

# *Air Quality*

*Review and Assessment*  
*Stage 1*



**EAST RIDING**  
OF YORKSHIRE COUNCIL

## **FOREWORD**

The Government attaches great importance to the opportunities for partnership, which the management of local air quality brings.

The Environment Act 1995 provides the statutory basis for consultation and liaison on the Stage 1 review and assessment and the Government expects local authorities to develop a closer relationship with other agencies, commerce and local community groups who may be able to contribute to the improvement of local air quality.

For the purpose of reviewing and assessing air quality local authorities need to consult in accordance with Schedule 2 of the Act. It is proposed that consultation be carried out with:

- I. The Secretary of State
- II. The relevant Environment Agency
- III. The relevant highways authority
- IV. All neighbouring local authorities
- V. Any relevant National Park Authority
- VI. Other relevant public authorities as the local authority considers appropriate e.g. Parish Councils
- VII. Bodies representative of business interests

Widespread consultation among the general public of the East Riding will be secured by depositing copies of this document at all Customer Service Centres, public libraries and in local secondary schools.

All consultees or other interested parties wishing to comment on the review are asked to make their responses to the Director of Social Services, Housing and Public Protection, County Hall, Beverley HU17 9BA by 31 March 1999.

## **SUMMARY**

The Environment Act 1995 required the preparation of a National Air Quality Strategy which provides a framework for air quality control through local air quality management.

Air quality standards and objectives have been enacted through the Air Quality Regulations 1997.

Local Authorities are required to undertake a staged air quality review and assessment. In areas where the air quality objectives are not likely to be met by the year 2005, local authorities must establish Air Quality Management Areas.

This report represents the first stage review and assessment of air quality within the East Riding of Yorkshire and identifies potential significant sources of air pollution within the area.

Further assessment, in the form of a stage 2 review, is required to investigate the likelihood of exceeding the air quality objectives for nitrogen dioxide, sulphur dioxide and particulates.

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# 1. AIR QUALITY REVIEW AND ASSESSMENT - STAGE 1

## 1.1 INTRODUCTION

Part IV of the Environment Act 1995 and the National Air Quality Strategy (NAQS) set out a new system for local air quality management. As part of the system, local authorities are required to carry out periodic reviews of air quality in their areas and to assess present and likely future air quality against prescribed air quality objectives.

The East Riding of Yorkshire Council, in response to the new duties imposed by the Act, has undertaken the first stage of an air quality review within its area. The review has been carried out with respect to 3 key elements.

- The identification of sources of emissions of atmospheric pollutants referred to in the NAQS.
- A comparison of estimated and, where available, monitored air quality in the East Riding of Yorkshire with NAQS standards and objectives.
- For each primary pollutant, a determination of the need to proceed to a second stage review and assessment.

## 1.2 AIMS AND OBJECTIVES

The aims of the first stage review and assessment :

- To investigate present and future air quality in the East Riding of Yorkshire.
- To make an assessment of air quality in relation to the objectives of the NAQS.

The objectives of the first stage review and assessment:

- To identify the principle sources of pollutant emissions affecting air quality in the East Riding of Yorkshire.
- To identify the areas of the East Riding of Yorkshire which are likely to experience the highest concentration of pollutants.
- To indicate whether present and predicted future air quality in the East Riding of Yorkshire is likely to comply with the air quality objectives of the NAQS.
- To identify what future actions are likely to be required by the East Riding of Yorkshire Council in relation to air quality review and assessment under Part IV of the Environment Act 1995.

## 2. NATIONAL AIR QUALITY STRATEGY

### 2.1 INTRODUCTION

The quality of the air we breathe is of critical importance. However, there is a need to reconcile rising demands in living standards with the maintenance of environmental quality. Whilst healthy individuals are unlikely to experience acute effects at typical air pollution levels today, there is evidence of associations with advanced mortality, chronic illness and discomfort for sensitive groups.

The Government has investigated the need for a new framework for air quality control. This has been fuelled by recent episodes of poor air quality in many of the UK's major urban areas and by increasing concerns expressed by both the public and scientists. The Environment Act 1995 required:

- The development of a national strategy to improve areas of poor air quality.
- The development of local air quality assessment and management.
- New regulatory powers in respect of air quality.

### 2.2 OVERVIEW

The key elements of the National Air Quality Strategy are:

- Health based air quality standards and objectives.
- A target of 2005 of achievement of the objectives.
- Policies for meeting those objectives.

### 2.3 NATIONAL AIR QUALITY STANDARDS

Air quality standards are concentrations of pollutants in the atmosphere, which achieve a certain level of air quality based on an assessment of the effect of each pollutant on public health. The Government has adopted standards recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO).

### 2.4 AIR QUALITY OBJECTIVES

Air quality objectives represent the Government's judgement of the progress that can be made towards the air quality standards by 2005. These objectives drive air quality policy and the implementation of Part IV of the Environment Act 1995 (Fig 1).



Fig 1. Standards and Specific Objectives in the National Air Quality Strategy

POLLUTANT	STANDARD		SPECIFIC OBJECTIVE
	concentration	measured as	to be achieved by 2005
Benzene	5 ppb	running annual mean	the air quality standard
1,3-Butadiene	1 ppb	running annual mean	the air quality standard
Carbon Monoxide	10 ppm	running 8-hour mean	the air quality standard
Lead	0.5 µg/m <sup>3</sup>	annual mean	the air quality standard
Nitrogen dioxide	150 ppb	1 hour mean	150 ppb hourly*
	21 ppb	annual mean	21 ppb annual mean*
Ozone	50 ppb	running 8 hour mean	50 ppb measured as the 97th percentile
Particles PM <sub>10</sub>	50 µg/m <sup>3</sup>	running 24-hour mean	50 µg/m <sup>3</sup> measured as the 99th percentile*
Sulphur dioxide	100 ppb	15 minute mean	100 ppb measured as the 99.9th percentile*

*ppm = parts per million, ppb = parts per billion, µg/m<sup>3</sup> = micrograms per cubic metre*

*\* these objectives are to be treated as provisional. For these pollutants present estimates point to a gap between the reductions required to meet objective levels everywhere and those likely to be achieved by measures adopted or announced by the Government or likely introduced on a European basis. These objectives are more likely to be changed when the strategy is reviewed in 1999 or if compelling evidence becomes available sooner, prior to the review.*

### 3. LOCAL AIR QUALITY MANAGEMENT

The Environment Act 1995 requires local authorities to review air quality within their areas and to assess whether the air quality standards and objectives for each pollutant, with the exception of ozone, are being achieved or are likely to be achieved by 2005. For any area where air quality objectives are not likely to be met, the local authority must designate an Air Quality Management Area (AQMA). Where an AQMA has been designated the local authority must carry out further assessments and draw up an action plan specifying measures to be taken to bring air quality in the area back within limits.

The review and assessment of local air quality is to be carried out using a staged approach. The three stages that a local authority should follow when undertaking air quality reviews are as follows:

- Stage 1 involves identifying potentially polluting sources within the local authority's area.
- Stage 2 uses simple screening methods to determine whether there are likely to be areas within the local authority's boundary where air quality objectives will be breached in 2005.
- Stage 3 involves more precise and sophisticated assessment methods and, where necessary the declaration of AQMA's.

## 4. REVIEW AND ASSESSMENT OF CARBON MONOXIDE

### 4.1 INTRODUCTION

Carbon Monoxide (CO) is produced by the incomplete combustion of carbon - containing materials like wood, coal and oil. The main source of CO in the UK is road transport, which currently accounts for over 90% of total emissions. CO concentrations are therefore highest near busy and especially congested, roads (Fig 2).

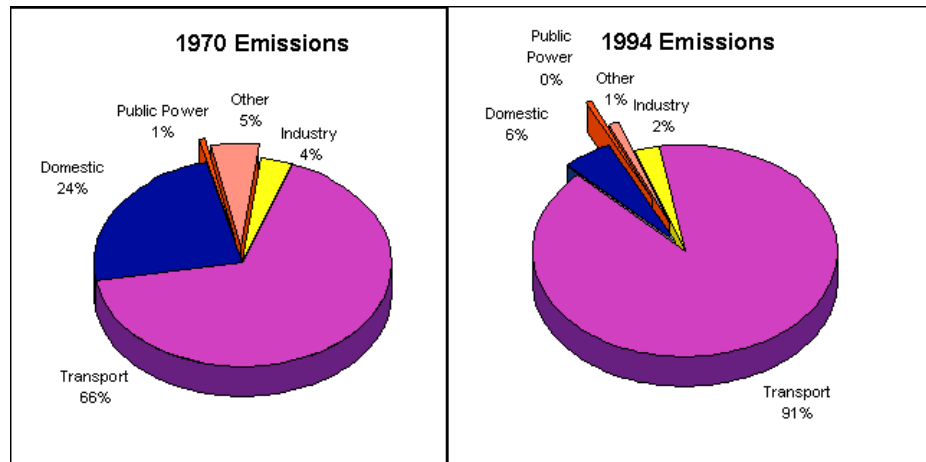


Fig 2. Carbon Monoxide emissions in the UK.

CO has an affinity for haemoglobin (the constituent of blood, which carries oxygen around our bodies) 200 times that of oxygen. It therefore impairs the oxygen - carrying capacity of the blood as carboxyhaemoglobin is formed rather than oxyhaemoglobin.

### 4.2 STANDARDS AND OBJECTIVES FOR CARBON MONOXIDE

The Government has adopted an 8 hour running average of 10 ppm as an air quality standard for CO with a specific objective for the standard to be achieved as the maximum 8 hour running average by the end of the year 2005.

### 4.3 THE NATIONAL PERSPECTIVE

Existing national policies are expected to deliver the national air quality objective by the end of the year 2005 with the possible exception of the near vicinity of heavily trafficked roads or in the vicinity of certain stationary sources of CO. Only local authorities with such sources are expected to identify a need to proceed to a second or third stage review and assessment for this pollutant (Fig 3).

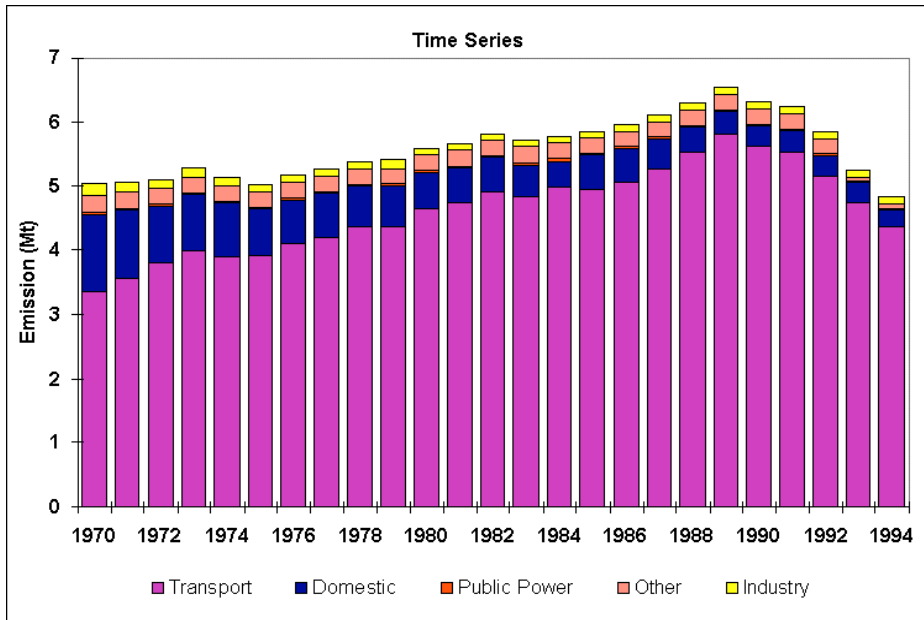


Fig 3 Carbon Monoxide emission trends.

Circumstances that may lead to an exceedance of the air quality objective for CO include:

- An unusual vehicle mix with a preponderance of polluting vehicles.
- Excessive congestion.
- Street canyon effects.
- Unusual diurnal variation in emission (e.g. high traffic flows at night coincident with episodes of poor dispersion).
- Stationary sources of CO.
- A combination of heavily trafficked roads and dispersed, low level combustion sources.

#### 4.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW OF CO

The East Riding of Yorkshire Council has collated the following information:

- Current and 2005 forecast annual average daily traffic flows mean traffic for the major road network in the East Riding of Yorkshire.
- Predicted mass emission rates of CO taken from the National Atmospheric Emission Inventory.
- Details of Part A and Part B authorised processes present within the East Riding of Yorkshire.
- Details of significant sources of CO in neighbouring areas, which may impact within the East Riding of Yorkshire.
- Planned developments in the locality.

For all existing and proposed processes or activities the Council has identified those which have the potential, singly or in combination, to emit significant quantities of CO. For the purposes of this stage 1 review these are assumed to consist of:

- Roads with a current or projected daily traffic flow of 50,000 vehicles.
- One or more Part A or Part B processes of the types identified to be potential significant sources of CO.
- A combination of road transport and low level combustion sources which lead to a projected annual mass emission rate of greater than 200kg in a 1 km by 1 km grid square within the East Riding of Yorkshire.

#### 4.5 ROAD TRANSPORT

No roads have been identified within the East Riding of Yorkshire which have a current or projected daily traffic flow of 50,000 vehicles (Appendix 4).

#### 4.6 PART A AND B AUTHORISED PROCESSES

Part A and B authorised processes are shown in Tables 1 and 2 (Appendix 1). No processes have been identified which are potential significant sources of CO.

#### 4.7 COMBINED ROAD TRANSPORT AND LOW LEVEL COMBUSTION SOURCES

The National Atmospheric Emissions Inventory (NAEI) contains estimated emissions for carbon monoxide on a 1 km by 1 km grid shown in Appendix 4.

#### 4.8 PLANNED DEVELOPMENTS IN THE LOCALITY

Planned developments that may impact upon air quality in the East Riding of Yorkshire are listed in Appendix 5. None of these are likely to be significant sources of CO for the purposes of air quality review and assessment.

#### 4.9 CONCLUSIONS FOR CARBON MONOXIDE

The air quality objective for Carbon Monoxide is not likely to be exceeded.

#### 4.10 ACTION REQUIRED TO FURTHER REVIEW CARBON MONOXIDE

None

## 5. REVIEW AND ASSESSMENT OF BENZENE

### 5.1 INTRODUCTION

Benzene is an organic chemical that at normal temperatures is a liquid, which readily evaporates. Almost all ground level atmospheric benzene is likely to have resulted from human activities.

The main source of atmospheric benzene in the UK is the combustion and distribution of petrol of which it is a minor constituent, currently about 2% by volume. Diesel is a relatively small source. Motor vehicle exhaust gases contain some of this as unburned benzene but also contain benzene formed from the combustion of other aromatic components of petrol. Motor vehicles account for 71% of total emissions with 70% of this arising from petrol vehicles. The refining, distribution and evaporation of petrol from vehicles account for about 10% of total emissions.

Long term exposure to benzene increases the risk of leukaemia.

### 5.2 STANDARDS AND OBJECTIVES FOR BENZENE

The Government has adopted a running average of 5 ppb as an air quality standard for benzene with a specific objective for the standard to be achieved by the end of the year 2005.

### 5.3 THE NATIONAL PERSPECTIVE

Existing national policies are expected to deliver the national air quality objective for benzene by the end of the year 2005. Roadside levels of benzene, even next to the most busy or congested roads, are expected to be well below the objective. Only local authorities with major industrial processes which either handle, store or emit benzene, are expected to need to undertake a second or third stage review and assessment of this pollutant.

### 5.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW OF BENZENE

The East Riding of Yorkshire Council has collated the following information:

- Current urban kerbside concentrations obtained from local diffusion tube measurements.
- Details of Part A and B authorised processes present within the East Riding of Yorkshire.
- Details of any significant sources of benzene in neighbouring areas, which may impact within the East Riding of Yorkshire.
- Planned developments in the locality.

For all existing and proposed processes or activities the Council has identified those which have the potential singly or collectively to emit significant quantities of benzene. For the purposes of this stage 1 review these are assumed to consist of:

- An existing average kerbside concentration of 5 ppb or greater.
- One or more Part A or B authorised processes of the types identified to be potential significant sources of benzene.

#### 5.5 MONITORING OF BENZENE

Prior to 1998 no monitoring of benzene had been carried out in the East Riding of Yorkshire or in neighbouring areas. In response to the publication of the National Air Quality Strategy the Council undertook a benzene-monitoring programme using diffusion tubes.

Monitoring data is available for 6 kerbside sites in Beverley, Goole and Bridlington for the period June 1998 to September 1998, shown in Table 9 (Appendix 3). This data indicates that current ambient levels of atmospheric benzene fall well below the national air quality objective for 2005.

#### 5.6 PART A AND B AUTHORISED PROCESSES

Part A and B authorised processes are shown in Tables 1 and 2 (Appendix 1). No such processes present within the East Riding of Yorkshire or within neighbouring areas handle, store or emit benzene.

#### 5.7 PLANNED DEVELOPMENTS WITHIN THE LOCALITY

Planned developments that may impact upon air quality in the East Riding of Yorkshire are listed in Appendix 5. None of these are likely to be significant sources of Benzene.

#### 5.8 CONCLUSION FOR BENZENE

The air quality objective for benzene is not likely to be exceeded.

#### 5.9 ACTION REQUIRED TO FURTHER REVIEW BENZENE

None.

## 6. REVIEW AND ASSESSMENT OF 1,3 BUTADIENE

### 6.1 INTRODUCTION

Like benzene, 1, 3 butadiene is a volatile organic compound emitted into the atmosphere principally from the combustion of petrol and diesel fuels. Unlike benzene, 1, 3 butadiene is not a constituent of the fuel but is a product of combustion. Other than in the vicinity of a small number of industrial processes in the UK, particularly the manufacture of synthetic rubber, the dominant source is the motor vehicle.

Like benzene, 1, 3 butadiene is a carcinogen.

### 6.2 STANDARDS AND OBJECTIVES FOR 1, 3 BUTADIENE

The Government has adopted a running annual average of 1 ppb as an air quality standard for 1, 3 butadiene with an objective for the standard to be achieved by the end of the year 2005.

### 6.3 THE NATIONAL PERSPECTIVE

Existing national policies are expected to deliver the air quality objective for 1, 3 butadiene by the end of 2005. Roadside levels of 1, 3 butadiene, even next to the most busy or congested roads, are expected to be well below the air quality objective. Only local authorities with major industrial processes which either handle, store or emit 1, 3 butadiene are expected to need to undertake a second or third stage review and assessment of this pollutant.

### 6.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW OF 1, 3 BUTADIENE

The East Riding of Yorkshire Council has collected the following information:

- Details of Part A and B authorised processes present within the East Riding of Yorkshire.
- Details of any significant sources of 1, 3 butadiene in neighbouring areas, which may impact within the East Riding of Yorkshire.
- Planned developments in the locality.

For all existing and proposed processes and activities the Council has identified those which have the potential singly or collectively to emit significant quantities of 1, 3 butadiene. For the purpose of this stage 1 review these are assumed to consist of:

- One or more Part A or B authorised processes of the type identified to be potential significant sources of 1, 3 butadiene.



6.5 PART A AND B AUTHORISED PROCESSES

Part A and B prescribed processes are shown in Tables 1 and 2 (Appendix 1). No such processes within the East Riding of Yorkshire store or emit 1,3 butadiene. No processes within neighbouring areas are likely to impact within the East Riding of Yorkshire.

6.6 PLANNED DEVELOPMENTS WITHIN THE LOCALITY

Planned developments that may impact upon air quality in the East Riding of Yorkshire are listed in Appendix 5. None of these are likely to be significant sources of 1,3 Butadiene.

6.7 CONCLUSIONS FOR 1, 3 BUTADIENE

The air quality objective for 1, 3 butadiene is not likely to be exceeded.

6.8 ACTION REQUIRED TO FURTHER REVIEW 1,3 BUTADIENE

None.

## 7. REVIEW AND ASSESSMENT OF LEAD

### 7.1 INTRODUCTION

Lead is a widely used non-ferrous metal and has a large number of industrial applications. As the compound tetraethyl lead, it is 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 this use is rapidly declining (Fig 4).

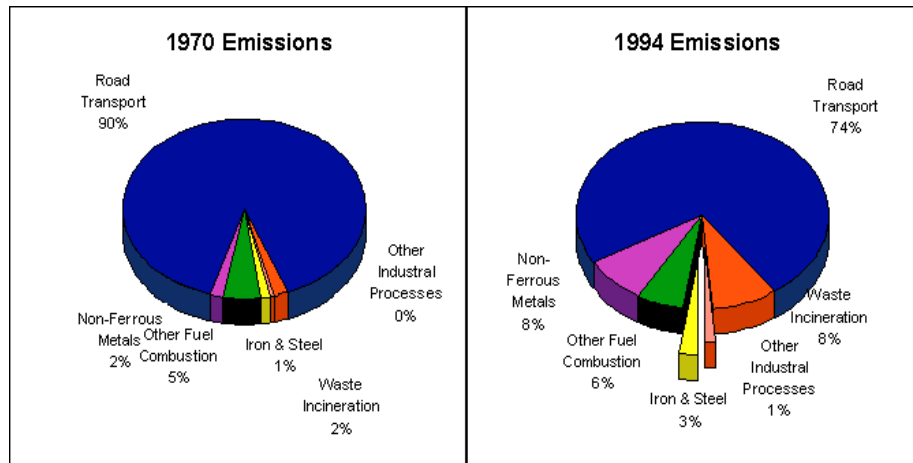


Fig 4. Emissions of lead in the UK.

Most emissions of lead in the UK arise from petrol-engined vehicles.

Lead is a cumulative poison and in sufficient amounts can cause severe damage, particularly to the central nervous system. The young are particularly susceptible to damage and low level exposure to lead may cause impairment of children's intelligence and concentration.

### 7.2 STANDARDS AND OBJECTIVES FOR LEAD

The Government has adopted an annual average of  $0.5\mu\text{g}/\text{m}^3$  as an air quality standard for lead with an objective for the standard to be achieved by the end of the year 2005.

### 7.3 THE NATIONAL PERSPECTIVE

Existing national policies are expected to deliver the prescribed objective for lead at all rural and urban background sites and roadside locations by 2005. Only local authorities with significant industrial sources are expected to need to undertake a second or third stage review and assessment for this pollutant (Fig 5).

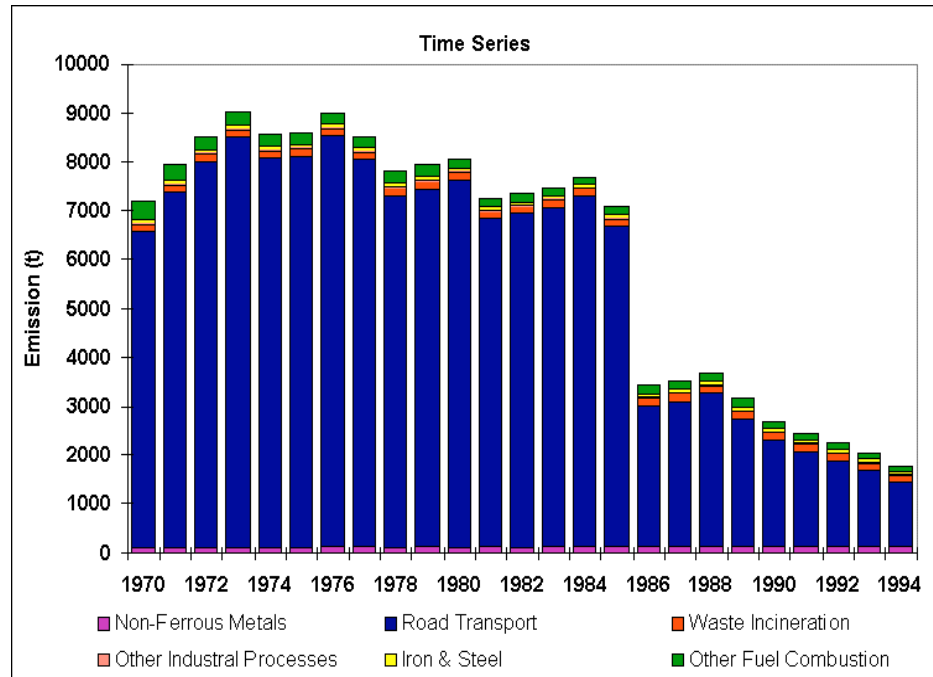


Fig 5. Lead emission trends.

#### 7.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW OF LEAD

The East Riding of Yorkshire Council has collated the following information:

- Details of Part A and Part B authorised processes present with the East Riding of Yorkshire.
- Details of large Part A authorised processes in neighbouring areas which could impact within the East Riding of Yorkshire.
- Planned developments in the locality.

For all existing and proposed processes or activities the Council has identified those which have the potential, singly or collectively, to emit significant quantities of lead. For the purposes of this stage 1 review these are assumed to consist of:

- One or more Part A processes of the types identified to be a potential significant source of lead.
- One or more Part B authorised processes in close proximity, which collectively have the potential to emit significant quantities of lead.
- Industrial or other sites with non-prescribed processes with the potential to emit significant quantities of lead.
- Planned developments in the locality.

7.5 PART A AND B AUTHORISED PROCESSES

Part A and B authorised are shown in Tables 1 and 2 (Appendix 1). No processes have been identified which are potential significant sources of lead.

7.6 PLANNED DEVELOPMENTS IN THE LOCALITY

Planned developments that may impact upon air quality in the East Riding of Yorkshire are listed in Appendix 5. None of these are likely to be significant sources of lead.

7.7 CONCLUSIONS FOR LEAD

The air quality objective for lead is not likely to be exceeded.

7.8 ACTION REQUIRED TO FURTHER REVIEW LEAD

None

## 8. REVIEW AND ASSESSMENT OF NITROGEN DIOXIDE

### 8.1 INTRODUCTION

Nitrogen oxides are formed during high temperature combustion processes from the oxidation of nitrogen in the air or fuel. The principal source of nitrogen oxides - nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>), collectively known as NO<sub>x</sub>, is road traffic, which is responsible for approximately half the emissions in Europe. NO<sub>x</sub> concentrations are therefore greatest in urban areas where traffic is heaviest. Other important sources are power stations, heating plants and industrial processes (Fig 6).

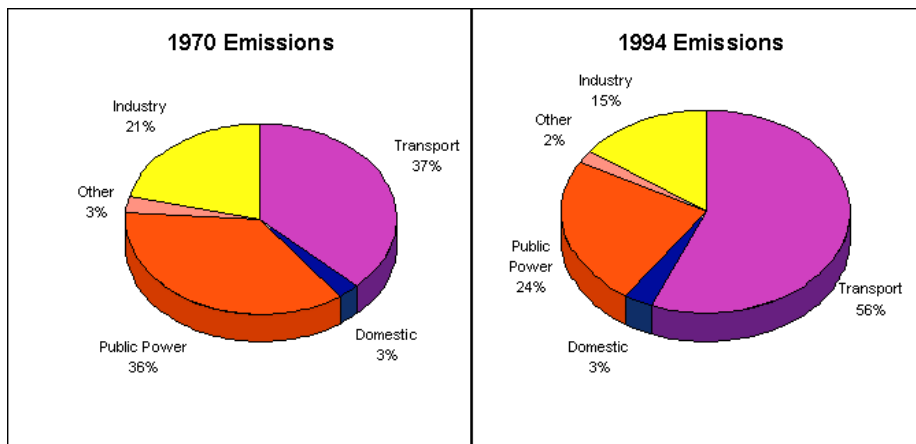


Fig 6. Nitrogen oxide emissions in the UK.

Nitrogen oxides are released into the atmosphere mainly in the form of NO which is then readily oxidised to NO<sub>2</sub> by reaction with ozone. Nitrogen dioxide has a variety of environmental and health impacts. It is a respiratory irritant, may exacerbate asthma and possibly increase susceptibility to infections. In the presence of sunlight it reacts with hydrocarbons to produce photochemical pollutants such as ozone (summer smog). In addition, nitrogen oxides are converted to nitric acid. This nitric acid is in turn removed from the atmosphere by direct deposition to the ground or by transfer to aqueous droplets thereby contributing to acid deposition (acid rain).

There is a complex relationship between emissions of NO<sub>x</sub> and the resulting concentrations of NO<sub>2</sub>, dependent on the proportion of NO<sub>2</sub> in the primary emission and the availability of atmospheric oxidant, especially ozone, to oxidise NO to NO<sub>2</sub>. Elevated levels of NO<sub>x</sub> occur in urban environments under stable meteorological conditions when the airmass is unable to disperse.

### 8.2 STANDARDS AND OBJECTIVES FOR NITROGEN DIOXIDE

The Government has adopted a 1 hour average of 150 ppb as an air quality standard for nitrogen dioxide with a specific objective for the standard to be achieved as an hourly maximum by the end of the year 2005. The Government has also adopted an annual average of 21 ppb as

an air quality standard with a specific objective to achieve this by the year 2005.

### 8.3 THE NATIONAL PERSPECTIVE

The results of an analysis set out in the National Air Quality Strategy suggest that for nitrogen dioxide a reduction of 5 to 10% over and above that achieved by national measures will be required to ensure that air quality objectives are met everywhere by the end of 2005. Local authorities with major roads, or highly congested roads, which have the potential to result in elevated levels of nitrogen dioxide are expected to identify a need to progress to the second or third stage review and assessment of this pollutant (Fig 7).

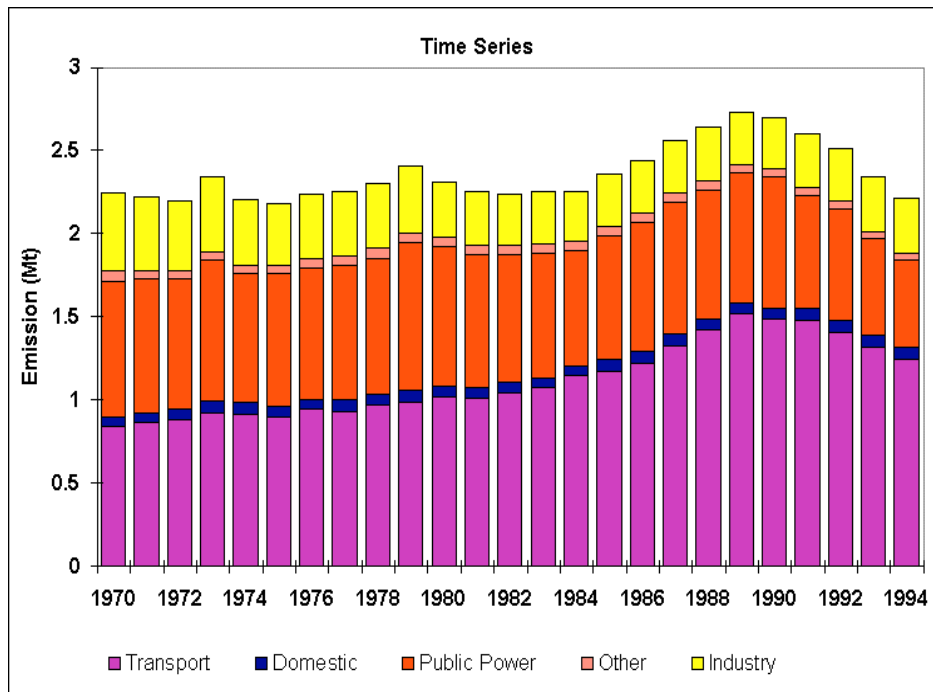


Fig 7. Nitrogen Dioxide emission trends.

Exceedances of the 1 hour air quality objective for NO<sub>2</sub> are most likely to be associated with winter episodes of poor dispersion or during summer ozone episodes. Local authorities do not have control over summer ozone concentrations since these have a significant trans-boundary component. However, local authorities can influence sources of NO<sub>x</sub> and thus prevent winter episodes and reduce the severity of summer episodes.

### 8.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW OF NITROGEN DIOXIDE

The East Riding of Yorkshire Council has collated the following information:

- Current and 2005 forecast annual average daily traffic flows for the major road network in the East Riding of Yorkshire.

- Current urban background concentrations taken from local diffusion tube measurements.
- Details of Part A and B authorised processes present within the East Riding of Yorkshire.
- Details of large Part A authorised processes in neighbouring areas which may impact within the East Riding of Yorkshire.
- Planned developments in the locality.

For all existing and proposed processes or activities the Council has identified those which have the potential, singly or collectively, to emit significant quantities of NO<sub>x</sub>. For the purposes of this stage 1 review these are assumed to consist of:

- An existing mean urban background concentration of 30 ppb or greater.
- One or more existing or planned roads with a current or projected annual average daily traffic flow of 20,000 vehicles.
- One or more Part A or B processes of the types identified to be potential significant sources of NO<sub>x</sub>.

#### 8.5 MONITORING OF NITROGEN DIOXIDE

Prior to local government reorganisation in 1996, passive monitoring of NO<sub>2</sub> was carried out in Bridlington and Goole using diffusion tubes as part of the UK Nitrogen Dioxide National Survey. This monitoring was resumed by the East Riding of Yorkshire Council in 1998 incorporating 16 sites in Bridlington, Beverley, Goole and Hedon. The 1998 monitoring data is shown in Tables 5 to 8 (Appendix 3). These results indicate occasional, minor exceedances of the air quality objective, mainly at kerbside locations. They do not, however, include data for the months of November to January when raised concentrations due to episodes of poor dispersion may be expected.

#### 8.6 ROAD TRANSPORT

Roads with a current or projected daily traffic flow of 20,000 vehicles or 15,000 vehicles in urban areas are identified in Tables 3 and 4 (Appendix 2) and Appendix 4.

## 8.7 PART A AUTHORISED PROCESSES

Those Part A and B authorised processes which are of the types identified as being potential significant sources of NO<sub>x</sub> are shown in Tables 1 and 2 (Appendix 1).

## 8.8 PLANNED DEVELOPMENTS WITHIN THE LOCALITY

Planned developments that may impact upon air quality in the East Riding of Yorkshire are listed in Appendix 5. Of these the following are potential significant sources of NO<sub>x</sub> and will require further assessment:

- Energy Power Resources, Goole Renewable Energy Plant, Glews Hollow, Goole.
- B.P.Chemicals Ltd, Gas Turbine Power Station, Saltend.
- Amlon Metals Ltd (T/A Euromet), Animal Carcass Incinerator, Pollington Airfield, Goole.

## 8.9 CONCLUSIONS FOR NITROGEN DIOXIDE

The air quality objective for nitrogen dioxide may be exceeded as a result of:

- Daily traffic flows of 20,000 or more vehicles.
- Part A and B authorised processes which are potential significant sources of nitrogen dioxide.
- Proposed developments in Goole and Saltend which are potential significant sources of nitrogen dioxide.

## 8.10 ACTION REQUIRED TO FURTHER REVIEW NITROGEN DIOXIDE

Further assessment is required to investigate the likely exceedance of the air quality objective for nitrogen dioxide. This will take the form of screening dispersion modelling within a stage 2 review together with continuous automatic monitoring at 3 locations within the East Riding of Yorkshire and a continuation of the diffusion tube monitoring already being carried out.



## 9. REVIEW AND ASSESSMENT OF PM<sub>10</sub>

### 9.1 INTRODUCTION

Particulates are the finely divided solids or liquids which may be dispersed into the air from combustion processes, transport, industry or natural sources including coal smoke, diesel smoke, fine ash, sulphates and land dusts. PM<sub>10</sub> represents the fraction of particulates of very small size (less than 10 micrometres) which if inhaled would penetrate into the lungs.

Industrial sources account for about 47% of total emissions of PM<sub>10</sub>, transport 26%, power stations 15% and domestic and other low-level combustion 11%. In urban areas, transport, particularly diesel, is likely to be the dominant source. PM<sub>10</sub> may also be formed by the action of sunlight on emissions of sulphur and nitrogen compounds from across Europe during summer smog (Fig 8).

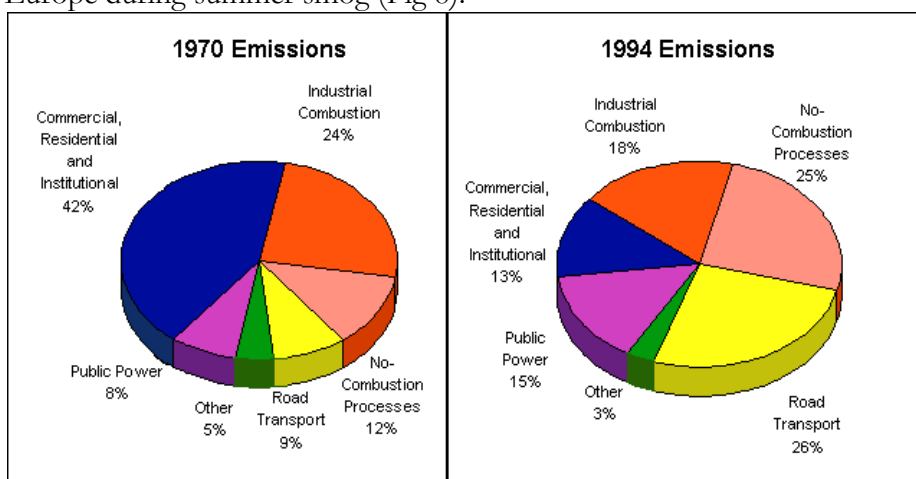


Fig 8. Emissions of PM<sub>10</sub> in the UK.

### 9.2 STANDARDS AND OBJECTIVES FOR PM<sub>10</sub>

The Government has adopted a running 24 hour average of 50  $\mu\text{gm}^{-3}$  as an air quality standard for PM<sub>10</sub> with a specific objective for the standard to be achieved as the annual 99th percentile of daily maximum running 24 hour averages (i.e. no more than 4 days exceeding the standard per year) by the end of the year 2005.

### 9.3 THE NATIONAL PERSPECTIVE

The PM<sub>10</sub> standard is currently exceeded at all sites in the national monitoring network and it is likely that this will be most difficult of the air quality objectives to achieve for most local authorities. A significant proportion of PM<sub>10</sub> is due to the oxidation of sulphur and nitrogen compounds. These are regional scale pollutants and outside the control of individual local authorities. There are also natural or semi-natural sources such as wind-blown dust and sea salt particles. The impact of local urban sources is superimposed on this background and it is this proportion which the local authority must attempt to assess.

Local sources are generally responsible for exceedance of the air quality objective for PM<sub>10</sub> associated with winter episodes during poor dispersion whereas secondary sources are the main cause of high levels of PM<sub>10</sub> during the summer smog (Fig 9).

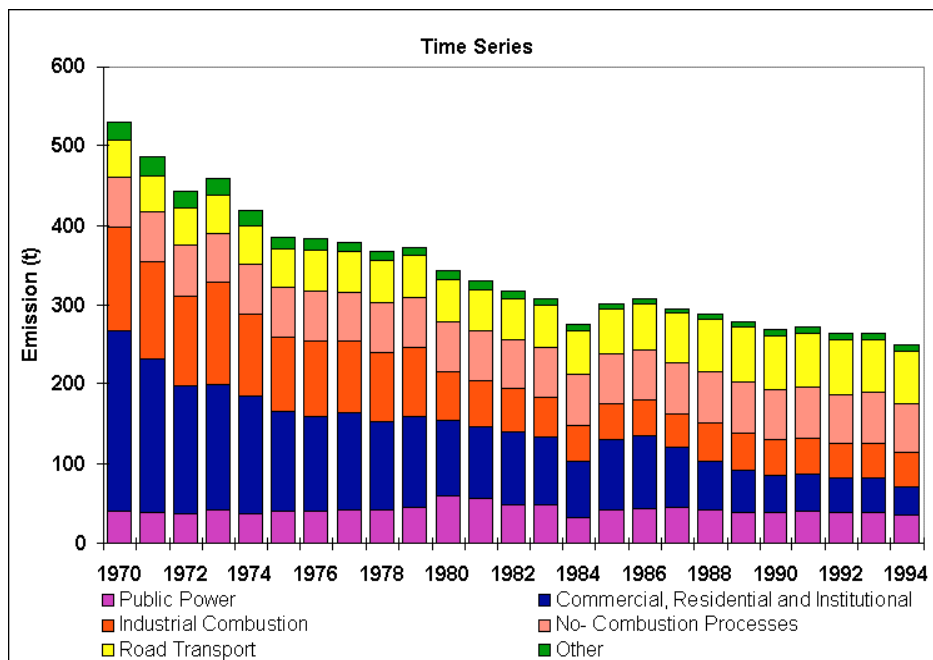


Fig 9. PM<sub>10</sub> emission trends.

#### 9.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW OF PM<sub>10</sub>

The East Riding of Yorkshire Council has collated the following information

- Current and 2005 forecast annual average daily traffic flows for the major road network in the East Riding of Yorkshire.
- Approximate emission densities from road transport and other low level dispersion sources of PM<sub>10</sub>.
- Estimated current urban and rural background concentrations taken from the National Atmospheric Emissions Inventory.
- Details of Part A and Part B authorised processes present within the East Riding of Yorkshire.
- Details of any significant sources of PM<sub>10</sub> in neighbouring areas, which may impact, with the East Riding of Yorkshire.
- Planned developments within the locality.

For all existing and proposed processes and activities the Council has identified those which have the potential, singly or in combination, to emit significant quantities of PM<sub>10</sub>. For the purposes of this Stage 1 review these are assumed to consist of:

- Emissions from low level dispersed sources greater than 10 tonnes per year in any 1 km by 1 km grid square within the East Riding of Yorkshire.
- One or more existing or planned roads with a forecast annual average daily traffic flow of greater than 25,000.
- One or more Part A or B processes of the types identified to be potential significant sources of PM<sub>10</sub>.
- Any industrial process which emits significant quantities of dust in the form of PM<sub>10</sub> from uncontrolled or fugitive sources within the plant.

#### 9.5 LOW LEVEL DISPERSED SOURCES

The National Atmospheric Emissions Inventory (NAEI) contains estimated emissions of PM<sub>10</sub> on a 1 km by 1 km grid shown in Appendix 4. This identifies the possibility of emissions of PM<sub>10</sub> from low level dispersed sources exceeding 10 tonnes per year in several grid squares within the East Riding of Yorkshire.

#### 9.6 ROAD TRANSPORT

Roads with a current or projected daily traffic flow of 25,000 vehicles are identified in Tables 3 and 4, (Appendix 2) and Appendix 4.

#### 9.7 PART A AND B AUTHORISED PROCESSES

Those Part A and B authorised processes which are the types identified as being potential significant sources of PM<sub>10</sub> are shown in Tables 1 and 2, (Appendix 1).

#### 9.8 PLANNED DEVELOPMENTS IN THE LOCALITY

Planned developments that may impact upon air quality in the East Riding of Yorkshire are listed in Appendix 5. Of these the following are potential significant sources of PM<sub>10</sub> and will require further assessment:

- Energy Power Resources, Goole Renewable Energy Plant, Glews Hollow, Goole.
- B.P.Chemicals Ltd, Gas Turbine Power Station, Saltend.
- Amlon Metals Ltd (T/A Euromet), Animal Carcass Incinerator, Pollington Airfield, Goole.

#### 9.9 CONCLUSIONS FOR PM<sub>10</sub>

The air quality objective for PM<sub>10</sub> may be exceeded as a result of

- Estimated emissions from low level dispersed sources of greater than 10 tonnes per year in several 1km by 1km grid squares
- Roads with a forecast daily traffic flow of more than 25,000
- Part A and B authorised processes which are potential significant sources of PM<sub>10</sub>
- Proposed developments in Goole and Saltend which are potential significant sources of PM<sub>10</sub>

#### 9.10 ACTION REQUIRED FOR FUTURE REVIEW OF PM<sub>10</sub>

Further assessment is required to investigate the likely exceedance of the air quality objective for PM<sub>10</sub>. This will take the form of screening dispersion modelling within a stage 2 review together with continuous automatic monitoring at 3 locations within the East Riding of Yorkshire.

## 10. REVIEW AND ASSESSMENT OF SULPHUR DIOXIDE

### 10.1 INTRODUCTION

Sulphur dioxide (SO<sub>2</sub>) is a corrosive acid gas, which is emitted in the combustion of coal and oil. Power generation accounts for 67% of total UK emissions, other industry 24%, commercial and domestic heating 5% and road transport 2% (Fig 10).

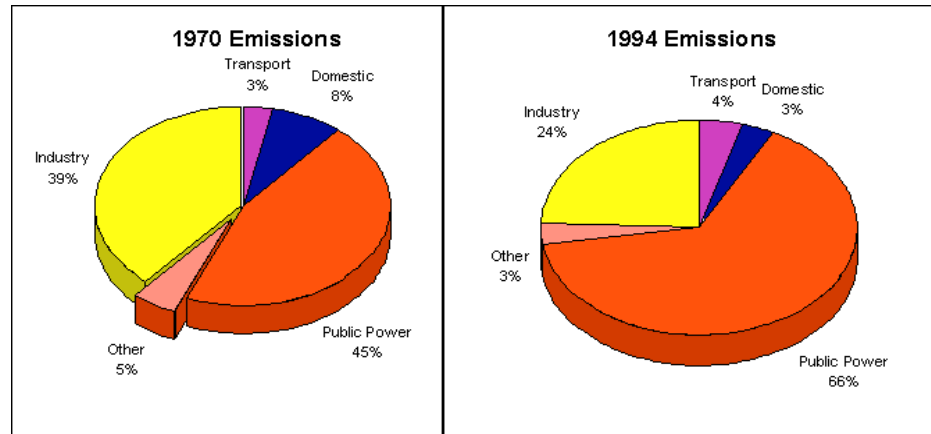


Fig 10. Emissions of Sulphur Dioxide in the UK.

SO<sub>2</sub> combines with water vapour in the atmosphere to produce acid rain. Acid rain is implicated in the damage and destruction of vegetation and in the degradation of soils, building materials and watercourses. SO<sub>2</sub> is also associated with asthma and chronic bronchitis.

### 10.2 STANDARDS AND OBJECTIVES FOR SULPHUR DIOXIDE

The Government has adopted a 15 minute average of 100 ppb as an air quality standard for SO<sub>2</sub> with an objective for the standard to be achieved as the 99.9th percentile (i.e. on all but 35 periods of 15 minutes per year) by the end of the year 2005.

### 10.3 THE NATIONAL PERSPECTIVE

Since the Clean Air Acts in the 1950's and 1960's UK wide SO<sub>2</sub> emissions have diminished steadily and in most UK cities they are no longer considered to pose a threat to health. Exceedances of the air quality standards currently occur in the vicinity of industrial processes for which stack heights were designed to meet previous air quality standards, down wind of coal or oil-fired power stations and in areas where significant quantities of coal are used for space heating. SO<sub>2</sub> concentrations are elevated at the kerbside but not sufficiently to exceed the air quality standard in the absence of other sources (Fig 11).

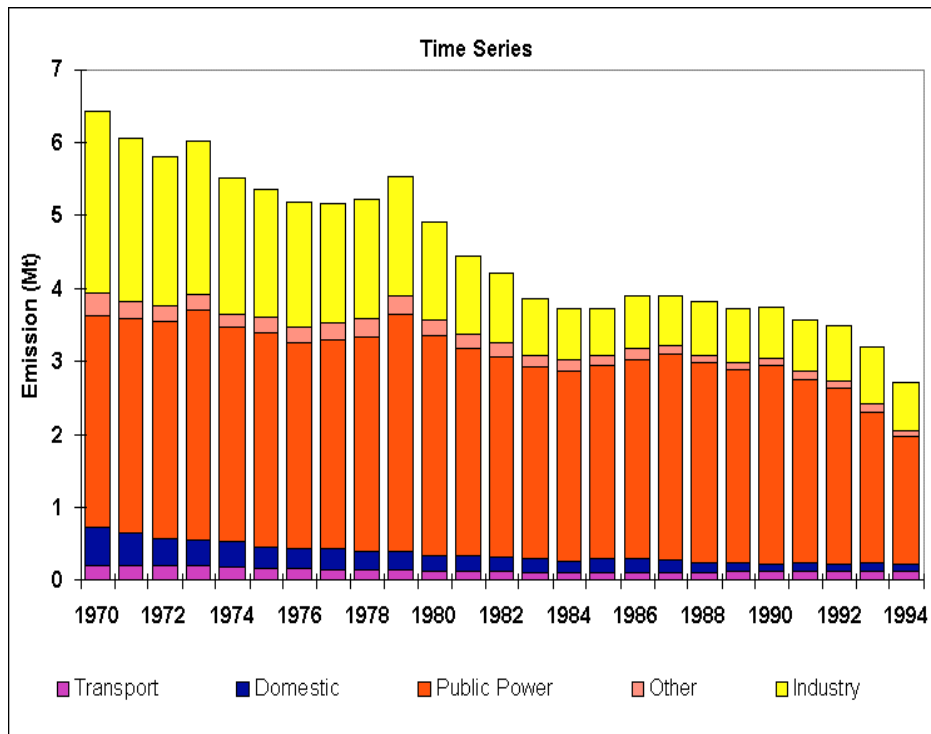


Fig 11. Sulphur Dioxide emission trends.

#### 10.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW OF SO<sub>2</sub>

The East Riding of Yorkshire Council has collated the following information

- Details of Part A and B authorised processes present within the East Riding of Yorkshire.
- Approximate emissions densities from domestic combustion and other low level dispersed sources of SO<sub>2</sub>.
- Estimated current urban background concentrations taken from the National Atmospheric Emissions Inventory.
- Details of combustion systems with a thermal power rating greater than 5 MW using solid fuel or fuel oil.
- Details of significant sources of SO<sub>2</sub> in neighbouring areas, which may impact within the East Riding of Yorkshire.
- Planned developments in the locality.

For all existing and proposed processes or activities the Council has identified those which have the potential, singly or in combination, to emit significant quantities of SO<sub>2</sub>. For the purpose of this stage 1 review these are assumed to consist of:

- Part A and B authorised processes of the types identified to be potential significant sources of SO<sub>2</sub>.
- Solid fuel and fuel oil fired combustion systems with thermal power greater than 5MW.

- Low level domestic combustion and other short stack emissions of greater than 40 tonnes per year in a 1 km by 1 km grid square within the East Riding of Yorkshire.

#### 10.5 PART A AND B AUTHORISED PROCESSES

Part A and B authorised processes which are of the types identified as being potential significant sources of SO<sub>2</sub> are shown in Tables 1 and 2 (Appendix 1).

#### 10.6 COMBUSTION SYSTEMS

No solid fuel or oil fired combustion systems with thermal power greater than 5 MW, other than Part A or B authorised processes have been identified within the East Riding of Yorkshire or neighbouring areas.

#### 10.7 LOW LEVEL DOMESTIC COMBUSTION AND SHORT STACK EMISSIONS

The National Atmospheric Emissions Inventory (NAEI) contains estimated emissions for sulphur dioxide on a 1 km by 1 km grid shown in Appendix 4. This identifies the possibility of emissions of sulphur dioxide from low level domestic combustion and other short stack sources exceeding 40 tonnes per year in the Goole urban area.

#### 10.8 PLANNED DEVELOPMENTS IN THE LOCALITY

Planned developments that may impact upon air quality in the East Riding of Yorkshire are listed in Appendix 5. Of these the following are potential significant sources of SO<sub>2</sub> and will require further assessment:

- Energy Power Resources, Goole Renewable Energy Plant, Glews Hollow, Goole.
- B.P.Chemicals Ltd, Gas Turbine Power Station, Saltend.
- Amlon Metals Ltd (T/A Euromet), Animal Carcass Incinerator, Pollington Airfield, Goole.

#### 10.9 CONCLUSIONS FOR SULPHUR DIOXIDE

The air quality objective for SO<sub>2</sub> may be exceeded as a result of:

- Estimated emissions from low level domestic combustion and short stacks of greater than 40 tonnes per year in the Goole urban area.
- Part A and B authorised processes which are a potential significant source of SO<sub>2</sub>.

- Proposed developments in Goole and Saltend which are potential significant sources of SO<sub>2</sub>

#### 10.10 ACTION REQUIRED TO FURTHER REVIEW SULPHUR DIOXIDE

Further assessment is required to investigate the likely exceedance of the air quality objective for sulphur dioxide. This will take the form of screening dispersion modelling within a Stage 2 review together with continuous automatic monitoring at 3 locations within the East Riding of Yorkshire.



## **APPENDICES**

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Appendix 1 - Authorised Processes (Part A and B)

Appendix 2 - Road Transport

Appendix 3 - Monitoring Results

Appendix 4 - Maps

Appendix 5 - Proposed Developments in the Locality

Appendix 6 - References

Appendix 7 - Glossary

**APPENDIX 1****TABLE 1 - PART A AUTHORISED PROCESSES**

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>SIGNIFICANT EMISSIONS</b>
Parengo UK Ltd East Knapton Malton	Gas Turbine Combustion Natural Gas Refining	SE888770	NO <sub>2</sub> SO <sub>2</sub>
British Sugar York	Combustion Cement Lime Manufacture	SE567529	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>
Tate & Lyle Citric Acid Denison Road Selby	Organic Acids	SE632317	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>
Hodgson Chemicals Bawtry Road Selby	Inorganic Chemicals	SE617308	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>
National Power plc Drax Power Station Selby	Power Generation	SS665270	NO <sub>2</sub> SO <sub>2</sub>
National Power plc Eggborough Power Station Eggborough	Power Generation	SE575245	NO <sub>2</sub> SO <sub>2</sub>
National Power plc Ferrybridge Power Station Ferrybridge	Power Generation	SE467268	NO <sub>2</sub> SO <sub>2</sub>
Croda Chemicals Papermill Road Rawcliffe Bridge Goole	Organic Chemicals	SE695215	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>
Kemira Chemicals New Potter Grange Road, M62 Trading Estate Goole	Chemical Fertiliser	SE738235	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>
L & M Engineers Nos. 1 & 2 Dry Docks ABP Estate Goole	Ship Cleaning	SE748233	PM <sub>10</sub>
Miracle Garden Care Howdendyke Goole	Chemical Fertiliser	SE758268	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>
British Aerospace Defence Ltd, Military Aircraft Division Brough Hull	Cadmium Plating	SE940263	
Hodgeson Chemicals Ltd Chantry Lane Beverley	Organic Chemicals Petrochemicals Acids	TA041394	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>SIGNIFICANT EMISSIONS</b>
BP Chemicals Ltd Saltend	Combustion Organic Chemicals Inorganic Chemicals	TA164275	NO <sub>2</sub> PM <sub>10</sub>
BP Exploration Co Ltd Easington	Combustion Natural gas refining	TA398208	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>
British Gas Easington	Natural Gas Refining Combustion	TA400205	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>
Parengo UK Ltd Caythorpe Rudston Bridlington	Natural Gas Refining	TA125678	NO <sub>2</sub> SO <sub>2</sub>
British Gas Atwick	Natural Gas Refining	TA195513	SO <sub>2</sub> PM <sub>10</sub>
Croda Universal Ltd Clough Road Hull	Organic chemicals	TA095315	NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub>
John L Seaton & Co Ltd Bankside Hull	Organic chemicals	TA110315	NO <sub>2</sub> SO <sub>2</sub>
Hodgson Chemicals Ltd Clough Road Hull	Organic chemicals	TA096315	PM <sub>10</sub>
Holliday Pigments Ltd Morley Street Hull	Acids	TA110313	PM <sub>10</sub>
Smith & Nephew Medical Ltd Hessle Road Hull	Di-isocyanates	TA080275	PM <sub>10</sub>

**TABLE 2 - PART B AUTHORISED PROCESSES**

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Marine and Industrial Transmissions, 80 Weeland Road Hensall	Waste oil burner	SE291234	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Mooney & Morley Ltd Holme Lane Selby	Waste oil burner	SE613328	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Hepworth Building Products Ltd Escrick Works York	Clay Goods	SE625403	CO SO <sub>2</sub> NO <sub>x</sub> Particulates	SO <sub>2</sub>
Plasmor Ltd Green Lane Great Heck Goole	Bulk Cement	SE598213	Particulates	
Pozzalanic Lytag Ltd Hazel Old Lane Hensall	Minerals	SE594234	Particulates	PM <sub>10</sub>
Tarmac Quarry Products Bawtry Road Selby	Bulk Cement	SE615308	Particulates	
RMC Roadstone Barlby Road Selby	Macadam	SE629325	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	SO <sub>2</sub> PM <sub>10</sub>
Sellite Blocks Ltd The Old Quarry Great Heck	Cement	SE592213	Particulates	
BOCM Pauls Ltd Barlby Road Selby	Animal Feeds	SE623328	Odour Particulates	
Unifit International Ltd Barlby Road Selby	Vegetable oil	SE625328	Odour	
Elvington Plant Hire Elvington Ind. Estate Elvington	Waste oil burner	SE689484	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Sansfield Concrete Elvington Ind. Estate Elvington	Bulk Cement	SE687485	Particulates	

COMPANY	PROCESS	GRID REF	POSSIBLE EMISSIONS	SIGNIFICANT EMISSIONS
York Direct Ltd Elvington Ind. Estate Elvington	Printworks	SE676476	NO <sub>x</sub> VOCs	
Al Plant & Haulage York Road Elvington	Crushing and Screening	SE675488	Particulates	PM <sub>10</sub>
ECS Commercials Common Road Dunnington	Waste oil burner	SE674517	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Murray Brown & Co Flixton	Minerals	TA047778	Particulates	PM <sub>10</sub>
ARC (Northern) Premix Hunmanby	Bulk Cement	TA105769	Particulates	
Atlas Ward Structures Ltd Sherburn	Metal coating	SE961770	Particulates	
Ward Building Components Ltd, Sherburn	Di-isocyanates	SE961770	Di-Isocyanates VOCs	
Schnetady Europe Ltd Burythorpe	Sand drying	SE785655	Particulates	PM <sub>10</sub>
Lenstone Ltd Settrington	Minerals	SE828700	Particulates	PM <sub>10</sub>
Flogates Neilsen Road Goole	Heavy clay goods Pitch impregnation of refractory goods	SE733237	CO SO <sub>2</sub> NO <sub>x</sub> Particulates	SO <sub>2</sub>
Tilcon Ltd Dutch Riverside Goole	Bulk cement	SE745235	Particulates	
Ready Mixed Concrete Dunhill Road Goole	Bulk cement	SE737235	Particulates	
Motosave Boothferry Road Goole	Bulk cement	SE740239	Particulates	
ARC Pipes Balk Lane Pollington	Bulk cement	SE614202	Particulates	
H T Tennison Gowdall Lane Pollington	Timber	SE607205	Particulates	
Burgess Endeavour plc Gowdall Lane Pollington	Animal feeds	SE617208	Odour Particulates	
Celcon Blocks Heck Lane Pollington	Bulk cement	SE600205	Particulates	
Sandtoft Roof Tiles Main Street Broomfleet	Heavy clay goods	SE883273	CO SO <sub>2</sub> NO <sub>x</sub> Particulates	SO <sub>2</sub>

COMPANY	PROCESS	GRID REF	POSSIBLE EMISSIONS	SIGNIFICANT EMISSIONS
D Webster Hull Road Eastrington	Maggot breeding	SE796298	Odour Ammonia Amines Sulphides	
J T Hutchinson HGV Baileywood Lane Holme upon Spalding Moor	Waste oil burner	SE814384	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Service Timber Ltd Brighton Airfield Brighton	Timber	SE725352	Particulates	
Swantech Ltd Brighton Airfield Brighton	Timber	SE725351	Particulates	
Hygiena Ltd Thorpe Road Howden	Timber Combustion Adhesive Coatings Coating Manufacture	SE760290	CO SO <sub>2</sub> NO <sub>x</sub> Particulates VOCs	SO <sub>2</sub> PM <sub>10</sub>
Gateway Fabrications Ltd Broad Lane Gilberdyke	Metal coating	SE826294	Particulates	
Transco Rawcliffe	Gas odourisation		SO <sub>2</sub> NO <sub>2</sub>	
Transco Asselby	Gas odourisation		SO <sub>2</sub> NO <sub>2</sub>	
Construction Materials Services Ltd Boothferry Road Howden	Bulk cement	SE742274	Particulates	
Britannia Food Ingredients Glews Hollow Goole	Vegetable oils and fats	SE737234	Odour VOCs	
Glews Garage Rawcliffe Road Goole	Respraying of road vehicles	SE716238	Particulates VOCs	
HSL (Import Centre) Seavy Road Goole	Respraying of road vehicles	SE735235	Particulates VOCs	
Airmyn Garage High Street Airmyn	Respraying of road vehicles	SE725253	Particulates VOCs	
Rossmoor Garage Storewood	Waste oil burner	SE728448	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Halifax Estates Bugthorpe	Waste oil burner	SE775581	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	

COMPANY	PROCESS	GRID REF	POSSIBLE EMISSIONS	SIGNIFICANT EMISSIONS
Pocklington Blocks Ltd Airfield Ind. Estate Pocklington	Bulk cement	SE785481	Particulates	
Redland Ready Mix Ltd Airfield Ind. Estate Pocklington	Bulk cement	SE785482	Particulates	
RMC Roadstone Ltd Huggate	Roadstone coating	SE842565	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	SO <sub>2</sub> PM <sub>10</sub>
E W Creaser (Burnby) Ltd Burnby	Minerals	SE857468	Particulates	PM <sub>10</sub>
Clifton Service Station Howden Road Holme on Spalding Moor	Waste oil burner	SE814382	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Gilberdyke MOT Centre Main Road Gilberdyke	Waste oil burner	SE826283	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
G & M Car Repairs Main Road Gilberdyke	Waste oil burner	SE826283	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
York Road Filling Station Stamford Bridge	Waste oil burner	SE713555	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Elite Office Furniture Britannia Way Goole	Timber	SE734232	Particulates	
Barton Engineering Havelock Street Bridlington	Waste oil burner	TA175670	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Gowland Motor Services Gordon Road Bridlington	Waste oil burner	TA175675	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Reg Lee Motor Engineers St Johns Avenue Bridlington	Waste oil burner	TA176673	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Tim Allsop St Johns Street Bridlington	Waste oil burner	TA174672	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Southside Autopoint West Street Bridlington	Waste oil burner	TA185665	CO SO2 NOx Lead Particulates	
RMC Technical Services Ltd, Kelleythorpe	Bulk cement	TA005570	Particulates	
Mixconcrete Pinfold Lane Bridlington	Bulk cement	TA175685	Particulates	
Carwood Funeral Services Ltd, Beverley Road Hutton Cranswick	Timber	TA018519	Particulates	
Fishers Nutrition Ltd Cranswick	Animal feeds	TA021516	Odour Particulates	
Cranswick Mill Ltd Cranswick	Animal feeds	TA017517	Odour Particulates	
Motor Vehicle Imports Ltd Carnaby	Vehicle refinishing	TA135638	Particulates VOCs	
Commercial Marine Supplies Bridlington Road Nafferton	Waste oil burner	TA057604	CO SO2 NOx Lead Particulates	
Dalgety Fridaythorpe Thixendale Road Fridaythorpe	Animal feeds	TA872593	Odour Particulates	
Primetime Pet Foods Kelleythorpe	Animal feeds	TA005570	Odour Particulates	
Broach Hill Garage Beverley Road Hutton Cranswick	Vehicle refinishing	TA018530	Particulates VOCs	
East Riding Crematorium Oxton	Crematorium	TA015695	CO NOx Particulates	
Sandsfield Readymix Concrete Ltd Catwick Lane Brandesburton	Bulk Cement	TA160463	Particulates	
Bayrum Timber Ltd Tower House Lane Saltend	Timber	TA161294	Particulates	
Clifton Service Station Howden Road Holme on Spalding Moor	Waste oil burner	SE814382	CO SO2 NOx Lead Particulates	
Gilberdyke MOT Centre Main Road Gilberdyke	Waste oil burner	SE826283	CO SO2 NOx Lead Particulates	



COMPANY	PROCESS	GRID REF	POSSIBLE EMISSIONS	SIGNIFICANT EMISSIONS
G & M Car Repairs Main Road Gilberdyke	Waste oil burner	SE826283	CO SO2 NOx Lead Particulates	
York Road Filling Station Stamford Bridge	Waste oil burner	SE713555	CO SO2 NOx Lead Particulates	
Elite Office Furniture Britannia Way Goole	Timber	SE734232	Particulates	
Barton Engineering Havelock Street Bridlington	Waste oil burner	TA175670	CO SO2 NOx Lead Particulates	
Gowland Motor Services Gordon Road Bridlington	Waste oil burner	TA175675	CO SO2 NOx Lead Particulates	
Reg Lee Motor Engineers St Johns Avenue Bridlington	Waste oil burner	TA176673	CO SO2 NOx Lead Particulates	
Tim Allsop St Johns Street Bridlington	Waste oil burner	TA174672	CO SO2 NOx Lead Particulates	
Tilcon Mortar Catwick Lane Bransburton	Bulk cement	TA132463	Particulates	
Tarmac Topmix Ellifoot Lane Burstwick	Bulk cement	TA231285	Particulates	
Feedex Feeds Daisy Hill Burstwick	Animal feeds	TA222305	Odour Particulates	
Yorkshire Marine Containers Bransburton	Paint spraying	TA140485	Particulates VOCs	
Sangwin Concrete Blocks Ltd, Burstwick	Bulk cement	TA241270	Particulates	
Humberside Blocks Ltd Ellifoot Lane Burstwick	Bulk cement	TA230285	Particulates	
Holderness Bait Sunderland Road Roos	Maggot Breeding	TA275294	Odour Ammonia Amines Sulphides	

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Electro Furnance Products Hull Road Saltend	Minerals Non-ferrous metals	TA150289	Particulates	PM <sub>10</sub>
Crescent Garage Main Street Willerby	Waste oil burner	TA021309	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Gren Craig Motors Oldbeck Road Beverley	Waste oil burner	TA057398	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
Johnsons Garage Elloughton	Waste oil burner	SE949280	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	
RMC Ltd Gibson Lane Melton	Bulk cement	SE965261	Particulates	PM <sub>10</sub>
Tarmac Topmix Ltd Routh	Bulk cement	TA055345	Particulates	
RMC Roadstone Ltd Gibson Lane Melton	Roadstone coating	SE975750	CO SO <sub>2</sub> NO <sub>x</sub> Lead Particulates	SO <sub>2</sub> PM <sub>10</sub>
Appleby Abrasives Ltd Gibson Lane Melton	Minerals	SE975750	Particulates	PM <sub>10</sub>
Microfine Minerals Ltd Lund	Minerals	SE972501	Particulates	PM <sub>10</sub>
Croxton & Gray Ltd Melton	Minerals	TA957575	Particulates	PM <sub>10</sub>
ECC Ltd Walkington Road Beverley	Minerals	TA021381	Particulates	PM <sub>10</sub>
Harborlite UK Ltd Livingston Road Hessle	Minerals	TA040259	Particulates	PM <sub>10</sub>
W Clifford Watts Ltd South Cave	Minerals	SE915315	Particulates	PM <sub>10</sub>
Beverley Ford Beck View Road Beverley	Vehicle refinishing	TA053395	Particulates VOCs	
Harlands of Hull Ltd Springfield Way Anlaby	Printing	TA025325	NO <sub>x</sub> VOCs	
Yorkshire Marine Containers Ltd Belprin Road Beverley	Paint spraying	TA050395	Particulates VOCs	

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Bankside Patterson Ltd Barmston Road Beverley	Paint spraying	TA15140	Particulates VOCs	
British Aerospace Ltd Brough	Paint spraying	SE955265	Particulates VOCs	
Swift Group Ltd Dunswell Road Cottingham	Paint spraying Timber	TA051345	Particulates VOCs	
Bayram Timber North Newbald	Timber	SE911368	Particulates	
Hodgsons Chemicals Ltd Chantry Lane Beverley	Animal matter	TA041394	Particulates	
Blended Feeds Ltd Raywell	Animal feeds	SE990310	Odour Particulates	
Gower Furniture Ltd Hull Road Woodmansey	Timber	TA055385	Particulates	
Peter Fraser Accident Repairs Springfield Way Anlaby	Vehicle refinishing	TA040298	Particulates VOCs	
Frank Gresham & Co Ltd Brough	Timber	SE945262	Particulates	
Charles Welpton Ltd Hessle	Paint spraying	TA041396	Particulates VOCs	
Transco Paull	Gas odourisation		SO2 NO2	
Transco Ganstead	Gas odourisation		SO2 NO2	
Kingstown Furniture Ltd Leeds Road Hull	Timber treatment	TA110325	VOCs	
Lamboard Holding Ltd 228 Leeds Road Hull	Timber	TA110320	Particulates	
C Jackson & Sons 27 Walker Street Hornsea Parade Hull	Timber	TA113295	Particulates	
Atlas Caravan Co Ltd Wiltshire Road Hull	Timber	TA065273	Particulates	
Woods Timber Co Ltd Witham Hull	Timber	TA105292	Particulates	
Cosalt Holiday Homes Lorraine Street Hull	Timber	TA105308	Particulates	

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Hygena Components Ltd Carlton Street Hull	Timber	TA069280	Particulates	
Hygena Components Ltd Brighton Street Hull	Timber	TA073277	Particulates	
Brown's Garage 160A Albert Avenue Hull	Waste oil burner	TA070292	CO SO2 NOx Lead Particulates	
Belcher Motors 43 Burleigh Street Hull	Waste oil burner	TA110299	CO SO2 NOx Lead Particulates	
Travis Perkins Ltd 50/58 Clarence Street Hull	Timber	TA105290	Particulates	
Hewetsons Floors Ltd Marfleet Hull	Timber	TA145295	Particulates	
Shipham & Co Ltd Hawthorne Avenue Hull	Non ferrous metals	TA068282	CO SO2 NOx Particulates	SO2 Lead
Willerby Caravans Ltd 1251 Hedon Road Hull	Timber	TA150292	Particulates	
Hedon Road Service Station 901 Hedon Road Hull	Waste oil burner	TA145293	CO SO2 NOx Lead Particulates	
Hygena Components Ltd Brighton Street Hull	Non ferrous metal	TA073277	CO SO2 NOx Particulates	SO2 Lead
Tilcon Ltd Lime Street Hull	Bulk cement	TA101295	Particulates	
Tilcon Ltd Freightliner Road Hull	Bulk cement	TA065270	Particulates	
Redland Ready Mix Ltd Hotham Street Hull	Bulk cement	TA119294	Particulates	

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Hygena Ltd Oslo Road Hull	Adhesive coating	TA095325	VOCs	
Hull CC - Leisure Service Leisure Services Department Hull	Crematorium	TA	CO NOx Particulates	
T H Dick & Co Ltd Cleveland Street Hull HU8 7BD	Furnace	TA103305	CO SO2 NOx Lead Particulates	Lead
Fabricast Ltd Main Street Hull	Foundry	TA099301	CO SO2 NOx Lead Particulates	
Tarmac Topmix Ltd Wincolmllee Hull	Bulk cement	TA101301	Particulates	
Caradon Ideal National Avenue Hull	Foundry Cupola	TA066311	CO SO2 NOx Lead Particulates	SO2 Lead
Thermica Ltd Chamberlain Road Hull	Vermiculite	TA105311	Particulates	
Starkeys Technicast Ltd 45 Stockholm Road Hull	Cupola	TA098320	CO SO2 NOx Lead Particulates	SO2 Lead
Sisons Garage 1026 Hedon Road Hull	Waste oil burner	TA149292	CO SO2 NOx Lead Particulates	
Jordan & Co (Hull) Ltd Witham Hull	Vehicle refinishing	TA107290	Particulates VOCs	
Ken Rooms Ltd Cumberland Street Hull	Drum coating	TA110301	Particulates	
John Seaton & Co Bankside Hull	Vegetable oils	TA110310	Odour Particulates VOCs	

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Karlshams Ltd 189/197 Wincolmllee Hull	Vegetable oils	TA110302	Odour Particulates VOCs	
Lex Tillotson Ltd Hedon Road Hull	Vehicle refinishing	TA148292	Particulates VOCs	
Cargill Plc 45 Morley Street Hull	Vegetable oils	TA102311	Odour Particulates VOCs	
T C Harrison 132 Anlaby Road Hull	Vehicle refinishing	TA080287	Particulates VOCs	
Anglia Oils Ltd King George Dock Hull	Pet food	TA145290	Odour Particulates	
Humbrol Ltd Marfleet Hull	Coating manufacture	TA142295	Particulates VOCs	PM <sub>10</sub>
Teal & Mackrill Ltd Lockwood Street Hull	Coating manufacture	TA098295	Particulates VOCs	PM <sub>10</sub>
AKZO Ltd Sculcoates Lane Hull	Coating manufacture	TA090307	Particulates VOCs	PM <sub>10</sub>
Van Leer (UK) Ltd Southcoates Lane Hull	Printing and coating	TA125295	Particulates VOCs	
Mydrin Ltd Clough Road Hull	Coating manufacture	TA095315	Particulates VOCs	PM <sub>10</sub>
Auto Cellulosers (Hull) 11 - 17 Daltry Street Hull	Vehicle refinishing	TA185282	Particulates	
Seven Seas Ltd 1305 Hedon Road Hull	Pet food	TA135292	Odour Particulates	
Croda Paints Bankside Hull	Coating manufacture		Particulates VOCs	PM <sub>10</sub>
Remploy Ltd Chamberlain Road Hull	Timber	TA105312	Particulates	
J H Fenner & Co Ltd Marfleet Hull	Drying vegetable matter	TA142295	Particulates	

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Sanderson Ford Clough Road Hull	Vehicle refinishing	TA095312	Particulates VOCs	
Davenport Engineering Co Upton Street Hull	Coating manufacture Adhesive coating	TA107301	Particulates VOCs	PM <sub>10</sub>
T J Smith & Nephew Ltd 101 Hessle Road Hull	Coating manufacture Adhesive coating		Particulates VOCs	PM <sub>10</sub>
Metal Drum Co Ltd Wiltshire Road Hull	Drum coating	TA165275	Particulates VOCs	
EPAC International Ltd Amsterdam Road Hull	Coating	TA112325	Particulates VOCs	
Holme Tannery Ltd Sculcoates Lane Hull	Hide and skins	TA090307	Odour Ammonia Sulphides VOCs	
Donaldsons Filter Comp. Oslo Road Hull	Rubber	TA095326	1,3 Butadiene Particulates	1,3 Butadiene PM <sub>10</sub>
British Cocoa Mills Ltd 145 Cleveland Street Hull	Pet food	TA103305	Odour Particulates	
Hullfish Meal Ltd Albert Dock Hull	Fish meal and oil	TA090280	Odour Ammonia Amines Sulphides	
Kingstown Furnishings (A) Leads Road Hull	Timber	TA110320	Particulates	
Sam Allon (Contracts) Ltd Lincoln Street Hull	Minerals	TA	Particulates	PM <sub>10</sub>
Holmes Tannery Ltd Sculcoates Lane Hull	Leather finishing	TA090307	Particulates VOCs	
IBL Hodgson Street Hull	Vegetable oils	TA103295	Odour Particulates VOCs	
Profile Timber Ltd 114 Marfleet Avenue Hull	Timber	TA142297	Particulates	

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
HGL Motors Sculcoates Lane Hull	Waste oil burner	TA090307	CO SO2 NOx Lead Particulates	
Thompson of Hull Clive Sullivan Way Hull	Vehicle refinishing	TA	Particulates VOCs	
D J Broady Ltd 122 Stoneferry Road Hull	Minerals	TA101310	Particulates	PM10
Frank Barton Motors 2 Popple Street Hull	Waste oil burner	TA107289	CO SO2 NOx Lead Particulates	
The Crossroads Group Valletta Street Hull	Waste oil burner	TA149295	CO SO2 NOx Lead Particulates	
Willerby Caravan Co Ltd 1251 Hedon Road Hull	Wood coating	TA134292	Particulates	
Chatfields Garage 137 Ella Street Hull	Waste oil burner	TA075305	CO SO2 NOx Lead Particulates	
Hawthorn Timber Ltd Grindell Street Hull	Timber treatment	TA120295	VOCs	
JCT 600 Ltd Strickland Street Hull	Waste oil burner	TA084280	CO SO2 NOx Lead Particulates	
British Fuels Ltd Sculcoates Lane Hull	Coal handling	TA090280	Particulates	PM10
Brian Tindall Ltd Courtney Street Hull	Vehicle refinishing	TA110297	Particulates VOCs	
Dixon Motors Plc Naylors Row Clarence Street Hull	Vehicle refinishing	TA107292	Particulates VOCs	



<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Atlas Caravans Ltd Wiltshire Road Hull	Wood coating	TA065302	Particulates VOCs	
Landau Holdings Bontoft Avenue Hull	Wood coating	TA065302	Particulates VOCs	
C B North Ltd 66 Hedon Road Hull	Timber	TA115292	Particulates	
Robin Concrete and Waste Foster Street Stoneferry Road Hull	Bulk cement	TA102310	Particulates	
W H Draper 2 Cooper Street Hull	Non ferrous metal	TA110295	CO SO2 NOx Lead Particulates	SO2 Lead
Humber Galvanising Ltd Citadel Trading Park Hull	Galvanising	TA110286	Lead Particulates	
Quarrymix Freightliner Road Hull	Bulk cement	TA065270	Particulates	
Colin Harrison Car Sales 166 St George Road Hull	Waste oil burner	TA073283	CO SO2 NOx Lead Particulates	
Bridge Packaging Ltd 104 Flinton Street Hull	Printing	TA078280	NOx VOCs	
UK Waste Management Ltd Stoneferry Road Hull	Minerals	TA101310	Particulates	PM10
Henry Booth & Co Stockholm Road Hull	Printing	TA110320	NOx VOCs	
Caradon Bathrooms Wiltshire Road Hull	GRP	TA065273	VOCs	
N R Burnett West Carr Lane Hull	Timber	TA110318	Particulates	
Chrispyn Uk Ltd Valletta Street Hull	Timber	TA149295	Particulates	

<b>COMPANY</b>	<b>PROCESS</b>	<b>GRID REF</b>	<b>POSSIBLE EMISSIONS</b>	<b>SIGNIFICANT EMISSIONS</b>
Ideal Standard Ltd National Avenue Hull	GRP	TA166305	VOCs	
Wallis Auto Engineering Malton Street Witham	Waste oil burner	TA105292	CO SO2 NOx Lead Particulates	
Sam Allon Lincoln Street Hull	Minerals	TA	Particulates	PM10
Thermica Vulcan Street Hull	Bulk cement	TA095315	Particulates	
Hawthorne Timber Ltd Wyke Street Hull	Timber	TA118292	Particulates	

## APPENDIX 2

**TABLE 3**

Roads with an existing or forecast daily average traffic flow of about 20,000 vehicles or more.

<b>ROAD NUMBER</b>	<b>SECTION</b>	<b>1996</b>	<b>2006 Low Growth</b>	<b>2006 High Growth</b>
M18	Between M62(J35) and M18 (J6)	29000	35500	38500
M62	between J34 (Whitley Bridge) and J38 (North Cave)	28500	35000	38000
A63(T)	between M62 (J38) and A15 (Ferry Crest I/C)	25000	30500	33000
A15	Between Humber Field and Humber Bridge Roundabouts	18500	22500	24500
A164	between Willerby roundabout and A1079 I/C	25000	30500	3300
A1033	West of Saltend roundabout	20000	24000	26000

**TABLE 4**

Existing and forecast daily average traffic flow in urban areas of about 15,000 vehicles or more.

**BEVERLEY**

<b>ROAD</b>	<b>1996</b>	<b>2006 Low Growth</b>	<b>2006 High Growth</b>
Swinemoor Lane	12500	15000	16500
Hull Bridge Road	11000	13500	14500
Norwood	13000	16000	17500
New Walkergate	12500	15000	16500
Queensgate	19000	23000	25000

**GOOLE**

<b>ROAD</b>	<b>1996</b>	<b>2006 Low Growth</b>	<b>2006 High Growth</b>
Rawcliffe Road	13000	16000	17500
Boothferry Road	11000	13500	14500

**BRIDLINGTON (AUGUST)**

<b>ROAD</b>	<b>1996</b>	<b>2006 Low Growth</b>	<b>2006 High Growth</b>
Kingsway	14500	17500	19000
Bessingby Road	15000	18000	19500
Quay Road	16000	19500	21000
Well Lane by-pass	13500	16500	17500
Marton Road	12500	15500	16500
Flamborough Road	18000	21500	23500

### APPENDIX 3

#### MONITORING RESULTS 1998

##### A. NITROGEN DIOXIDE (ppb)

**TABLE 5 - BEVERLEY**

	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	MEAN
1.1 KERBSIDE	-	26.7	27.2	27.2	22.1	18.8	22.5	-	20.9	23.6
INTERMEDIATE	-	18.0	16.7	10.0	13.6	12.5	12.0	-	15.2	14.0
URBAN	-	19.0	17.3	5.7	14.0	12.0	13.6	-	16.7	14.1
BACKGROUND	-	13.6	15.7	10.5	11.0	9.9	11.0	-	14.6	12.3

**TABLE 6 - BRIDLINGTON**

	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	MEAN
1.2 KERBSIDE	25.0	25.1	24.0	23.0	19.4	16.2	21.4	21.0	21.5	21.8
INTERMEDIATE	20.0	19.4	16.2	12.0	12.0	11.0	11.5	11.0	15.2	14.2
URBAN	16.0	15.2	12.5	10.0	8.4	8.4	10.5	10.0	12.0	11.4
BACKGROUND	-	14.1	13.0	9.0	8.9	7.8	7.8	8.0	11.0	9.9

**TABLE 7 - GOOLE**

	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	MEAN
1.3 KERBSIDE	34	-	22.0	21.5	20.4	21.0	23.6	25.1	-	21.8
INTERMEDIATE	-	25.0	-	-	10.0	16.0	18.8	17.3	-	14.2
URBAN	22.5	22.0	14.0	10.5	10.0	-	-	16.2	-	11.4
BACKGROUND	24.0	21.5	14.0	11.0	-	15.0	15.7	16.2	-	9.9

**TABLE 8 - HEDON**

	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	MEAN
1.4 KERBSIDE	-	27.7	23.5	23.5	23.0	22.5	19.9	-	25.6	23.7
INTERMEDIATE	-	20.4	15.7	7.8	14.7	-	13.1	-	19.9	15.2
URBAN	-	18.0	14.6	11.0	13.0	15.7	11.0	-	19.4	14.7
BACKGROUND	-	20.4	13.6	9.0	12.0	13.6	14.1	-	16.7	14.2

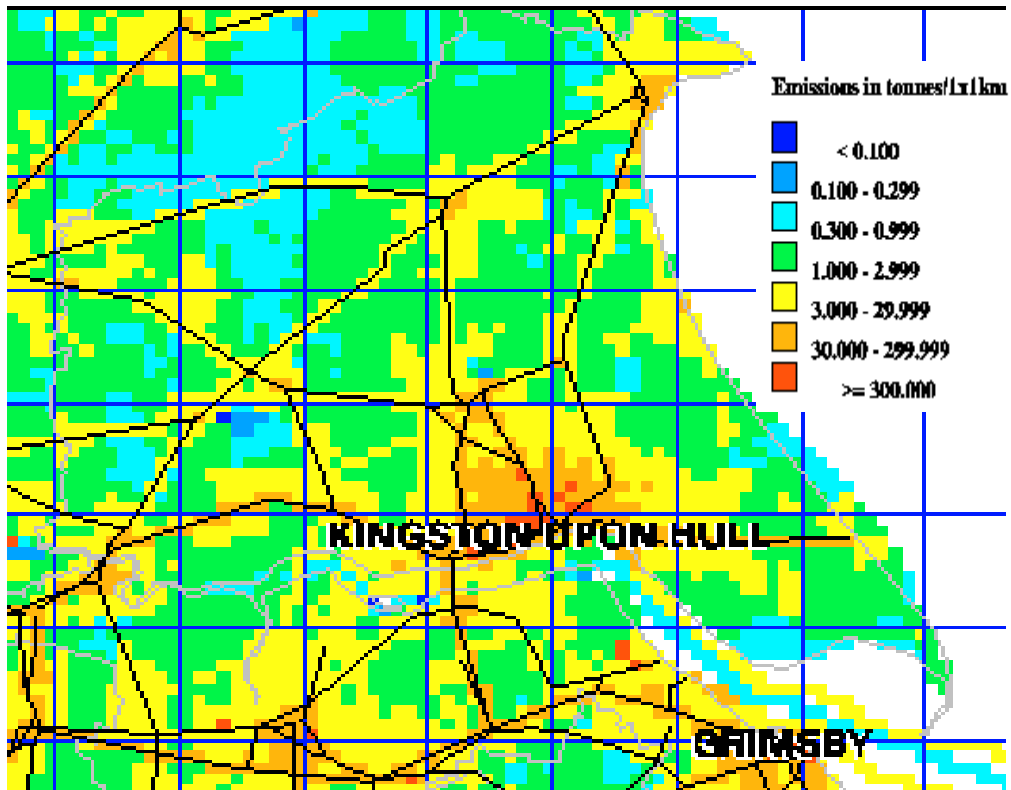
##### B. KERBSIDE BENZENE (ppb)

**TABLE 9**

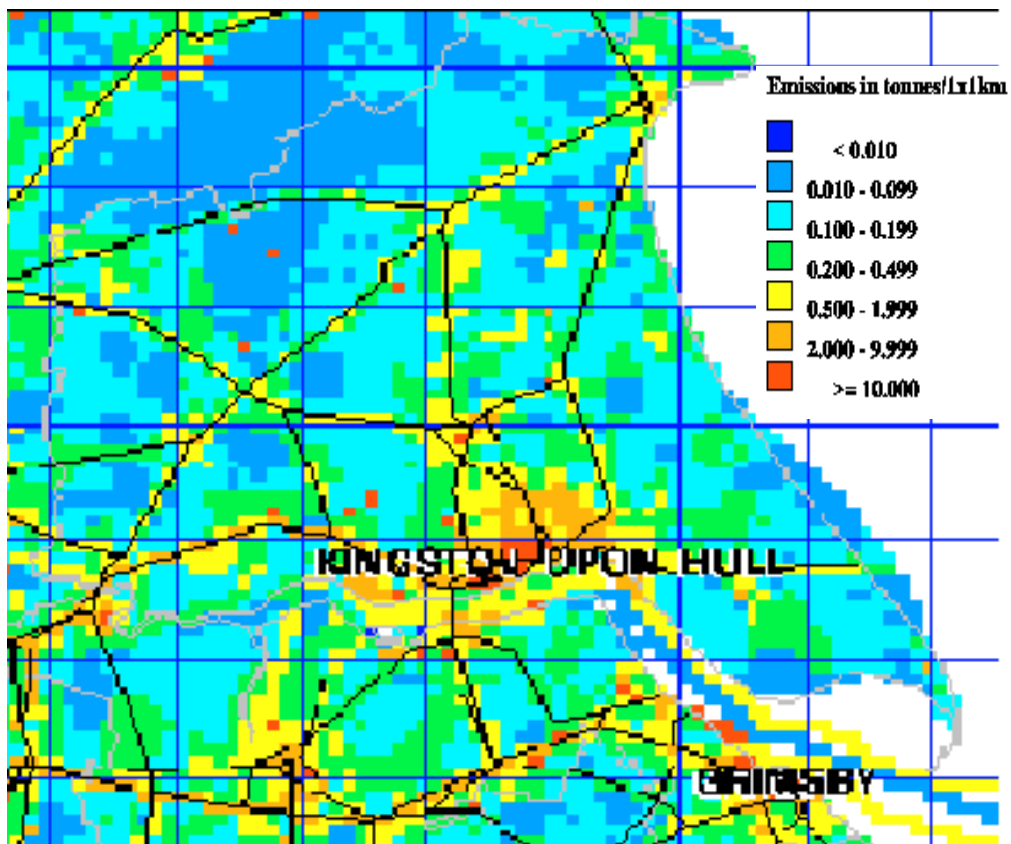
	JUN	JUL	AUG	MEAN
BEVERLEY, KELDGATE (1)	1.6	8.0	0.5	3.4
BEVERLEY, KELDGATE (2)	0.6	2.5	2.0	1.7
BEVERLEY, KELDGATE (3)	0.5	1.2	0.4	0.7
BEVERLEY, NORTH BAR	1.0	0.5	0.2	0.6
BRIDLINGTON, CROSS STREET	0.9	0.3	0.8	0.6
GOOLE, STANMORE STREET	0.5	0.2	0.2	0.3

**APPENDIX 4**

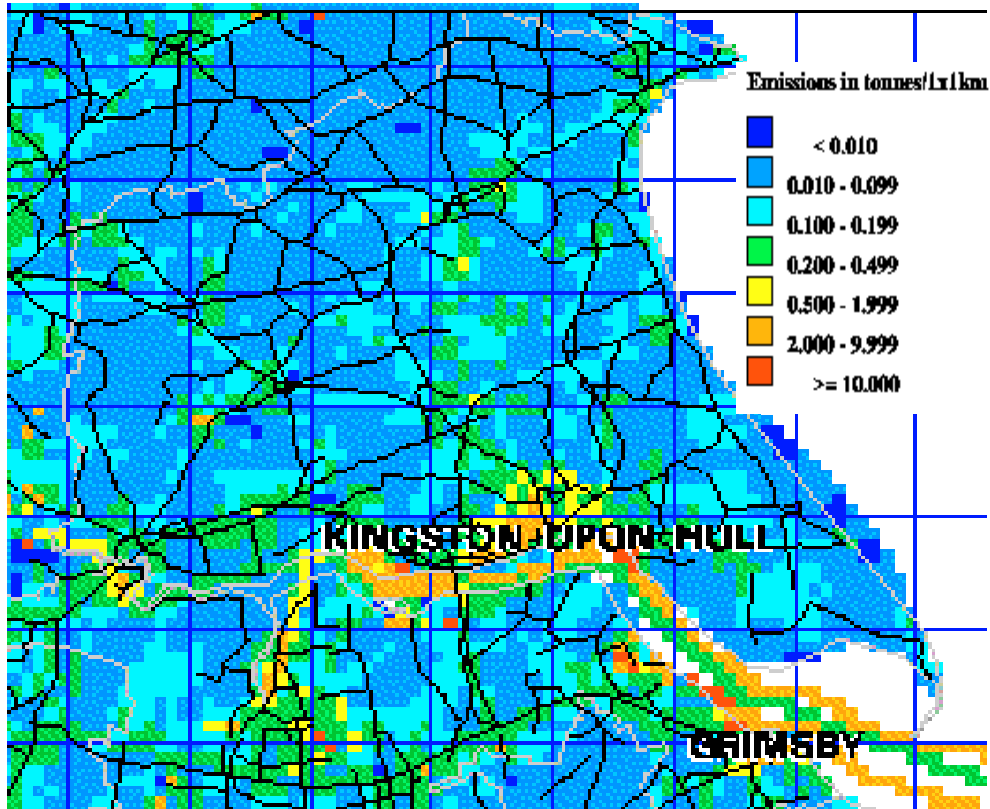
*Estimated annual emissions of Carbon Monoxide(1996)*



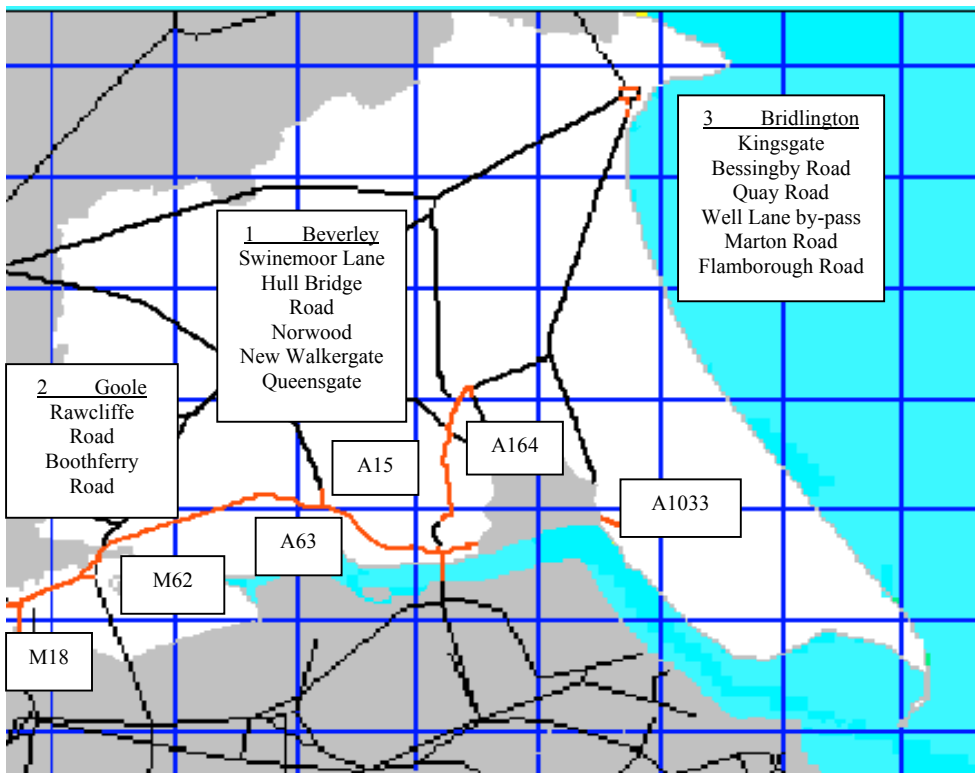
*Estimated annual emissions of PM10(1996)*



Estimated annual emissions of Sulphur Dioxide(1996)

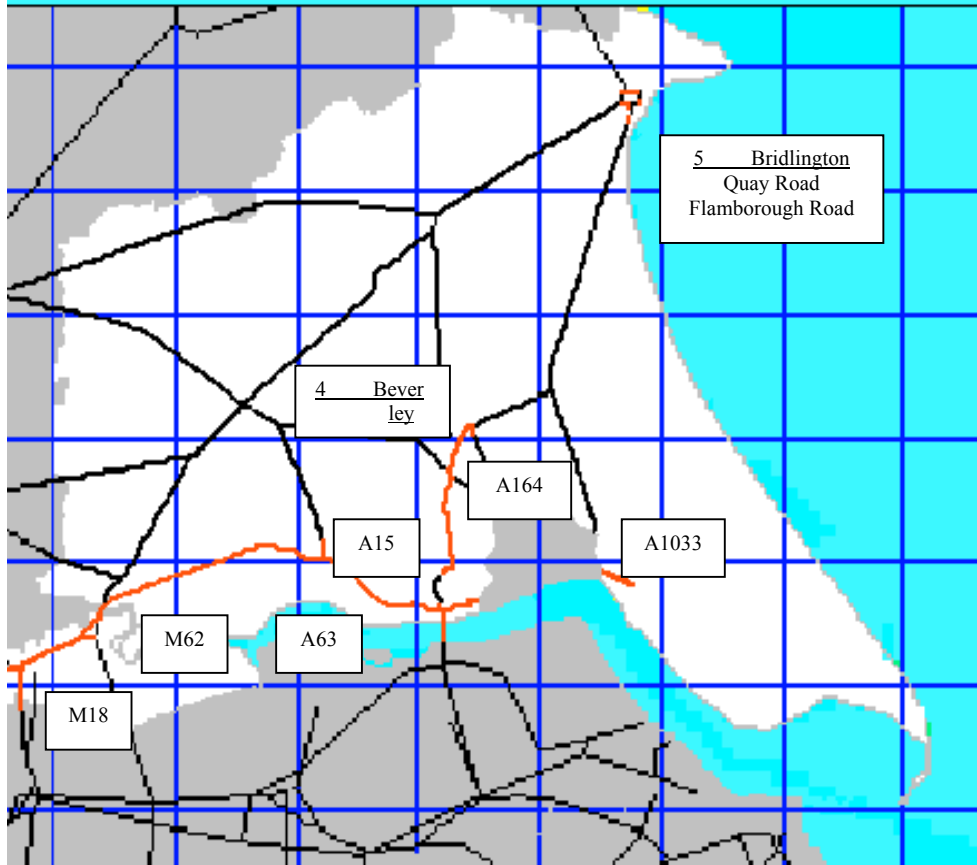


Roads with a forecast daily traffic flow of 20,000 vehicles, or 15,000 vehicles in urban areas





*Roads with a forecast daily traffic flow of 25,000*



**APPENDIX 5**

**PROPOSED DEVELOPMENTS IN THE LOCALITY**

<b>1.5 COMPANY</b>	<b>1.6 PROCESS</b>	<b>GRID REF</b>	<b>EMISSIONS</b>
Energy Power Resources Goole Renewable Energy Plant Glews Hollow Goole	Waste Incinerator	SE732229	SO2 NO2 PM10
B.P.Chemicals Ltd Saltend	Gas Turbine Power Station	TA164275	SO2 NO2 PM10
Amlon Metals Ltd (T/A Euromet) Pollington Airfield Goole	Animal Carcass Incinerator	SE620207	CO SO2 NO2 PM10

## **APPENDIX 5**

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- Benzene, 1994, ISBN 0 11 752859 5
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- Ozone, 1994, ISBN 0 11 752 873 0
- Carbon Monoxide, 1994, ISBN 0 11 753035 2
- Particulates, 1995 ISBN 0 11 753199 5
- Sulphur Dioxide, 1995, ISBN 0 11 753135 9

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Review and Assessment: Pollutant Specific Guidance, LAQM TG4 (98) (DETR)

#### Information Services

<http://www.aeat.co.uk/netcon/airqual/welcome.html>

CEEFAX (p 410-417)

TeleText (p 106)

## **APPENDIX 6**

### Glossary

AQMA	Air Quality Management Area
CO	Carbon Monoxide
DETR	Department of the Environment, Transport and the Regions
EPAQS	Export Panel of Air Quality Standards
$\mu\text{g}\cdot\text{m}^{-3}$ , $\mu\text{g}/\text{m}^3$	Micrograms per cubic metre
NAEI	National Atmospheric Emissions Inventory
NAQS	National Air Quality Strategy
NO	Nitrogen Oxide
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
nth percentile	The concentration of pollutant which is not exceeded for n% of the time
ppb	Parts per billion
ppm	Parts per million
PM <sub>10</sub>	Particles 10 microns (millionths of a metre) or less in diameter
SO <sub>2</sub>	Sulphur Dioxide
VOCs	Volatile Organic Compounds
WHO	World Health Organisation.

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**Georgina Duffy-Pidd** - (age 7) St. Joseph's RC School, Kennedy Drive, Goole

**Winner:** Air Quality Review & Assessment Stage 1 poster competition in support of the National Schools Associates Programme organised in consultation with Humberside Business / Education Partnership

**Christopher Greaves** - (age 11) Burlington Junior School, Marton Road, Bridlington

**Winner:** Air Quality Review & Assessment Stage 1 slogan competition in support of the National Schools Associates Programme organised in consultation with Humberside Business / Education Partnership

☐ *"use your bike, use your feet, give the car a rest and the planet a treat"*

**Shane Vause** - (age 11) Burlington Junior School, Marton Road, Bridlington

**Runner up:** Air Quality Review & Assessment Stage 1 slogan competition in support of the National Schools Associates Programme organised in consultation with Humberside Business / Education Partnership

☐ *"don't save your legs going by car, save the world you can walk that far"*

Vermuyden School, Centenary Road, Goole.