objective during first round of review and assessment; roads with significantly changed traffic flows.

The Council has recognised that there are roads that fall within the categories, but acknowledge that there is insufficient data available to date. As advised by the Government Helpline, a decision was made to obtain more reliable data and assess road traffic sources at the Detailed Assessment stage.

A sample of roads has been screened using DMRB and predictions of PM_{10} concentrations are shown to exceed the provisional 2010 objective level. A summary of the DMRB – predicted Annual Mean PM_{10} concentrations for the roads is given in Table 15.

It should also be noted, however, that the Annual Growth figures for traffic flow were unavailable at the time of this report and therefore have not been applied to traffic data. The predictions for the current Annual Average Daily Traffic Flow (AADTF) would indicate that the 2010 predictions would increase further and still not meet the objective level based on current data. This data will be reviewed in further detail at the Detailed Assessment stage, taking into account Annual growth figures for traffic.

Table 15: Summary of DMRB – Predicted PM_{10} Annual Mean Concentrations

Name		Year 2001	Year 2004	Year 2010
1	London Road	26.10	24.78	20.10
2.	Handford Road	25.63	24.46	21.21
3.	Norwich Road (A1156) Barrack Corner	28.49	27.12	22.52
4.	Bury Road	26.70	24.24	22.53
5.	Woodbridge Road (A1071) Nr Colchester Road	24.36	23.15	20.20
6	Woodbridge Road (A1071) Nr Argyle Street	24.34	23.12	20.17
7.	Bourne Hill (Wherstead Road)	27.61	26.19	21.78
8.	Bridge Street (Wherstead Road)	27.81	26.27	27.07
9.	Felixstowe Road (A1156) Kings Way	24.79	23.64	20.49
10.	Fore Street (A1156) Felixstowe Road	28.01	26.61	22.08
11.	Valley Road (A1214)	25.99	24.81	21.55
12.	Park Road	23.50	22.49	20.13
13.	Star Lane	26.29	25.04	21.55
14.	Fonnereau Road	23.21	22.22	19.96
15.	Crown Street	26.71	25.40	21.57
16.	College Street	25.40	24.23	21.06

11.3.6 Roads with Significantly Changed Traffic Flows

Due to development, Ipswich Borough Council has since introduced a new gyratory system, which has changed the traffic flow and data in the town centre area. These changes were not identified in the last round of review and assessment, and we are therefore starting again to look at the roads and obtain new reliable data. The collection and collation of sufficient data is a time consuming process, hence this information will be incorporated at the detailed assessment stage.

11.3.7 New Industrial Sources and Existing Industrial Sources with Substantially Increased Emissions

The guidance outlines industrial sources with the potential to emit significant quantities of PM_{10}. Industries that are within Ipswich Borough are regulated by the Environmental Protection Act 1990 or the Pollution Prevention & Control Act 1999. There are no new industrial sources of PM_{10} since the first round of review and assessment.

Existing sources of potential PM_{10} concentration within Ipswich Borough, as identified in Guidance TG (03) include RMC, Tarmac, ABP Ipswich Port Ltd, which are categorised Part B processes. Ipswich Hospital and Cerro Manganese which are categorised Part A processes.

RMC
Relevant public exposure = 200 – 400m of dust but guidance says no need to progress further if 2004 background is less than 26 µg/m^3. Our estimate background for 2004 is 22.8 µg/m^3 maximum, therefore no further action is required.

ABP Ipswich Ltd
Fugitive emissions from offloading coal. However guidance says no need to progress if relevant exposure is within 400 – 1,000 mtrs and background for 2004 is less than 27 µg/m^3. Our estimated background 2004 is 22.8 µg/m^3 maximum, therefore no further action is required.

Tarmac
Propose development close to process. Nomogram calculation suggest a potential exceedance, which will be assessed at Detailed Assessment stage once details of proposed development surrounding site are made available.

Ipswich Hospital
Levels of particulate (total) emissions have reduced since last assessment. Therefore, no further action is required.

Cerro Manganese
Levels of particulate (total) emissions have reduced since last assessment. Therefore, no further action is required.

11.3.8 Areas with Domestic Solid Fuel Burning

Domestic solid fuel burning can be a significant source of PM_{10}. Local authorities must identify where significant levels of solid fuel burning still take place. 'Significant' is an area 500 x 500m with more than 50 houses burning solid fuel as the primary source of heating.

In order to make such an assessment it is necessary to use professional judgement to identify such areas, including experience of smoke hanging over the area on a winter's evening.

Ipswich Borough primary source of fuel burning is gas. Therefore no further investigation action of this source is required.

11.3.9 Quarries/Landfill Sites/Opencast Coal/Handling Of Dusty Cargoes At Port etc

The above sources may be significant in terms of fugitive dust emissions, as where dust is emitted, a proportion (typically around 20%) will be present at PM_{10}. TG(03) requires local authorities to establish whether there are relevant receptor locations 'near' to the sources of dust emission. 'Near' is defined in TG(03) according to the prevailing PM^{10} background concentration, with distances being measured from the source rather than the site boundary:

- within 1000m if the estimated 2004 annual mean background is greater than or equal to 27 $\mu g/m^3$.
- within 400m if the estimated 2004 annual mean background is greater than or equal to 26 $\mu g/m^3$.
- within 200m if the estimated 2004 annual mean background is less than 26 $\mu g/m^3$.

Where there are relevant receptor locations 'near' to the source, local authorities are required to determine whether there are dust concerns associated with the facility.

Estimated annual mean background concentrations for 2004 have been mapped for the UK and have been accessed from the Intranet at the following address (www.airquality.co.uk/archive/laqm/tools.php).

The 2004 annual mean background concentration is a maximum of 22.8 $\mu g/m^3$ and would indicate that no further assessment is required. However, the provisional objective to be achieved by 2010 would not be achieved in one area and is also very close to the provisional objective level in other areas, based on the estimated background concentration for those currently available for Ipswich. Further monitoring is required in this area.

The authorised processes previously identified that reside in the port area of Ipswich that could potentially exceed dust emission, include RMC, ABP and Tarmac. These are regulated under IPPC (Integrated Pollution Prevention Control).

However, the Council has received complaints from residents who reside in and near the port area. Further investigation will be required in this area and will be reported at the Detailed Assessment stage.

A particulate monitor is in the process of being purchased and will be used to aid the Detailed Assessment process.

11.3.10 Aircraft

TG(03) recommends that aircraft should be considered as a potential source of PM_{10} emissions where there are relevant receptor locations within 500m of the airport boundary. TG(03) advises that only airports with a predicted total equivalent passenger throughput in 2005 of more than 5 million per annum (mppa) or a total freight throughput of 500,000 tonnes have the potential to cause an exceedance of the Air Quality Objectives and therefore require assessment. There are no commercial airports within Ipswich meeting the above criteria.

11.4 Conclusion

The updating and screening assessment highlights that there is insufficient data to conclude Particulate Matter (PM_{10}) concentrations for traffic data and will be reviewed at Detailed Assessment. The updating and screening assessment for Particulate Matter (PM_{10}) also confirms that detailed assessment is required to study existing industrial sources that reside in the Port of Ipswich.