ENV/254/25
01.02.07

Report on the Updating and Screening Assessment of Air Quality in the Suffolk Coastal District.

September 2006

Report on the Updating and Screening Assessment of Air Quality in the Suffolk Coastal District.

September 2006

Environmental Protection
Suffolk Coastal District Council

Executive Summary

Part IV of the Environment Act 1995 established a new legal framework for national air quality and includes strategies and policies to be adopted at both the national and local level. It places a duty on all local authorities to periodically review air quality within their districts under the Local Air Quality Management (LAQM) process. This will ensure that local authorities continually assess air quality in their districts to update their records and determine any areas of concern.

Local authorities must review air quality against health-based standards and objectives set in the Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002. These Regulations set standards and objectives for seven pollutants: benzene, 1,3-butadiene, lead, carbon monoxide, nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and particles (PM_{10}). If a review indicates locations where any of the Air Quality Objectives are likely to be exceeded, the local authority must designate an Air Quality Management Area (AQMA). A Further Assessment must then be undertaken and a written Action Plan drawn up in pursuit of achievement of the objectives.

The first round of review and assessment for Suffolk Coastal concluded that the Air Quality Objectives for all seven pollutants would be met within the Suffolk Coastal district and no AQMAs were declared. The second round of review and assessment concluded that the risk of exceedance of the Air Quality Objectives for benzene, 1,3-butadiene, lead and carbon monoxide is unlikely, and no further assessment is necessary. For NO_2, SO_2 and PM_{10} the review and assessment concluded that there was a potential risk of the air quality objectives being exceeded. Further investigation was required to assess emissions of NO_2 from traffic using the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge (Woodbridge junction), and emissions of NO_2, SO_2 and PM_{10} from activities on and associated with the Port of Felixstowe.

In September 2005 a Detailed Assessment report was produced for the Woodbridge junction which concluded that the annual mean objective for NO_2 is likely to be exceeded at two receptor locations. On 3 April 2006 an Air Quality Management Area Order made by Suffolk Coastal District Council for the Woodbridge junction on 3 March 2006 came into effect. A Further Assessment is now being undertaken for the junction which must be completed within 12 months of the AQMA declaration. A working group has been established to look at all possible solutions to decrease the NO_2 concentrations in the AQMA and at the junction in general. Once the options have been investigated the draft Action Plan will be drawn up and fully consulted upon in order to obtain public opinion before the final version is submitted to Defra.

The third round of review and assessment has now begun with this Updating and Screening Assessment Report to determine whether there have been any changes in the concentration of the seven prescribed pollutants.

This Updating and Screening Assessment for the Suffolk Coastal district has determined that the risk of exceedance of the Air Quality Objectives for carbon monoxide, benzene, 1,3-butadiene and lead is unlikely, and no further assessment will be necessary.

This Updating and Screening Assessment for the Suffolk Coastal district has determined that for NO_2, SO_2 and PM_{10} there is a potential risk of emissions from activities on and associated with the Port of Felixstowe causing exceedances of the air quality objectives at receptor locations. A Detailed Assessment will be undertaken to investigate these emissions, further information on the form these investigations will take is outlined in the Summary and Recommendations chapter of this report (chapter 12).

For further information concerning this report, please contact Environmental Protection, Suffolk Coastal District Council, Melton Hill, Woodbridge, IP12 1AU

Telephone: 01394 444624 Fax: 01394 444354
Email: environmental.protection@suffolkcoastal.gov.uk

Table of Contents

Appendices

A **Processes regulated under the Pollution Prevention and Control (England and Wales) Regulations 2000 (as amended) within the Suffolk Coastal district**

B **Monthly and annual mean nitrogen dioxide (NO_2) concentrations in air recorded by diffusion tubes at sites in Felixstowe, Kesgrave, Woodbridge, and Melton in 2005.**

C **Maps detailing the location of nitrogen dioxide diffusion tube monitoring sites within the Suffolk Coastal district, and the automatic NO_x analyser in Woodbridge.**

D **Summary and graphical representation of data output from an automatic NO_x analyser, sited at the junction of Lime Kiln Quay Road, The Thoroughfare and St. John's Street in Woodbridge, between 1 January and 31 December 2005.**

E **Graphical representation to show trends in annual mean nitrogen dioxide concentrations measured at permanent diffusion tube sites in Felixstowe, Kesgrave, Woodbridge and Melton between 1999 and 2004.**

F **Summary of traffic data obtained and information used to run the Design Manual for Roads and Bridges (DMRB) Screening Methodology for roads within the Suffolk Coastal district.**

G **The Suffolk Coastal District Council Air Quality Management Area Order no. 1, 2006 (for the junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge).**

H **Continued Assessment of Emissions Generated by the Port of Felixstowe – Chapter 11 from the Progress Report on Air Quality in the Suffolk Coastal district (May 2005)**

1. Introduction

This is the air quality Updating and Screening Assessment Report for Suffolk Coastal District Council. It is required by the government guidance issued in 2003 (LAQM.TG(03)) under Part IV of the Environment Act 1995, and begins the third round of local air quality management review and assessment. This report has been prepared using the technical guidance LAQM.TG(03) together with guidance update provided by the Department for Environment, Food and Rural Affairs (Defra) in January 2006.

1.1 Legislative background

Part IV of the Environment Act 1995 established a new legal framework for national air quality and includes strategies and policies to be adopted at both the national and local level. It places a duty on all local authorities to periodically review air quality within their districts under the Local Air Quality Management (LAQM) process. This will ensure that local authorities continually assess air quality in their districts in order to update their records and determine any areas of concern.

Local authorities must review air quality against health-based standards and objectives set in the Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002 for seven key pollutants. The pollutants specified in the Regulations, together with their objectives and target dates for achievement can be seen in table 1.1 below.

Table 1.1 Objectives included in the Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002, for England, for the purposes of Local Air Quality Management

Pollutant	Air Quality Objective		Date to be achieved
	Concentration	Measured as	
Benzene	16.25 μg/m^3	Running annual mean	31 December 2003
	5.0μg/m^3	Annual mean	31 December 2010
1,3-butadiene	2.25 μg/m^3	Running annual mean	31 December 2003
Carbon monoxide	10.0 mg/m^3	Maximum daily running 8-hour mean	31 December 2003
Lead	0.5 μg/m^3	Annual mean	31 December 2004
	0.25 μg/m^3	Annual mean	31 December 2008
Nitrogen dioxide (objectives are provisional)	200 μg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31 December 2005
	40 μg/m^3	Annual mean	31 December 2005
Particles (PM_{10}) (gravimetric) (Measured using the European gravimetric transfer sampler or equivalent)	50 μg/m^3 not to be exceeded more than 35 times a year	24-hour mean	31 December 2004
	40 μg/m^3	Annual mean	31 December 2004
Sulphur dioxide	350 μg/m^3 not to be exceeded more than 24 times a year	1-hour mean	31 December 2004
	125 μg/m^3 not to be exceeded more than 3 times a year	24-hour mean	31 December 2004
	266 μg/m^3 not to be exceeded more than 35 times a year	15-minute mean	31 December 2005

In addition to the objectives set out in the Regulations (table 1.1), the European Union has set limit values in respect of nitrogen dioxide to be achieved by 2010, as well as indicative limit values for particles (PM_{10}) also to be achieved by 2010. Both of these objectives can be seen in table 1.2 below. Local authorities currently have no statutory obligation to assess air quality against these limit values, as they have not yet been transcribed into the Regulations under which LAQM operates. In this report no assessments have been made by Suffolk Coastal in respect of these 2010 limits.

Table 1.2 Nitrogen dioxide and particle objectives, from European Union legislation, for England, Wales, Northern Ireland and Greater London (not included currently in the Regulations).

Pollutant	**Region**	**Air Quality Objective**		**Date to be achieved by**
		Concentration	**Measured as**	
Nitrogen dioxide	All authorities	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31 December 2010
		40 $\mu g/m^3$	Annual mean	31 December 2010
Particles (PM_{10})	Greater London	50 $\mu g/m^3$ not to be exceeded more than 10 times a year	24-hour mean	31 December 2010
	Greater London	23 $\mu g/m^3$	Annual mean	31 December 2010
	Greater London	20 $\mu g/m^3$	Annual mean	31 December 2015*
	Rest of England, Wales and Northern Ireland	50 $\mu g/m^3$ not to be exceeded more than 7 times a year	24-hour mean	31 December 2010
	Rest of England, Wales and Northern Ireland	20 $\mu g/m^3$	Annual mean	31 December 2010

* This objective is provisional, to be achieved only where cost effective and proportional local action can be identified.

1.2 The Review and Assessment process

Review and assessment is undertaken using a phased approach currently operating in a 3-year cycle. The first stage of the process is an **Updating and Screening Assessment** (this report) to be completed by all local authorities. This is based on a checklist to identify those matters that have changed since previous rounds of review and assessment and which may now require further assessment.

Where the Updating and Screening Assessment identifies a risk that an air quality objective may be exceeded at a location with relevant public exposure, the authority is then required to undertake a **Detailed Assessment**. The aim of a Detailed Assessment is to identify with reasonable certainty whether or not a likely exceedance will occur. Assumptions used in a Detailed Assessment will need to be considered in depth and data collected or used should be quality assured to a high standard. This is to ensure that local authorities are confident in the decisions they reach.

Local authorities must prepare an air quality **Progress Report** in the third year, and also in any year when an Updating and Screening Assessment or Detailed Assessment is not required. The Progress Report is intended to determine whether there have been any changes by examining any new monitoring results and new local developments that may have an effect on future air quality.

If a review indicates locations where any of the Air Quality Objectives are likely to be exceeded, the local authority must designate an **Air Quality management Area** (AQMA). A **Further Assessment** must then be undertaken to confirm the exceedance within 12 months of the declaration of the AQMA, and a written **Action Plan** must drawn up in pursuit of achievement of the objectives. There is no statutory time-scale for production of the Action Plan, but 12-18 months following declaration of the AQMA is recommended by Defra.

The first round of review and assessment for Suffolk Coastal was completed in 2001 and consisted of three stages, each reported upon separately. The findings of the first round were that the Air Quality Objectives for all seven pollutants would be met within the Suffolk Coastal district and no AQMAs were declared.

Findings of the second round of review and assessment are summarised below.

1.3 Summary of the second round of review and assessment findings for the Suffolk Coastal district.

Reports produced for the second round of review and assessment to date are titled as below. **All reports have been accepted by Defra.**

- Report on the Updating and Screening Assessment of Air Quality in the Suffolk Coastal District. Report written by Suffolk Coastal District Council and published June 2003.
- Report on the Detailed Assessment of nitrogen dioxide and particulate matter concentrations from traffic emissions at two junctions within the district: junction of the A1152 and B1438 in Melon, and the junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge. Report produced by the National Environmental Technology Centre (Netcen) for Suffolk Coastal District Council, April 2003.
- Report on sulphur dioxide monitoring at the Port of Felixstowe. Report produced by Entec UK Limited for Suffolk Coastal District Council, November 2002.
- Report on the Detailed Assessment and Continued Updating and Screening Assessment of Air Quality in the Suffolk Coastal District. Report written by Suffolk Coastal District Council and published March 2004.
- Progress Report – Air Quality in the Suffolk Coastal District. Report written by Suffolk Coastal District Council and published May 2005.
- Air Quality Monitoring Detailed Assessment Advice. Report produced by the National Environmental Technology Centre (Netcen) for Suffolk Coastal District Council, September 2005.

The reports can be viewed at www.suffolkcoastal.gov.uk/yourdistrict/envprotection/airquality on the Suffolk Coastal website, or paper copies are available at our Melton Hill offices in Woodbridge, and our Undercliff Road West offices in Felixstowe. The findings of the reports are detailed below:

The Updating and Screening Assessment and Detailed Assessment concluded that the risk of exceedance of the air quality objectives for benzene, 1,3-butadiene, lead and carbon monoxide is unlikely, and no further assessment is necessary. For nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and particles (PM_{10}) the review and assessment concluded that there was a potential risk of the air quality objectives being exceeded. Further investigation was required to assess emissions of NO_2 from traffic using the junction of Lime Kiln Quay Road, The Thoroughfare, and St. John's Street in Woodbridge, and emissions of NO_2, SO_2 and PM_{10} from activities on and associated with the Port of Felixstowe.

The Progress Report produced in May 2005 provided an update on the situation and confirmed the above findings. It concluded:

- **NO_2 emissions from traffic using the junction of Lime Kiln Quay Road, The Thoroughfare, and St. John's Street in Woodbridge** - a full report with the results and conclusions of detailed computer modelling to be undertaken for the Woodbridge junction would be published later in 2005. The report would determine whether it will be necessary to consider the declaration of an AQMA at this junction.

- **Emissions of PM_{10} from activities on and associated with the Port of Felixstowe** – detailed modelling undertaken as part of the Felixstowe South Reconfiguration planning application concluded that the objectives would be met at receptor locations near to the Port of Felixstowe and along the A14. No further review and assessment was considered necessary.

- **Emissions of NO_2 from activities on and associated with the Port of Felixstowe** – detailed modelling undertaken as part of the Felixstowe South Reconfiguration planning application concluded that the annual mean NO_2 objective in 2005 will be exceeded at receptor locations situated in The Downs (close to the Port of Felixstowe Road) and Spriteshall Lane (close to Dock Spur roundabout). Results of diffusion tube monitoring undertaken in 2004 do not correspond with the modelling results and 7 new diffusion tube monitoring sites have been established at the start of 2005 to obtain further information for receptor locations close to the Port of Felixstowe and along the A14. The monitoring site in Ferry Lane at The Dooley Inn Public House shows concentrations of NO_2 above the objective levels when predicted forward to the end of 2005. Doubts have been cast on the reliability of results from the monitoring location due to vehicles parking in close proximity to the diffusion tubes and the relevant receptor location being confirmed as the top floor of the building only. Two new diffusion tube sites have been established on the building at the height of the receptor and away from the direct emissions of vehicles using the car park at the front of the building. At the end of 2005 12-months of monitoring information will be obtained for all of the new diffusion tube sites in Felixstowe and the Trimleys. This will enable Suffolk Coastal District Council to consider whether declaration of an Air Quality Management Area for NO_2 is necessary at receptor locations near to the Port of Felixstowe and/or along the A14. The findings will be reported in the Updating and Screening Assessment report, which is due to be published in 2006.

- **Emissions of SO_2 from activities on and associated with the Port of Felixstowe** – detailed modelling undertaken as part of the Felixstowe South Reconfiguration planning application concluded that the objectives would be met at receptor locations near to the Port of Felixstowe and along the A14. The report produced was assessed by independent consultants, netcen, who expressed concern that a risk exists for the discharge plumes from ships at berth to combine when the wind is from the north-west or south-east and cause objective exccedances at receptor locations. Data required for a screening modelling study to predict the concentration of SO_2 at receptor locations near to the Port of Felixstowe is being investigated with the assistance of netcen. Once the data is obtained it will be determined whether detailed monitoring and modelling of SO_2 emissions is necessary. The findings will be reported in the Updating and Screening Assessment report, which is due to be published in 2006.

Following submission of the Progress Report to Defra they had the following comment to make regarding PM_{10} emissions from the Port of Felixstowe:

> 'Considering the discrepancies highlighted between the available NO_2 monitoring data and the modelling results reported from the Felixstowe South reconfiguration Environmental Statement, it is surprising that more caution is not expressed regarding the model results for PM_{10} as these are likely to be based on similar emissions sources but, due to a lack of PM_{10} monitoring data to verify them, appear to be accepted unquestioningly.'

Defra's comments have been taken on board and further assessment of PM_{10} emissions from the Port of Felixstowe will also be undertaken in addition to NO_2 and SO_2. Details regarding assessment of emissions from activities on and associated with the Port of Felixstowe are presented in Chapter 11 of this report.

1.4 Consultation findings regarding the Progress Report and the Detailed Assessment report for Woodbridge junction

All Local Authorities must consult on the findings of their periodic reviews of air quality, as laid out in Schedule 11 of the Environment Act 1995. This enables local views to be taken into consideration within the review and assessment process, which is of great importance as Local Air Quality Management (LAQM) is about air quality issues relevant to the Suffolk Coastal district.

Suffolk Coastal undertook a full Consultation exercise in August 2005 to obtain comments on the contents and findings of the Progress Report produced for the district. A full Consultation exercise was also undertaken in Spring 2006 to obtain comments on the contents and findings of the Detailed Assessment report produced, and subsequent Air Quality Management Area declared, for the junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge.

As the majority of responses to both Consultations related to the Woodbridge junction they have been amalgamated. In total, 37 consultation responses have been received to date, 33 of which relate to the Woodbridge junction, 1 to the A14 / A12 and traffic from the Port of Felixstowe, and 3 stating that they had no comments to make.

The majority of consultation responses for the Woodbridge junction provide suggestions that may help to reduce the NO_2 concentrations at the junction. A working group has been established to formulate the Action Plan for the junction and all suggestions will be investigated. The consultation response suggestions will form part of the Action Plan process for the AQMA declared and will be presented in conjunction with reports produced for this.

2. Updating and Screening Assessment methodology

2.1 Relevant receptor locations

For the purpose of review and assessment, authorities are required to focus their work upon locations where members of the public are regularly present and likely to be exposed over the averaging period of the objective. This should include locations where likely future developments may affect exposure to existing sources of air pollution or may result in new sources. The following approach is suggested in LAQM.TG(03) to define relevant locations for review and assessment and has been used in this Updating and Screening Assessment:

- For annual mean objectives (benzene, 1,3-butadiene, lead, nitrogen dioxide and PM_{10}) the review and assessment should focus upon all background locations where members of the public might regularly be exposed, and building facades of residential properties, schools, hospitals, libraries, etc.

  Areas where the annual mean objectives would not apply are, for example, building facades of offices or other places of work where members of the public do not have regular access, and gardens of residential properties.

- For 24-hour mean and 8-hour mean objectives (carbon monoxide, sulphur dioxide and PM_{10}) the review and assessment should focus upon all locations where the annual mean objective applies and also gardens of residential properties, where people would be expected to spend a significant proportion of time. For assessment of the 24-hour PM_{10} objective only areas of the garden where people would be expected to spend a number of hours have been included for assessment.

  Areas where these objectives would not apply are, for example, kerbside sites or any other location where public exposure is expected to be short term.

- For 1-hour mean objectives (nitrogen dioxide and sulphur dioxide) the review and assessment should focus upon all locations where the annual mean, 24-hour and 8-hour objectives apply. Also included should be kerbside sites (e.g. pavements of busy shopping streets), parts of car parks and railway stations, etc, which are not fully enclosed, and any outdoor locations to which the public might reasonably be expected to have access and spend 1 hour or more.

  Areas where these objectives would not apply are, for example, kerbside sites where the public would not be expected to have regular access or be exposed for more than 1 hour.

- For 15-minute mean objective (sulphur dioxide) the review and assessment should focus upon all locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.

Authorities should not consider exceedances of the objectives at any location where public exposure over the relevant averaging period would not be realistic, and the locations should represent non-occupational exposure. There are specific regulations that cover occupational exposure and therefore this is not covered under the LAQM review and assessment process.

2.2 Information used to undertake the Updating and Screening Assessment

The following information was complied for completion of this report, building upon that collated for the previous rounds of review and assessment:

- Details of any relevant air quality monitoring undertaken within the Suffolk Coastal district, by the Council or other bodies, including all relevant information, e.g. - quality assurance and quality control (QA/QC) procedures, and information on diffusion tube analysis.
- Details of significant transport-related sources within the local authority's area, including all current available traffic data and future traffic growth predictions for any existing or proposed roads for the future objective years as required.
- Annual mean background levels for pollutants in the UK, estimated and mapped on a 1km x 1km grid basis by netcen, on behalf of Defra and the Devolved Administrations.
- Details of, and distances to, relevant receptor locations for pollutant sources.
- Details for industrial processes regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) within the Suffolk Coastal district and neighbouring local authority areas.
- Details of aircraft movements from Woodbridge Airfield.
- Details of any small boilers >5MW(thermal) burning coal or oil.
- Details regarding shipping movements and related activities at the Port of Felixstowe.
- Details of railway locomotive use within the Suffolk Coastal district and areas where they may idle for any period of time.
- Details of any other existing or proposed sources of pollutants, as detailed in LAQM.TG(03), i.e. - quarries, landfill sites, etc.
- Details of any large scale planned developments in the Suffolk Coastal district. Where any future developments are proposed which could impact on the air quality in the Suffolk Coastal District, an assessment will be made at the time of the planning application as to whether any breaches of air quality objectives will occur.

The above information was collated using the following sources:

- Guidance documents provided by Defra, namely LAQM.TG(03) and the update for it produced in January 2006.
- Information collated from previous rounds of review and assessment.
- Suffolk Coastal District Council, Health Department.
- Suffolk Coastal District Council, Planning Department.
- Details from analytical laboratories with regard to diffusion tubes, e.g. - QA/QC procedures, tube and adsorbent types.
- The National Air Quality Archive, Department of Environment, Transport and the Regions.
- Traffic flow data held by Suffolk County Council Environment & Transport Department.
- Suffolk Coastal District Council Geographic Information System.
- Register of processes regulated under regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended), held by Suffolk Coastal District Council.
- Individual operators of processes regulated under regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended), where necessary.
- Neighbouring local authorities.
- The Environment Agency
- The Ministry of Defence, Wattisham Air Traffic Services, with regard to the number and type of aircraft movements from Woodbridge Airfield.
- Port of Felixstowe for information on shipping and Port related activities, current and future.
- Pollutant specific information from the Expert Panel on Air Quality Standards, Department of the Environment.
- Defra helpdesks.

3. Review and assessment of carbon monoxide

3.1 Air quality objectives

Defra and the Devolved Administrations have adopted an objective for carbon monoxide of 10 mg/m^3 measured as a maximum daily running 8-hour mean to be achieved by 31 December 2003.

3.2 Sources

Carbon monoxide is a colourless, odourless gas formed by the incomplete combustion of carbon containing fuels. In the outside environment the main source of carbon monoxide in the UK is road transport, predominantly petrol-engined vehicles (LAQM.TG(03)). In the indoor environment exposure to high levels of carbon monoxide can occur from gas cookers and fuel burning heaters, especially if they are poorly maintained. Another major source of personal exposure for some people is the smoking of cigarettes.

3.3 Health effects

There are two main threats to human health from exposure to carbon monoxide; carbon monoxide readily combines with the haemoglobin in the blood in place of oxygen therefore reducing the blood's capacity to transport oxygen to the tissues including the brain; carbon monoxide can block important biochemical reactions in cells. The reaction is reversible and exposure to unpolluted air will remove most of the carbon monoxide from the body, albeit slowly.

Studies have shown that exposure to high levels of carbon monoxide in the air can lead to tiredness, unconsciousness and even death. In some patients who recover from carbon monoxide poisoning, brain damage can be demonstrated. At lower levels, as seen in the ambient atmosphere, people with an existing disease affecting the delivery of oxygen to the heart or brain (for example coronary heart disease – angina) are likely to be at particular risk if their oxygen delivery systems are further impaired by carbon monoxide. In a healthy person, carbon monoxide exposure can decrease performance in athletes.

The current objective set for carbon monoxide is based on the World Health Organisation air quality guideline, and is set as the concentration at which health effects arising from exposure are unlikely to be observed.

3.4 The national and local perspective

Annual emissions of carbon monoxide have been falling steadily since the 1970's, and are expected to continue to do so. Studies carried out at a national level, based on both measured and modelling data, suggest that existing national policies will be sufficient to achieve the objectives and there is little likelihood of the objective for carbon monoxide being exceeded (LAQM.TG(03)). The technical guidance advises that it is highly unlikely that any local authority will be required to proceed beyond the Updating and Screening Assessment.

3.5 Updating and Screening Assessment for carbon monoxide

3.5.1 Monitoring data

This local authority is currently not monitoring carbon monoxide.

3.5.2 Very busy roads or junctions in built-up areas

The technical guidance LAQM.TG(03) update states that very busy roads and junctions in areas where the current annual mean background is expected to be above 1 mg/m^3 should be identified.

Annual mean background levels of carbon monoxide for 2001 in the UK have been estimated and mapped on a 1km x 1km grid basis by netcen, on behalf of Defra and the Devolved Administrations. The information can be accessed on the internet at www.airquality.co.uk/archive/laqm/tools.php. From these mapped estimates, the highest annual mean background level of carbon monoxide within the Suffolk Coastal area for 2001 is 0.331 mg/m^3.

Using the correction factors provided in LAQM.TG(03), 2001 levels of carbon monoxide cab be predicted forward to 2006. The highest predicted annual mean background level of carbon monoxide within the Suffolk Coastal area in 2006 is 0.21 mg/m^3. As this is considerably below 1 mg/m^3 **no further investigation will be necessary.**

3.6 Conclusion

Suffolk Coastal District Council concludes that there continues to be no risk of the air quality objective for carbon monoxide being exceeded in the Suffolk Coastal area.

4. Review and assessment of benzene

4.1 Air quality objectives

Defra and the Devolved Administrations have adopted an air quality objective of 16.25 μg/m^3 measured as a running annual mean to be achieved by 31 December 2003 for benzene.

In addition a second, lower, air quality objective has also been adopted for benzene of 5 μg/m^3 measured as a running annual mean to be achieved by 31 December 2010.

4.2 Sources

The benzene molecule is made up of six atoms of carbon arranged in a ring structure, to each of which is attached an atom of hydrogen. At normal ambient temperatures it is a liquid but it readily evaporates and small amounts are detectable in the atmosphere, hence it is known as a volatile organic compound. In the UK the main atmospheric sources of benzene are petrol-engined vehicles, petrol refining, and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems (LAQM.TG(03)). Diesel fuel also contains benzene but is a relatively small source in comparison to petrol. Other sources of benzene include cigarette smoking and low concentrations can be found in some foods and water.

4.3 Health effects

Benzene is a recognised genotoxic human carcinogen, as it damages the genetic structure of cells. Studies of industrial workers accidentally exposed in the past to high levels of benzene have shown an excess risk of leukaemia, which increased in relation to their working lifetime exposure. Because benzene is a genotoxic carcinogen no absolutely safe level can be specified for ambient air.

The current objective set for benzene of 16.25 μg/m^3 measured as a running annual mean to be achieved by 31 December 2003, is based on advice from the Expert Panel on Air Quality Standards (EPAQS) that exposure to this level of benzene represents an exceedingly small risk to health. EPAQS did, however, take into account additional advice from the Committee on Carcinogenicity, that exposure to benzene should be kept as low as practicable, and also recommended a target of 3.25μg/m^3 as a running annual mean. This has been adopted in the Air Quality Strategy as a long-term policy aim for benzene. The EU limit value of 5 μg/m^3 measured as a running annual mean to be achieved by 31 December 2010, has been adopted in UK legislation, and is working towards this aim.

4.4 The national and local perspective

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum 2003 advises that benzene emissions from road transport are projected to decrease by 79% between 1995 and 2010. This is due to a number of policy measures already in place and future planned ones. Since 1 January 2000 EU legislation has reduced the amount of benzene in petrol from 5% to below 1%, and it is presently about 0.7% by volume on average for fuel sold in the UK. In addition, the European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of benzene from the storage and distribution of petrol are controlled by vapour recovery systems (LAQM.TG(03)).

Forecasts based on national mapping suggest that the policy measures currently in place will achieve the 2003 objective at all urban background and roadside locations. The 2010 objective is expected to be met at all urban background sites and most roadside locations, but there is the possibility for some remaining exceedances that will need additional measures at a local level (LAQM.TG(03)).

The technical guidance LAQM.TG(03) advises that only those local authorities with relevant receptor locations in the vicinity of major industrial processes that store, handle, or emit benzene will need to progress beyond this Updating and Screening Assessment for the 2003 objective. In respect of the 2010 objective, data collected indicates that there may be exceedances in close vicinity to industrial sites (petrochemical processes) and busy roads. Potential emissions from petrol stations have also been highlighted with respect to benzene concentrations.

4.5 Updating and Screening Assessment for benzene

4.5.1 Monitoring data outside an Air Quality Management Area

This local authority is currently not monitoring benzene.

The previous Updating and Screening Assessment report, produced in 2003, presented the results of diffusion tube monitoring for benzene undertaken at a number of roadside and kerbside sites within the district between 1999 and 2001. Details of the monitoring and the results can be seen in the "Report on the Updating and Screening Assessment of Air Quality in the Suffolk Coastal district, June 2003". At all locations monitored the predicted annual mean benzene concentration for 2003 and 2010 was within the relevant air quality objective, and **no further assessment was necessary.**

4.5.2 Very busy roads or junctions in built-up areas

The technical guidance LAQM.TG(03) update states that very busy roads and junctions in areas where the 2010 annual mean background is expected to be above 2 $\mu g/m^3$ should be identified.

Annual mean background levels of benzene for 2010 in the UK have been estimated and mapped on a 1 km x 1km grid basis by netcen, on behalf of Defra and the Devolved Administrations. The information can be accessed from the internet at the following address; www.airquality.co.uk/archive/laqm/tools.php. From these mapped estimates the highest annual mean background level of benzene within the Suffolk Coastal area for 2010 is 0.395 $\mu g/m^3$.

As the annual mean background level of benzene within the Suffolk Coastal district in 2010 is below 2 $\mu g/m^3$ **no further investigation will be necessary.**

4.5.3 New industrial sources

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A.

There are no new or planned industrial processes of relevance for benzene within the Suffolk Coastal district, or any of the neighbouring authorities, since the last Updating and Screening Assessment in 2003. **No further assessment will be necessary.**

4.5.4 Industrial sources with substantially increased emissions, or new relevant exposure

The technical guidance LAQM.TG(03) update advises that any emissions from a process which have increased by more than 30% since the last round of review and assessments are classed as substantially increased. Consideration must also be given to any new relevant exposure for processes since the last round of review and assessments.

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A. There is one authorised process within the Suffolk Coastal district with the potential to emit significant quantities of benzene - British Energy Generation Limited, Sizewell B Power Station, near Leiston, Suffolk. This process was investigated in the last round of review and assessment and was not considered to be a significant emitter of benzene. The situation has not altered since this time and there is no new relevant exposure that needs to be considered for this process. **No further assessment will be necessary.**

There are no industrial processes of relevance for benzene within any of the neighbouring authorities that would impact within the Suffolk Coastal district.

4.5.5 Petrol stations

The technical guidance LAQM.TG(03) update advises that there is some evidence that petrol stations could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads. All petrol stations with an annual throughput of more than 2,000 cubic metres of petrol and a busy road nearby that have not been covered by previous review and assessment reports should be identified. A busy road is classified as having a traffic flow greater than 30,000 vehicles per day.

There is only one new petrol station with a throughput of greater than 500 cubic metres per year within the Suffolk Coastal district since the Updating and Screening Assessment in 2003. This is Smith & Wesby (Sax) Limited in Darsham which is located on the A12. 2004 traffic count data for the A12 at a location near this site shows a flow of approximately 11,900 vehicles per day, well below the identified threshold of 30,000. **No further assessment of this petrol station will be necessary.**

4.5.6 Major fuel storage depots (petrol only)

There are no major fuel storage depots, current or planned, within the Suffolk Coastal district or any neighbouring authorities. **No further assessment will be necessary.**

4.6 Conclusion

Suffolk Coastal District Council concludes that there continues to be no risk of the air quality objectives for benzene being exceeded in the Suffolk Coastal area.

5. Review and assessment of 1,3-butadiene

5.1 Air quality objectives

Defra and the Devolved Administrations have adopted an air quality objective for 1,3-butadiene of 2.25 μg/m^3 measured as a maximum running annual mean to be achieved by 31 December 2003.

5.2 Sources

1,3-butadiene at normal temperature and pressure is a gas. Trace amounts can be found in the atmosphere, all are solely derived from human activity. It is a chemical used mainly in the synthetic rubber industry, but is also found in some liquid petroleum gases. Its presence in low concentration in the ambient atmosphere derives mostly from its production in combustion processes, particularly of petrol and diesel, and from industrial site emissions. It is also produced by tobacco smoking, which is an important indoor source.

5.3 Health effects

The data on health effects is limited mainly to studies on animals and accidental exposure of workers to relatively high levels of 1,3-butadiene. Both types of study are consistent in showing that it is a potent carcinogen and acts, through other chemicals to which it is converted in the body, on the genetic material of cells. It is therefore recognised as a genotoxic human carcinogen. There is no currently feasible study in man that will show a measurable effect on health of the relatively low levels occurring in the general atmosphere. Studies on workers exposed to high levels have shown, in the long term, an increased risk of cancers of the lymphoid system and blood forming tissues, lymphomas and leukaemia. As 1,3-butadiene is a genotoxic carcinogen no absolutely safe level can be specified for ambient air.

The current objective set for 1,3-butadiene is based on advice from the Expert Panel on Air Quality Standards (EPAQS). EPAQS carried out a review of the objective in 2002, and confirmed that it should stay as 2.25 μg/m^3, measured as a running annual average. Concentrations of 1,3-butadiene measured in urban air in the United Kingdom have not exceeded this level and EPAQS believe that at this concentration any risks to the health of the population are exceedingly small.

5.4 The national and local perspective

Concentrations of 1,3-butadiene are measured at a limited number of UK national network monitoring sites, and the technical guidance LAQM.TG(03) advises that all sites were well below the objective. Studies carried out at a national level, based on both measured and modelling data, also suggest that there is little likelihood of the objective being exceeded.

The increasing numbers of vehicles fitted with three way catalysts will significantly reduce emissions of 1,3-butadiene in future years. New emission limits agreed for cars, light vans and heavy-duty vehicles sold from 2001 and 2006, together with improvements to fuel quality as part of the Auto-Oil programme, are expected to further reduce emissions from vehicle exhausts (LAQM.TG(03)). These measures are expected to deliver the air quality objective by the end of 2003, and no further measures are thought to be necessary.

The technical guidance advises that it is highly unlikely that any local authority will be required to proceed beyond the Updating and Screening Assessment.

5.5 Updating and Screening Assessment for 1,3-butadiene

5.5.1 Monitoring data

This local authority is currently not monitoring 1,3-butadiene.

5.5.2 New industrial sources

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A.

There are no new or planned industrial processes of relevance for 1,3-butadiene within the Suffolk Coastal district, or any of the neighbouring authorities, since the last Updating and Screening Assessment in 2003. **No further assessment will be necessary.**

5.5.3 Industrial sources with substantially increased emissions, or new relevant exposure

The technical guidance LAQM.TG(03) update advises that any emissions from a process which have increased by more than 30% since the last round of review and assessments are classed as substantially increased. Consideration must also be given to any new relevant exposure for processes since the last round of review and assessments.

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A. There is one authorised process within the Suffolk Coastal district with the potential to emit significant quantities of 1,3-butadiene - British Energy Generation Limited, Sizewell B Power Station, near Leiston, Suffolk. This process was investigated in the last round of review and assessment and was not considered to be a significant emitter of 1,3-butadiene. The situation has not altered since this time and there is no new relevant exposure that needs to be considered for this process. **No further assessment will be necessary.**

There are no industrial processes of relevance for 1,3-butadiene within any of the neighbouring authorities that would impact within the Suffolk Coastal district.

5.6 Conclusion

Suffolk Coastal District Council concludes that there continues to be no risk of the air quality objective for 1,3-butadiene being exceeded in the Suffolk Coastal area.

6. Review and assessment of lead

6.1 Air quality objectives

Defra and the Devolved Administrations have adopted an air quality objective for lead of 0.5 μg/m^3 measured as an annual mean to be achieved by 31 December 2004.

In addition a second, lower, air quality objective has also been adopted for lead of 0.25 μg/m^3 measured as an annual mean to be achieved by 31 December 2008.

6.2 Sources

Lead is a naturally occurring non-ferrous metal found in the Earth's crust, and is released naturally by such processes as weathering, volcanic activity and uptake and release by plants. It is, however, also released into the atmosphere by human activities, and it is the most widely used non-ferrous metal with a large number of industrial applications.

Historically, most of the national airborne emissions of lead have been from petrol-engined vehicles. Since the ban on sales of leaded petrol in the UK in 2000, emissions are now restricted to a variety of industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and in piping.

6.3 Health effects

Lead can be absorbed into the body through the lungs, stomach and intestines. Studies have shown that exposure to high levels may result in toxic biochemical effects in humans which in turn cause problems in the synthesis of haemoglobin for the blood, have effects on the kidneys, gastrointestinal tract, joints, reproductive system and can cause acute damage to the nervous system.

Of greater concern, however, are the more subtle effects seen through long-term exposure to lower levels of lead. Once absorbed, lead accumulates, particularly in the bone, teeth, skin and muscle where it is very stable, and it is released over months or years into the blood from where it exerts its effects. Studies have shown that lead has adverse effects on the developing brains of children and hence intellectual development.

The more stringent objective set for lead, 0.25 μg/m^3 measured as an annual mean to be achieved by 31 December 2008, is based on advice from the Expert Panel on Air Quality Standards (EPAQS). EPAQS believe that exposure to this level of lead would make the effects on the health of children, the most vulnerable group, so small as to be undetectable.

6.4 The national and local perspective

Detailed assessments on the potential impacts of lead emissions from industrial processes have been undertaken on behalf of Defra and the Devolved Administrations. Monitoring included a 12-month survey in the vicinity of 30 key industrial sites in the UK, which has been used to supplement other information already provided. This data generally indicates no exceedances of the 2004 or 2008 objectives, although locations in close proximity to non-ferrous metal production and foundry processes were deemed to be at risk and further investigations are being undertaken (LAQM.TG(03)).

The technical guidance LAQM.TG(03) states that only those local authorities with relevant locations in the vicinity of major industrial processes that emit significant quantities of lead will be required to proceed beyond the Updating and Screening Assessment.

6.5 Updating and Screening Assessment for lead

6.5.1 Monitoring data

This local authority is currently not monitoring lead.

6.5.2 New Industrial sources

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A.

There are no new or planned industrial processes of relevance for lead within the Suffolk Coastal district, or any of the neighbouring authorities, since the last Updating and Screening Assessment in 2003. **No further assessment will be necessary.**

6.5.3 Industrial sources with substantially increased emissions, or new relevant exposure

The technical guidance LAQM.TG(03) update advises that any emissions from a process which have increased by more than 30% since the last round of review and assessments are classed as substantially increased. Consideration must also be given to any new relevant exposure for processes since the last round of review and assessments.

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A. There is one authorised process within the Suffolk Coastal district with the potential to emit significant quantities of lead - British Energy Generation Limited, Sizewell B Power Station, near Leiston, Suffolk. This process was investigated in the last round of review and assessment and was not considered to be a significant emitter of lead. The situation has not altered since this time and there is no new relevant exposure that needs to be considered for this process. **No further assessment will be necessary.**

There are no industrial processes within any of the neighbouring authorities with substantially increased emissions of lead since the last review and assessment that would impact within the Suffolk Coastal district.

6.6 Conclusion

Suffolk Coastal District Council concludes that there continues to be no risk of the air quality objectives for lead being exceeded in the Suffolk Coastal area.

7. Review and assessment of nitrogen dioxide

7.1 Air quality objectives

Defra and the Devolved Administrations have adopted two air quality objectives for nitrogen dioxide (NO_2). Both objectives are provisional at this time and are as follows:

- 40 $\mu g/m^3$ measured as an annual mean to be achieved by 31 December 2005.
- 200 $\mu g/m^3$ measured as a 1-hour mean not to be exceeded more than 18 times per year, to be achieved by 31 December 2005.

7.2 Sources

Nitrogen oxides are acid gases formed during high temperature combustion processes from the oxidation of nitrogen in the air or fuel. They are released into the atmosphere mainly in the form of nitric oxide (NO), which is then readily oxidised to nitrogen dioxide (NO_2) by reaction with ozone. NO and NO_2 are, therefore, both oxides of nitrogen and are collectively known as nitrogen oxides (NO_x). There are many natural sources of NO_x in the atmosphere, but the largest source is from the combustion of fossil fuels (motor spirit, diesel and coal) by man. The principal source is from road transport, other important sources include the electricity supply industry and other industrial and commercial sectors.

7.3 Health effects

NO is produced naturally by cells in the lungs and respiratory tract and is not harmful to man when inhaled at the concentration likely to occur in the ambient atmosphere. NO_2, however, is an irritant gas thought to have both short and long term effects on airways and lung function. It is known to have serious effects if inhaled at very high concentrations - inflammation of the airways, severe lung damage and often fatality. Evidence also shows that long-term exposure to lower levels, such as those in the ambient atmosphere, may intensify symptoms associated with respiratory illness and enhance response to allergens in sensitised individuals, especially those with asthma.

For the above health reasons, the Expert Panel on Air Quality Standards (EPAQS) advised that a short-term, 1-hour limit for NO_2 of 286 $\mu g/m^3$ be adopted. They also considered that a longer-term standard was desirable, but concluded that there was insufficient evidence at the time (1996) to set an appropriate figure. The two current objectives adopted by Defra and the Devolved Administrations are based on European Union limit values set in the first Air Quality Daughter Directive, agreed in June 1998, which used the World Health Organisation air quality guideline, for which the 1-hour limit is more stringent.

7.4 The national and local perspective

The contribution of road transport to NO_x emissions has declined significantly in recent years as a result of various policy measures, and further reductions are expected up until 2010 and beyond. Emissions from the electricity supply industry and other industrial and commercial sectors have also declined dramatically due to the fitting of low NO_x burners, and the increased use of natural gas plant.

The annual mean NO_2 objective is widely exceeded at roadside sites throughout the UK, with exceedances also seen at urban background locations in major conurbations. Exceedances of the 1-hour objective are seen in major conurbations, at roadside or kerbside sites, in close proximity to

roads with large volumes of traffic on them. Modelling studies suggest that in general it will be most demanding to achieve the annual mean objective of 40 μg/m^3, but that if this is achieved the hourly objective will also be met.

An analysis of monitoring data in the vicinity of roads throughout the UK concludes that, outside of major conurbations, exceedances of the annual mean objective are only likely to occur within about 10 metres of the kerbside of single carriageway roads. This includes roads with relatively low traffic flows of 10,000 to 20,000 vehicles per day if they are in congested town centres. This conclusion is significant as many market towns have narrow streets with residential properties within 5 metres of the kerb. Exceedances of the annual mean objective are only likely within about 5 metres of the kerbside or hard shoulder of dual carriageways outside of major conurbations.

7.5 Updating and Screening Assessment for nitrogen dioxide

7.5.1 Monitoring data outside an Air Quality Management Area

There is no national network monitoring data available for NO_2 for the Suffolk Coastal area.

Automatic NO_x analyser results

Since the Progress Report (May 2005) an automatic NO_x analyser has remained at the junction of Lime Kiln Quay Road / Thoroughfare / St. John's Street, Woodbridge, in order to collect data as part of a Detailed Assessment for this site, for a site location map see Appendix C. The data used to inform the Detailed Assessment for this site was from 5 April 2004 to 31 March 2005. The analyser has continued to collect data since this time and a 12-month ratified data set has been obtained for 2005 (1 January – 31 December). Further information regarding this site and the findings of the Detailed Assessment undertaken is presented later in this report in Chapter 10. The data obtained for this site has been used to provide a bias correction factor for collocated diffusion tubes in 2005. The bias correction has been carried out using periods that match the diffusion tube exposure, further information is provided in Appendix B.

The automatic analyser operates continuously, recording and logging concentrations every 15 minutes and the data is downloaded daily. The analyser measures concentrations of oxides of nitrogen (NO_x), nitrogen oxide (NO) and nitrogen dioxide (NO_2) by ozone chemiluminescence. This is the reference method specified by the EC Nitrogen Dioxide Directives. Calibration methods employed included daily automatic calibration by permeation tube, gravimetric cylinder and static dilution. A fortnightly manual two point calibration by cylinder audit was undertaken to quantify the analyser 'zero' and 'span' response. The 'zero' response is the response of the analyser when the pollutant being measured is not present in the sample airstream, and the 'span' response is the response of the analyser to a gas mixture of an accurately known concentration. Data collection, 6-monthly site auditing, checking of calibration data, quality control and scaling of real-time results were undertaken by an external laboratory to ensure that the data collected was quality assured to a high standard. The expected accuracy of the method for NO_2 is ±10-11% with a precision of ±3.5ppb. The continuous analyser records levels in parts per billion (ppb); these values are then converted to μg/m^3.

A summary of the average measured concentrations and the maximum hourly mean concentrations of NO_2 for the monitoring period can be seen in table 7.1 overleaf. Detailed summary tables and graphs of the monitoring results can be seen in Appendix D.

The results in table 7.1 show that the average NO_2 concentration over the 12-month monitoring period was 42 μg/m^3, which is above the annual mean objective of 40 μg/m^3. The maximum hourly mean recorded at the site was 187 μg/m^3, which does not exceed the 1-hour objective of 200 μg/m^3 not to be exceeded more than 18 times per year.

Table 7.1 Summary of 12-month ratified NO_2 data collected by the automatic analyser located at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge from 1 January to 31 December 2005.

	Concentration
Period Mean NO_2	42 $\mu g/m^3$
Maximum hourly mean NO_2	187 $\mu g/m^3$
Data capture NO_2	98.7 %

More detailed information regarding the findings of the Detailed Assessment and continued monitoring at this junction is provided in Chapter 10 later in this report.

Diffusion tube results

The Progress Report (May 2005) presented diffusion tube data collected in 2004 at all sites, together with historic data for a number of sites to show trends in air pollution levels. In 2005 a number of new sites have been added to our survey in Felixstowe (Felixstowe 20 to 28) to provide additional monitoring data along the A14 trunk road and in proximity to the Port of Felixstowe boundary. There has also been one site removed from the survey in Woodbridge (Woodbridge 14), as it was not representative of a receptor location and the concentrations of NO_2 were below the objective levels. Site descriptions are provided in Appendix B, the location of each site is shown in the maps provided in Appendix C.

Monitoring was conducted using passive diffusion tubes, exposed on a monthly basis, information regarding the analyst laboratory used and its accreditation details is provided in Appendix B. The annual average concentration of NO_2 was calculated for all sites with 6 months or more of monitoring data. Diffusion tubes can over or under read and the annual average should be corrected for laboratory bias. Bias correction factors for 2005 were calculated using results from the collocation study undertaken at Woodbridge and are detailed in Appendix B of this report. These factors were used to correct the annual average concentration recorded for each site, and have been compared with the bias adjustment factor for the analyst laboratory, Harwell Scientifics, obtained from the Review and Assessment Helpdesk website inventory. The monthly results of sampling for 2005 together with the bias correction calculations are detailed in Appendix B.

Table 7.2 overleaf shows the bias corrected annual average results for all sites in 2005, these results are directly comparable with the NO_2 objective for 2005. The results in table 7.2 show 8 sites (highlighted in grey) with an annual mean concentration above the annual mean objective of 40$\mu g/m^3$.

Felixstowe 13, 26 and 27 are all on the same receptor location in Ferry Lane, Felixstowe, site locations are detailed on the maps in Appendix C. This is the closest receptor location to the Port of Felixstowe and one of its main entrance gates, Dock Gate 2. Felixstowe 13 has been in place since 2003 and Felixstowe 26 and 27 were added in 2005 in order to obtain additional information at this receptor. In 2005 the annual mean NO_2 concentrations at the three monitoring positions were 45.2 $\mu g/m^3$, 43.3 $\mu g/m^3$ and 40.4 $\mu g/m^3$ respectively. These results show a difference in NO_2 concentration in different areas of the building. Further investigations will be undertaken and will form part of a Detailed Assessment for this site and also for other receptors around the Port of Felixstowe and its main access road, the A14 trunk road. Further details are provided in Chapter 11 of this report.

Felixstowe 14 is located in Adastral Close and is another receptor location close to the Port of Felixstowe boundary; site locations are detailed on the maps in Appendix C. The site has an annual mean NO_2 concentration of 41.7 $\mu g/m^3$ in 2005. NO_2 concentrations at this site have risen since 2003,

and 2005 is the first year that the site has shown levels above the annual mean objective. Further investigations will be undertaken and will form part of a Detailed Assessment for this site and also for other receptors around the Port of Felixstowe and its main access road, the A14 trunk road. Further details are provided in Chapter 11 of this report.

Table 7.2 Bias corrected annual mean nitrogen dioxide concentrations recorded at sites within the Suffolk Coastal district in 2005, figures in micrograms per cubic metre (µg/m^3)

Site and location	Annual mean NO_2 concentration (µg/m^3)
Felixstowe 4 – Lynwood Avenue (Urban background site)	23.6
Felixstowe 12 – Hamilton Road (Roadside site)	33.3
Felixstowe 13 – Ferry Lane (Industrial / Roadside site)	**45.2**
Felixstowe 14 – Adastral Close (Industrial site)	**41.7**
Felixstowe 17 – Spriteshall lane (Roadside site)	32.1
Felixstowe 18 – Kirton Road (Roadside site)	33.3
Felixstowe 19 – Welbeck Close (Urban background site)	29.1
Felixstowe 20 – Glemsford Close (Industrial / Roadside site)	28.5
Felixstowe 21 – Kings Fleet Road (Urban background site)	30.0
Felixstowe 22 – Levington Road (Industrial site)	27.2
Felixstowe 23 – Heathgate Piece (Roadside site)	35.4
Felixstowe 24 – Brandon Road (Roadside site)	32.1
Felixstowe 25 –Rendlesham Road (Roadside site)	29.6
Felixstowe 26 – Ferry Lane (Industrial / Roadside site)	**43.3**
Felixstowe 27 – Ferry Lane (Industrial / Roadside site)	**40.4**
Felixstowe 28 – Blyford Way (Roadside site)	29.2
Kesgrave 1 – Main Road (Roadside site)	26.6
Kesgrave 4 – High School (Urban background site)	21.9
Kesgrave 6 – Main Road (Roadside site)	29.0
Kesgrave 9 – Main Road (Roadside site)	35.0
Woodbridge 1 – Thoroughfare (Kerbside site) in AQMA	**48.3**
Woodbridge 3 – Kingston Farm Road (Urban background site)	19.7
Woodbridge 5 – Thoroughfare (Roadside site)	31.9
Woodbridge 6 – Thoroughfare (Roadside site) in AQMA	**46.8**
Woodbridge 8 – Thoroughfare (Roadside site) in AQMA	**42.4**
Woodbridge 10 - St. John's Street (Roadside site)	35.2
Woodbridge 13 – Thoroughfare (Roadside site)	38.2
Woodbridge 15 – Thoroughfare (Roadside site) in AQMA	**42.3**
Melton 2 – Hall Farm Road (Urban background site)	15.3
Melton 5 – Melton crossroads (Roadside site)	30.6

Woodbridge 1, 6, 8 and 15 are all located on the Thoroughfare arm of the junction of Lime Kiln Quay Road / Thoroughfare / St. John's Street in Woodbridge, site locations are detailed on the maps in Appendix C. In 2005 the annual mean NO_2 concentrations at the four monitoring positions were 48.3 $\mu g/m^3$, 46.8 $\mu g/m^3$, 42.4 $\mu g/m^3$ and 42.3 $\mu g/m^3$ respectively. A Detailed Assessment undertaken in 2005 for this junction concluded that the annual mean objective is likely to be exceeded at two receptor locations on this junction and an Air Quality Management Area was declared in March 2006 which came into force in April 2006. A summary of the findings of the Detailed Assessment, continued monitoring and further work being undertaken at this junction are detailed in Chapter 10 of this report.

Trends in NO_2 concentrations

Nitrogen dioxide levels have been monitored in Suffolk Coastal since 1993 using diffusion tubes, however most of the original sites have now been relocated or removed. In 1999 the laboratory supplying and analysing the diffusion tubes was changed which caused a marked increase in the NO_2 monitoring results for all sites. Since 1999 the same analyst laboratory has been employed and so monitoring data has only been presented from 1999 onwards for the purpose of obtaining information on air quality trends. The data is presented in the form of four graphs in Appendix E

Many of the current diffusion tube sites are in place for short-term assessment of locations of concern and are not relevant for the purpose of obtaining trend information. The graphs in Appendix E show the annual average concentration of NO_2 recorded at those sites planned, at the current time, to remain in place for the foreseeable future. The graphs show that there are only six sites with five or more years of data that could provide useful information on trends, Felixstowe 4, Kesgrave 1 & 4, Woodbridge 1 & 3 and Melton 2. These are the only sites that will be included in the discussions on air quality trends.

All data presented has been corrected for laboratory bias, for the years 1999, 2000 and 2001 this was undertaken using a bias correction factor provided be the laboratory itself. From 2002 onwards the bias correction factor has been calculated from collocation studies undertaken within the Suffolk Coastal district. The graphs should, therefore, be viewed with some care as although the same laboratory was used to supply and analyse the tubes the bias correction method has altered from 2002 onwards.

For all five sites in place in 1999, it can be seen that the NO_2 concentration fell between 1999 and 2000, it then stabilised or increased slightly from 2000 to 2001 and then increased at all sites between 2001 and 2002. Between 2002 and 2005 the concentration has either stabilised or is showing a slight downward trend at all six sites.

7.5.2 Monitoring data within an Air Quality Management Area

In 2005 there were no Air Quality Management Areas (AQMAs) designated within the Suffolk Coastal district. In March 2006 an AQMA was declared for the road junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge and data will be available and presented in future reports for monitoring undertaken in 2006. Further details regarding the AQMA declared in Woodbridge are presented in Chapter 10 of this report.

7.5.3 Narrow congested streets with residential properties close to the kerb

Defra has examined the results from previous rounds of Review and Assessment and looked for locations and levels of traffic that might lead to exceedances of the objective for NO_2. Their investigations have found that concentrations are often higher where traffic is slow moving with stop/start driving, and where buildings either side of the road reduce the dispersion of traffic

emissions. Such locations were not always considered fully during previous rounds of Review and Assessments. The technical guidance LAQM.TG(03) update advises that if these types of location were specifically included during previous rounds then there is no need to proceed further.

In the previous round of Review and Assessment these types of location were fully investigated in the Updating and Screening Assessment (2003). The findings were that there are no streets that fall into this classification within the Suffolk Coastal district. **No further investigation will be necessary**.

7.5.4 Road junctions

Defra's experience from previous rounds of Review and Assessment suggests that road junctions were often not considered adequately. The technical guidance LAQM.TG(03) update advises that if road junctions were specifically included during previous rounds then there is no need to proceed further.

In the previous round of Review and Assessment these types of location were fully investigated in the Updating and Screening Assessment (2003). A Detailed Assessment was undertaken for two of the road junctions investigated within the district:

- The junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge. As detailed earlier, a Detailed Assessment undertaken in 2005 for this junction concluded that the annual mean objective is likely to be exceeded at two receptor locations and an Air Quality Management Area (AQMA) was declared in March 2006 and came into force in April 2006. A summary of the findings of the Detailed Assessment, continued monitoring and further work being undertaken at this junction are detailed in Chapter 10 of this report.

- The junction of the A1152 and the B1438 in Melton (the Melton crossroads). The Detailed Assessment undertaken for this junction used complex, air dispersion modelling to predict air quality impacts of NO_2 from moving and idling traffic at receptor locations on this junction. The model was validated using the results of continuous monitoring undertaken at the junction. The findings showed that it is unlikely (with a probability between 5% and 20%) that an exceedance of the annual mean objective would occur at the Melton crossroads in 2005, and it was not necessary to declare an AQMA.

  Since the modelling was undertaken in 2002, concentrations of nitrogen dioxide have continued to be monitored, using a set of triplicate diffusion tubes, at the closest receptor location to the junction. This receptor location was also identified by the modelling as experiencing the greatest concentrations of nitrogen dioxide from traffic emissions at the junction. The results of the diffusion tube monitoring have been detailed in each of the air quality reports produced since this time and the 2005 results are presented in Table 7.2 earlier in this report. The results for 2005 show that the annual mean NO_2 concentration at the closest receptor location to this junction is 30.6$\mu g/m^3$, well below the objective level of 40 $\mu g/m^3$.

  In order to undertake the detailed modelling outlined above and predict NO_2 concentrations arising from traffic emissions in 2005 traffic predictions were made. Historic traffic count information was obtained for the roads leading to the junction and future general traffic increases were predicted for 2005. Traffic increases from a number of developments were also predicted for 2005 and added to the flow in order to obtain the final traffic predictions for the junction. Traffic counts are undertaken annually by Suffolk County Council on the A1152 at Woods Lane and Wilford Bridge Road and can be seen in Appendix F. The 2005 count for Woods Lane shows an annual average daily traffic flow (7-day count) of 12,832 vehicles and the count for Wilford Bridge Road shows an annual average daily traffic flow (7-day count) of 14,309 vehicles. The traffic flow predictions used to run the computer modelling for the junction in 2002 used an annual average daily traffic flow (7-day count) of 14,426 vehicles for Woods Lane and 16,314 vehicles for Wilford Bridge Road. At the time it was predicted that these flows were conservative

in their estimation which has now been confirmed by the actual traffic counts undertaken in 2005. The results from the modelling therefore represent a worse scenario than currently exists at the junction and future exceedances of the objectives continue to be unlikely.

There are a number of large developments with planning permission that are part-way through completion or yet to be commenced which will increase the traffic flow through this junction in the future. These include the Annington Homes development at RAF Woodbridge Airbase, Sutton, Rendlesham Enterprise Park and New Rendlesham, the Deben Mill development at Woodbridge and the redevelopment of the RAF Woodbridge Airfield Barracks at Sutton.

Works began on the Melton crossroads in July 2006 to increase the capacity of the junction via the installation of additional turning lanes. In addition a traffic management system is to be introduced that will be able to identify if any of the approaches are experiencing queuing and alter the traffic light sequencing to reduce the queue lengths. This work should be completed later this year.

Traffic flows will continue to be recorded by Suffolk County Council on the A1152 annually and these will be monitored to assess any increases that may pose a problem for air quality at the junction. Diffusion tube monitoring at the closest receptor to the junction will be continued, and a second site will be set up for 2007 in order to confirm concentrations at another receptor location close to the junction. Should exceedances of the objectives be observed or predicted a further Detailed Assessment of the junction will be undertaken.

7.5.5 Busy streets where people may spend 1-hour or more close to traffic

Defra have examined the results from previous Review and Assessment, which have shown that there will be some locations where members of the public may regularly spend one hour or more, e.g. streets with many shops or outside cafes/bars. The technical guidance LAQM.TG(03) update advises that if these types of location were specifically included during previous rounds then there is no need to proceed further.

In the previous round of Review and Assessment these types of location were fully investigated in the Updating and Screening Assessment (2003), and at all of the sites investigated the 2005 objective was not likely to be exceeded. **No further investigation will be necessary**.

7.5.6 Roads with a high flow of buses and/or heavy goods vehicles

Defra have examined the results from previous Review and Assessment, and advise that there will be some street locations where traffic flows are not high (less than 20,000 vehicles per day) but there is an unusually high proportion of buses and/or heavy goods vehicles (greater than 25%) and relevant exposure within 10 metres which could lead to exceedance of the objectives. The technical guidance LAQM.TG(03) update advises that if these types of location were specifically included during previous rounds then there is no need to proceed further.

In the previous round of Review and Assessment these types of location were fully investigated in the Updating and Screening Assessment (2003). There is only one road with a proportion of heavy duty vehicles (HDVs) greater than 25% and totalling more than 2,500 vehicles per day within the Suffolk Coastal district, which is the A14 trunk road from the Haven Exchange roundabout at the Port of Felixstowe to the Ipswich Borough boundary. Emissions from traffic using the A14 trunk road do not come within the scope of this section of the report, however, as there are no relevant receptor locations within 10 metres of the road. **No further investigation will be necessary.**

7.5.7 New roads constructed or proposed since the previous round of Review and Assessment

There have been no new roads constructed or proposed within the Suffolk Coastal district since the first round of review and assessment.

7.5.8 Roads with significantly changed traffic flows, or new relevant exposure

The technical guidance LAQM.TG(03) update advises that any roads with traffic flows greater than 10,000 vehicles per day which have experienced a 'large' increase in traffic flow, taken to be 25% or more, since the previous round of Review and Assessment should be considered in this Updating and Screening Assessment.

The most recent available traffic flow data was obtained from Suffolk County Council Environment and Transport Department. The traffic data obtained is presented in Appendix F. For roads with a flow greater than 10,000 vehicles per day the percentage traffic increase between 2002 and 2005 was calculated. Where data was not available for the years 2002 and 2005 data was used from the nearest year.

There was one stretch of road that fell into this category, the A12 at Benhall. Data for this site is only collected for one week every other year, other counts are undertaken nearby at Farnham and Saxmundham bypass. The Farnham site is counted continuously and the Saxmundham bypass site is counted for one week six times per year. Data collected at the Farnham and Saxmundham sites is therefore more accurate than at the Benhall site. The Farnham and Saxmundham sites show percentage increases between 2002 and 2005 that are negative in value, -5.2% and -18.4% respectively, and the Benhall site appears to be an anomaly. An assessment will be made of the Benhall site as a precautionary approach.

The technical guidance LAQM.TG(03) update advises that the Design Manual for Roads and Bridges (DMRB) screening model should be used to predict the annual mean NO_2 concentration at the closest receptor location to determine whether any exceedances are likely.

Traffic information on flow, speed and percentage of heavy and light duty vehicles was obtained for the A12 at Benhall. Local background concentrations of NO_2 were obtained from a series of maps produced by netcen on behalf of Defra, which can be obtained from the website at www.airquality.co.uk. The nearest relevant receptor location was identified and the distance to the centre of the road measured. LAQM.TG(03) states that annual mean predictions should be carried out at locations where the 1-hour objective would apply so that an assessment of the short term objective can be made as well; the closest receptor location was, therefore, taken as the garden of the residential property where people could be expected to be exposed for 1-hour or more.

DMRB was run for this road to determine whether any exceedance of the objectives is likely. DMRB is explained in detail in Appendix F of this report. The calculated annual mean NO_2 concentration from the road was added to the background concentration to obtain the predicted concentration in 2005. Details of the DMRB input information can also be seen in Appendix F. The DMRB model predicts the annual mean NO_2 concentration for direct comparison with the annual mean objective but not the 1-hour concentration. LAQM.TG(03) states that if the annual mean objective is not exceeded the authority may confidently assume that the 1-hour objective will also be met. For this reason care has been taken when measuring distances to the nearest receptor location to ensure that locations where the 1-hour objective would apply have been included. Results from the DMRB screening method run for the A12 at Benhall can be seen in Table 7.3 overleaf.

Table 7.3 Predicted annual mean NO_2 concentration for 2005, derived from DMRB, for the A12 trunk road at Benhall

Receptor location	Estimated annual mean NO_2 background concentration for 2005 ($\mu g/m^3$)	DMRB calculated annual mean NO_2 contribution from road traffic ($\mu g/m^3$)	DMRB predicted total annual mean NO_2 concentration (background + traffic) in 2005 ($\mu g/m^3$)
Closest receptor location to the A12 between the A1094 junction at Farnham and the B1121 junction at Curlew Green, Kelsale.	9.4	5.7	**15.1**

The results show that the 2005 predicted annual mean NO_2 concentration at the closest receptor location on this stretch of the A12 is 15.1 $\mu g/m^3$. NO_2 concentrations are therefore not predicted to exceed the 2005 objective and **no further assessment will be necessary.**

7.5.9 Bus stations

The technical guidance LAQM.TG(03) update advises that the results from previous Review and Assessment have shown that concentrations of NO_2 may be elevated in the vicinity of bus stations where there are large numbers of bus movements per day. This only applies to bus stations that are not enclosed and the assessment is against the 1-hour objective. Any bus stations with a flow of buses greater than 1,000 movements per day, with relevant exposure within 10 metres of the bus station must be considered.

Using local knowledge of the district, there are no bus stations within the Suffolk Coastal district with a flow of buses greater than 1,000 movements per day. **No further investigation will be necessary**.

7.5.10 New industrial sources

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A.

There are no new or planned industrial processes of relevance for nitrogen dioxide within the Suffolk Coastal district, or any of the neighbouring authorities, since the last Updating and Screening Assessment in 2003. **No further assessment will be necessary.**

There are no new industrial processes of relevance for NO_2 within any of the neighbouring authorities, since the last Updating and Screening Assessment in 2003.

7.5.11 Industrial sources with substantially increased emissions, or new relevant exposure

The technical guidance LAQM.TG(03) update advises that any emissions from a process which have increased by more than 30% since the last round of review and assessments are classed as substantially increased. Consideration must also be given to any new relevant exposure for processes since the last round of review and assessments.

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A. There is one historic authorised process within the Suffolk Coastal district with the potential to emit significant quantities of NOx - British Energy Generation Limited, Sizewell B Power Station, near Leiston, Suffolk. This process was investigated in the last round of review and assessment and was not

considered to be a significant emitter of NOx. The situation has not altered since this time and there is no new relevant exposure that needs to be considered for this process. **No further assessment will be necessary.**

There are no industrial processes of relevance for NO_2 within any of the neighbouring authorities that would impact within the Suffolk Coastal district.

7.5.12 Aircraft

The technical guidance LAQM.TG(03) update advises that aircraft are significant sources of NO_x emissions, especially during takeoff. Emissions from aircraft once they are above 200 metres will make a negligible contribution to ground-level concentrations and do not need to be considered. Only aircraft emissions at airports not considered during previous rounds of Review and Assessment or for which there has been any change in public exposure need to be assessed.

LAQM.TG(03) provides information to assess emissions from aircraft at airports by the annual throughput of passengers and/or freight, and states that assessment is only necessary where there is relevant exposure within 1,000 metres of the airport boundary.

There are no commercial airports that carry passengers or freight within the Suffolk Coastal district. There is, however, a military airbase owned by the Ministry of Defence that is still operational at Woodbridge Airfield. There are relevant receptor locations within 1,000 metres of the airfield, the nearest being approximately 300 metres from the boundary.

In the last round of Review and Assessment information was obtained from the Ministry of Defence, Wattisham Air Traffic Services, with regard to aircraft movements from the airfield in 2002. From January to December 2002 there was a total of 257 aircraft movements from the site. Advice was sought from Defra's Review and Assessment Helpdesk, and they confirmed that the number of aircraft movements from Woodbridge Airfield in 2002 was insufficient to produce significant emissions of NO_2 to cause an exceedance of the objectives at receptor locations near the site.

Information has been obtained from the Ministry of Defence, Wattisham Air Traffic Services, with regard to aircraft movements from the airfield in 2005. From January to December 2005 there was a total of 110 aircraft movements from the site, a reduction by more than a half since 2002. **No further investigation will be necessary.**

7.6 Conclusion

Suffolk Coastal District Council concludes that the annual mean objective for NO_2 is likely to be exceeded at the junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge. A Detailed Assessment undertaken in 2005 for this junction concluded that the annual mean objective is likely to be exceeded at two receptor locations on this junction and an Air Quality Management Area was declared in March 2006 which came into force in April 2006. A summary of the findings of the Detailed Assessment, continued monitoring and further work being undertaken at this junction are detailed in Chapter 10 of this report.

Suffolk Coastal District Council concludes that there is a potential risk that the air quality objectives for NO_2 may be exceeded at receptor locations around the Port of Felixstowe, specifically at The Dooley Inn Public House, Ferry Lane and Adastral Close. Further investigations will be undertaken and will form part of a Detailed Assessment for these two sites and also for other receptors around the Port of Felixstowe and its main access road, the A14 trunk road. Further details are provided in Chapter 11 of this report.

8. Review and assessment of sulphur dioxide

8.1 Air quality objectives

Defra and the Devolved Administrations have adopted three air quality objectives for sulphur dioxide (SO_2):

- 15-minute mean of 266 μg/m^3 not to be exceeded more than 35 times in a year, to be achieved by 31 December 2005;
- 1-hour mean of 350 μg/m^3 not to be exceeded more than 24 times in a year, to be achieved by 31 December 2004;
- 24-hour mean of 125 μg/m^3 not to be exceeded more than 3 times in a year, to be achieved by 31 December 2004.

8.2 Sources

SO_2 is an acid gas at normal temperature and pressure, which is soluble in water. There are a number of natural sources of SO_2, for example volcanic activity and releases caused by marine organisms. In the UK the main source of SO_2 is however man-made, from the combustion of sulphur-containing fossil fuels, principally coal and fuel oil. Emissions of SO_2 have decreased in the past thirty years due to legislation moving away from the use of coal as a domestic urban fuel source. Emissions have become more localised due to the use of large, rural power stations burning fossil fuels to create energy generation. There are also significant emissions from other industrial combustion sources and shipping.

8.3 Health effects

SO_2 is an irritant gas when inhaled, due to its acidic nature, and it affects the lining of the nose, throat and airways of the lung. This can cause constriction of the airways and breathing difficulties, and is particularly likely to occur in those suffering from asthma and chronic lung disease. Asthma affects some 4% of the population with a higher percentage amongst children.

The effects of SO_2 on sensitive subjects are seen to appear almost immediately after the start of exposure. Some studies undertaken also suggest that SO_2, in conjunction with NO_2, can increase the sensitivity to allergens of some asthma sufferers. For these reasons the Expert Panel on Air Quality Standards (EPAQS) advised that the 15-minute, short-term, limit for SO_2 of 266μg/m^3 be adopted. This is intended to reduce the exposure of the population, including individuals who may be particularly susceptible, to levels of SO_2 at which harmful effects are unlikely to occur.

8.4 The national and local perspective

Nationally, concentrations of SO_2 have fallen. Local exceedances of the objectives, principally the 15-minute mean objective, may occur: in the vicinity of small combustion plant (those with a capacity of less than 20 mega watts (MW)) which burn coal or oil; in areas where solid fuels are the predominant source of domestic heating; and in the vicinity of major ports. It is understood, from defra, that there are a number of AQMAs for SO_2 across the UK relating to a range of different sources.

8.5 Updating and Screening Assessment for sulphur dioxide

8.5.1 Monitoring data outside an Air Quality Management Area

This local authority is currently not monitoring SO_2.

8.5.2 New industrial sources

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A.

There are no new or planned industrial processes of relevance for SO_2 within the Suffolk Coastal district, or any of the neighbouring authorities, since the last Updating and Screening Assessment in 2003. **No further assessment will be necessary.**

8.5.3 Industrial sources with substantially increased emissions, or new relevant exposure

The technical guidance LAQM.TG(03) update advises that any emissions from a process which have increased by more than 30% since the last round of review and assessments are classed as substantially increased. Consideration must also be given to any new relevant exposure for processes since the last round of review and assessments.

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A. There is one authorised process within the Suffolk Coastal district with the potential to emit significant quantities of SO_2 - British Energy Generation Limited, Sizewell B Power Station, near Leiston, Suffolk. This process was investigated in the last round of review and assessment and was not considered to be a significant emitter of SO_2. The situation has not altered since this time and there is no new relevant exposure that needs to be considered for this process. **No further assessment will be necessary.**

There are no industrial processes of relevance for SO_2 within any of the neighbouring authorities that would impact within the Suffolk Coastal district.

8.5.4 Areas of domestic coal burning

Defra have examined the results from previous Review and Assessment, which have shown that there are still areas where domestic coal burning is being carried out. These can be significant sources of SO_2, any area of about 500 x 500 metre where there may be more than 100 houses burning solid fuel as their primary source of heating will require investigation. The technical guidance LAQM.TG(03) update advises that if these types of location were specifically included during previous rounds then there is no need to proceed further unless there is any new relevant exposure.

In the previous round of Review and Assessment these types of location were fully investigated and findings presented in the Detailed Assessment Report (2004). It was concluded that there are unlikely to be any areas within Suffolk Coastal where burning of solid fuel as a primary source of heating for domestic purposes exceeds the trigger level of 100 houses in a 500 x 500 metre area.

In addition, the Southern England Regional Co-ordinator of the Approved Coal Merchants Scheme has also confirmed that the overall burn of solid fuel in domestic appliances in Suffolk has reduced

since 2003. Two merchants have ceased trading, two others no longer offer a delivery service and none have increased their tonnage band. **No further investigation will be necessary**.

8.5.5 Small boilers >5MW$_{(thermal)}$

Defra have examined the results from previous Review and Assessment, which have shown that larger boiler plant >5MW$_{(thermal)}$ burning coal or fuel oil can give rise to high short-term concentrations of SO_2, with the risk that the 15-minute objective may be exceeded. The new regulations limiting the sulphur content of fuel oil to less than 1% from January 2003 mean that boilers using fuel oil are unlikely to be significant on their own. Particular attention should be paid to the combined impact of several sources, including those outside the local authority area. The technical guidance LAQM.TG(03) update advises that if these types of location were specifically covered during previous rounds then there is no need to proceed further unless there is any new relevant exposure.

In the previous round of Review and Assessment these types of location were fully investigated. Specific investigations were undertaken for two sites: boiler plant used at Her Majesty's Prison and Young Offenders Institution at Hollesley Bay and Warren Hill at Hollesley; and boiler plant used at site buildings on the Port of Felixstowe. The boiler plant for both sites was not considered to be a significant emitter of SO_2 and no further assessment was necessary. The findings are presented in the Detailed Assessment Report (2004).

There are no new locations that we are aware of that require investigation at this time, and there is no new relevant exposure for any of the historic sites investigated. **No further investigation will be necessary.**

8.5.6 Shipping

The Technical Guidance LAQM.TG(03) update provides altered advice for assessing emissions of SO_2 from shipping. On the basis of evidence from Detailed Assessments carried out during the last round of review and assessments Defra have concluded that exceedances of the 15-minute objective are only likely to occur at very large ports, where public exposure is close to the emissions. An authority will only need to proceed to Detailed Assessment:

- where there are 5,000 – 15,000 ship movements per year and relevant exposure within 250 metres of the emissions sources or
- where there are more than 15,000 ship movements per year and relevant exposure within 1 kilometre of the emission sources.

Large ships generally burn oils with a high sulphur content. If there are sufficient movements in a port they can give rise to short-term SO_2 concentrations above the objectives. Auxiliary engines used whilst berthed usually use a lower sulphur fuel and are unlikely to be significant. The LAQM.TG(03) updates advises that when determining the number of shipping movements at a port this should be confined to large ships such as cross-channel ferries, Ro-Ro, container ships and cruise ships.

In 2005 the number of ship arrivals at the Port of Felixstowe was 4,322. The number of shipping movements in 2005 was therefore 8,644. This figure is similar to that for 2004, there were 4,415 ship arrivals and therefore 8,830 shipping movements. The Port of Felixstowe therefore falls within the category of 5,000 – 15,000 ship movements per year.

The closest area of public exposure to the ship emissions is the viewing area at Landguard Point in Felixstowe, approximately 600 metres away from the main ship berthing area. The closest residential receptors are at Adastral close in Felixstowe, approximately 700 metres away from the main ship berthing area.

Under the guidance provided in the LAQM.TG(03) update as there are no public receptor locations within 250 metres of the emission source we would not need to proceed to Detailed Assessment.

Investigations into SO_2 emissions from activities on and associated with the Port of Felixstowe are, however, being undertaken as part of a Detailed Assessment of this site and the main A14 access route. This investigation includes assessment of the current situation, together with future predictions with the Felixstowe South Reconfiguration and Bathside Bay, Harwich developments in place. Further information is presented in Chapter 11 of this report.

8.5.7 Railway locomotives

The Technical Guidance LAQM.TG(03) update advises that fuels used in the transport sector contain varying amounts of sulphur, and diesel and coal-fired locomotives may represent a risk of exceeding the 15-minute objective for SO_2. Moving locomotives do not make a significant contribution to short-term concentrations and do not need to be considered further, however exposure to stationary locomotives may be more significant in terms of the 15-minute objective. Areas where diesel or steam locomotives are regularly stationary for periods of 15 minutes or more and where there is the potential for regular outdoor exposure of members of the public within 15 metres require further investigation. The LAQM.TG(03) update advises that if these types of location were specifically covered during previous rounds then there is no need to proceed further unless there is any new relevant exposure.

In the previous round of Review and Assessment these types of location were fully investigated in the Updating and Screening Assessment (2003), and at all of the sites investigated the objectives were not likely to be exceeded. There are no areas that we are aware of where there is new relevant exposure within 15 metres of an area where locomotives may be stationary for periods of 15 minutes or more. **No further investigation will be necessary**.

8.6 Conclusion

Suffolk Coastal District Council concludes that there may be a risk of the air quality objectives for SO_2 being exceeded at receptors close to the Port of Felixstowe due to combined emissions from activities on and associated with the Port.

Investigations into SO_2 emissions from activities on and associated with the Port of Felixstowe are being undertaken as part of a Detailed Assessment of this site and the main A14 access route. This investigation includes assessment of the current situation, together with future predictions with the Felixstowe South Reconfiguration and Bathside Bay, Harwich developments in place. Further information is presented in Chapter 11 of this report.

9. Review and assessment of particles (PM_{10})

9.1 Air quality objectives

The air quality standards for fine particles have been set for PM_{10}, which is particulate matter with an aerodynamic diameter of less than 10 microns (μm). Defra and the Devolved Administrations have adopted two air quality objectives for PM_{10}. There are a number of measurement methods for PM_{10}, both objectives are based upon measurements carried out using the European gravimetric transfer reference sampler or equivalent, and are as follows:

- 40 $\mu g/m^3$ measured as an annual mean to be achieved by 31 December 2004.
- 50 $\mu g/m^3$ measured as a fixed 24-hour mean, not to be exceeded on more than 35 days per year, to be achieved by 31 December 2004.

9.2 Sources

Particulate matter in the atmosphere is a mixture of different chemical substances spanning a wide range of sizes. It consists of both primary components, which are released directly from the source into the atmosphere and secondary components, which are formed in the atmosphere by chemical reactions. It is characterised and defined by the mass of that fraction most likely to penetrate beyond the larynx and be deposited in the lung, particles less than 10 μm in diameter which are known as PM_{10}.

Particulate matter is very diverse and comes from both human-made and natural sources, which include products of combustion, dust, grit, sea salt and biological particles. There are three main source types of particles; primary, secondary and coarse. Particulate matter is a mix of each of the three source types and this mix can vary daily. The major sources of particulate emissions are coal burning, diesel combustion, construction, mining and quarrying.

Primary particles are released into the atmosphere directly from a number of stationary and mobile sources. The major mobile source is road transport, which produces primary particles when fuels are burned or lubricants used up in the engine, when tyres and brakes wear down and from road dust. The main stationary sources are the burning of fuels for industrial, commercial and domestic purposes. Emissions of dust can also generate high levels close to quarries and construction sites. Primary particles can also be produced from natural sources, for example sea-spray and dust from the Saharan desert travelling vast distances.

Secondary particles are not emitted directly from a source, they are formed within the atmosphere from chemical reactions. The most important chemical reactions are with the gases sulphur dioxide, oxides of nitrogen and ammonia which produce sulphate, nitrate and ammonium respectively. Secondary particles are also formed from chemical reactions of organic compounds present in the atmosphere. Organic compounds are released when fuel is burned or when fuel or solvents evaporate, and are also emitted naturally by vegetation.

Coarse particles consist of emissions from a wide range of sources both human-made and natural, including re-suspended dusts from road traffic, construction works, mineral extraction processes, windblown dusts and soils, sea salt and biological particles.

9.3 Health effects

Particulate air pollution is associated with a range of effects on health, including effects on the respiratory and cardiovascular systems, asthma and even death. Those most at risk are the elderly, children and those who already suffer from lung or heart disease. Both short and long term exposure to ambient levels of PM_{10} are consistently associated with respiratory and cardiovascular illness. Investigations have shown, however, that it is likely the most severe effects on health are caused by exposure over long periods of time.

The available evidence suggests that the fine components of PM_{10}, particles with a diameter of 2.5 µm or less, are the main cause of the harmful effects as they can penetrate deep into the lungs. They consist of carbon, trace metals (such as copper and zinc) and organic compounds. There is less evidence to connect secondary inorganic particulate matter (such as sulphates or nitrates) or larger particles with adverse health effects, although they cannot be ruled out. The coarse fraction also contains biological material such as pollen which can lead to adverse health effects.

9.4 The national and local perspective

Analysis of review and assessment work already undertaken has identified that exceedances of the 2004 objectives might be found adjacent to busy roads, in areas with significant emissions from the domestic burning of solid fuels, in the vicinity of industrial plant, port handling facilities or areas which have significant uncontrolled or fugitive sources (for example quarrying and materials handling facilities).

The expected reduction in future particle emissions is different for each source type. Emissions from road traffic (primary particles) will be governed by new legislation on emission standards. Emissions of secondary particles will be largely governed by controls on power generation, industry, and transport. There has been progress in recent years in reducing emissions of particles from both the transport and industrial sectors. Emissions of coarse particles are largely uncontrolled and in general are not expected to decline in the future.

A significant proportion of current annual mean PM_{10} is derived from regional background sources, including long distance transport from Europe, and in years with a high proportion of easterly winds, Europe does account for high concentrations, particularly in the south and east of England. It is, therefore, essential to treat each source separately and the principal focus should be towards the control of emissions at a local level.

9.5 Updating and Screening Assessment for PM_{10}

9.5.1 Monitoring data outside an Air Quality Management Area

This local authority is currently not monitoring PM_{10}.

9.5.2 Road junctions

Defra's experience from previous rounds of Review and Assessment suggests that road junctions were often not considered adequately. Any road junctions with a traffic flow of more than 10,000 vehicles per day and relevant exposure within 10 metres of the kerb require an assessment. The technical guidance LAQM.TG(03) update advises that if road junctions were specifically included during previous rounds then there is no need to proceed further.

In the previous round of Review and Assessment these types of location were fully investigated in the Updating and Screening Assessment (2003) and there were no junctions where an exceedance of the objectives was predicted. **No further investigation will be necessary.**

9.5.3 Roads with a high flow of buses and/or heavy goods vehicles

Defra have examined the results from previous Review and Assessment, and advise that there will be some street locations where there is an unusually high proportion of buses and/or heavy goods vehicles (greater than 20% and which totals more than 2,000 vehicles per day) and relevant exposure within 10 metres which could lead to exceedance of the objectives. The technical guidance LAQM.TG(03) update advises that if these types of location were specifically included during previous rounds then there is no need to proceed further.

In the previous round of Review and Assessment these types of location were fully investigated in the Updating and Screening Assessment (2003). There is only one road with a proportion of heavy duty vehicles (HDVs) greater than 20% and totalling more than 2,000 vehicles per day within the Suffolk Coastal district, which is the A14 trunk road from the Haven Exchange roundabout at the Port of Felixstowe to the Ipswich Borough boundary. Emissions from traffic using the A14 trunk road do not come within the scope of this section of the report, however, as there are no relevant receptor locations within 10 metres of the road. **No further investigation will be necessary.**

9.5.4 New roads constructed or proposed since the previous round of Review and Assessment

There have been no new roads constructed or proposed within the Suffolk Coastal district since the first round of review and assessment.

9.5.5 Roads with significantly changed traffic flows, or new relevant exposure

The technical guidance LAQM.TG(03) update advises that any roads with traffic flows greater than 10,000 vehicles per day which have experienced a 'large' increase in traffic flow, taken to be 25% or more, since the previous round of Review and Assessment should be considered in this Updating and Screening Assessment.

The most recent available traffic flow data was obtained from Suffolk County Council Environment and Transport Department. The traffic data obtained is presented in Appendix F. For roads with a flow greater than 10,000 vehicles per day the percentage traffic increase between 2002 and 2005 was calculated. Where data was not available for the years 2002 and 2005 data was used from the nearest year.

There was one stretch of road that fell into this category, the A12 at Benhall. Data for this site is only collected for one week every other year, other counts are undertaken nearby at Farnham and Saxmundham bypass. The Farnham site is counted continuously and the Saxmundham bypass site is counted for one week six times per year. Data collected at the Farnham and Saxmundham sites is therefore more accurate than at the Benhall site. The Farnham and Saxmundham sites show percentage increases between 2002 and 2005 that are negative in value, -5.2% and -18.4% respectively, and the Benhall site appears to be an anomaly. An assessment will be made of the Benhall site as a precautionary approach.

The technical guidance LAQM.TG(03) update advises that the Design Manual for Roads and Bridges (DMRB) screening model should be used to predict the number of 24-hour exceedances of 50 $\mu g/m^3$ at the closest receptor location.

Traffic information on flow, speed and percentage of heavy and light duty vehicles was obtained for the A12 at Benhall. Local background concentrations of PM_{10} for 2005 were obtained from a series of maps produced by netcen on behalf of Defra, which can be obtained from the website at www.airquality.co.uk. The nearest relevant receptor location was identified and the distance to the centre of the road measured. LAQM.TG(03) states that annual mean predictions should be carried out at locations where the 24-hour objective would apply so that an assessment of the short term objective can be made as well. The closest receptor location was, therefore, taken as the garden of the residential property where people may be exposed for a proportion of the 24-hour objective.

DMRB was run for this road to determine whether any exceedance of the objectives is likely. DMRB is explained in detail in Appendix F of this report. The calculated annual mean PM_{10} concentration from the road was added to the background concentration to obtain the predicted concentration in 2005 for direct comparison with the 2004 annual mean objective. DMRB also predicts the number of days when the PM_{10} concentration will be greater than 50 $\mu g/m^3$ and whether the 24-hour objective will be exceeded (the 24-hour objective includes 35 allowed exceedances). Details of the DMRB input information can also be seen in Appendix F. Results from the DMRB screening method run for the A12 at Benhall can be seen in Table 9.1 below.

Table 9.1 Predicted annual mean PM_{10} concentration and number of days when the concentrations will be >50 $\mu g/m^3$ for 2005 (derived from DMRB) for the A12 trunk road at Benhall

Receptor location	**Estimated annual mean PM_{10} background concentration for 2005 ($\mu g/m^3$)**	**DMRB calculated annual mean PM_{10} contribution from road traffic ($\mu g/m^3$)**	**DMRB predicted total annual mean PM_{10} concentration (background + traffic) in 2005 ($\mu g/m^3$)**	**DMRB predicted number of days when PM_{10} concentrations is >50 $\mu g/m^3$ in 2005**
Closest receptor location to the A12 between the A1094 junction at Farnham and the B1121 junction at Curlew Green, Kelsale.	19.6	2.2	**21.8**	**6**

The results show that the 2005 predicted annual mean PM_{10} concentration at the closest receptor location on this stretch of the A12 is 21.8 $\mu g/m^3$ and the number of days when the concentration is predicted to be greater than 50 $\mu g/m^3$ is 6. PM_{10} concentrations are therefore not predicted to exceed either of the objectives in 2005 and **no further assessment will be necessary.**

9.5.6 Roads close to the objective during the second round of Review and Assessment

The Technical Guidance LAQM.TG(03) update in 2006 advises that since the last round of Review and Assessment there have been changes to the background PM_{10} maps produced by netcen on behalf of Defra. The maps have been revised to a 2004 base year (previously a 2001 base year) and in some areas background PM_{10} concentrations are higher than previously estimated. These maps can be obtained from the air quality website at www.airquality.co.uk. The new background data might make a difference to locations that were predicted to be close to the objective during the last round of Review and Assessment. Any roads where the 24-hour objective was predicted to be exceeded for between 25 and 35 days at a relevant receptor location should be re-assessed.

The mapped background concentrations at any locations that fall within the above category should firstly be checked to see if they have increased significantly. A re-assessment using the Design

Manual for Roads and Bridges (DMRB) screening model will only be necessary where the concentrations have actually increased.

In the previous round of review and assessment there was one section of the A14 trunk road where the 24-hour objective was predicted to be exceeded for 27 days at the nearest receptor location. This location was where traffic speeds are decreased at the junction with the A154 and the Port of Felixstowe Road (Dock Spur roundabout) in Felixstowe. The updated mapped background concentrations of PM_{10} for this location have increased by 1 $\mu g/m^3$since the last review and assessment was undertaken. A re-assessment of this roundabout is therefore required in accordance with the LAQM.TG(03) update.

Updated traffic information on flow, speed and percentage of heavy and light duty vehicles was obtained for the A14, A154 and Port of Felixstowe Road. Information for the A14 and A154 for 2005 was obtained from Suffolk County Council, Environment & Transport Department, using traffic counts undertaken by the Highways Agency and Suffolk County Council. There was no information available from this source for the Port of Felixstowe Road, however a traffic count was commissioned on this stretch of road by the Port of Felixstowe as part of the Felixstowe South Reconfiguration planning application in 2003. This traffic count information was therefore used in order to undertake this reassessment, seasonal variation was accounted for and the data was predicted forward to 2005.

DMRB was run for this junction to determine whether any exceedance of the objectives is likely. DMRB is explained in detail in Appendix F of this report. The calculated annual mean PM_{10} concentration from the road was added to the background concentration to obtain the predicted concentration in 2005 for direct comparison with the 2004 annual mean objective. DMRB also predicted the number of days when the PM_{10} concentration will be greater than 50 $\mu g/m^3$ and whether the 24-hour objective will be exceeded (the 24-hour objective includes 35 allowed exceedances). Details of the DMRB input information can also be seen in Appendix F. Results from the DMRB screening method run for this junction can be seen in Table 9.2 below.

Table 9.2 Predicted annual mean PM_{10} concentration and number of days when the concentrations will be >50 $\mu g/m^3$ in 2005 (derived from DMRB) for the Dock Spur roundabout in Felixstowe

Receptor location	**Estimated annual mean PM_{10} background concentration for 2005 ($\mu g/m^3$)**	**DMRB calculated annual mean PM_{10} contribution from road traffic ($\mu g/m^3$)**	**DMRB predicted total annual mean PM_{10} concentration (background + traffic) in 2005 ($\mu g/m^3$)**	**DMRB predicted number of days when PM_{10} concentrations is >50 $\mu g/m^3$ in 2005**
Closest receptor location to the Dock Spur roundabout, Felixstowe	19.4	8	**27.4**	**19**

The results show that the 2005 predicted annual mean PM_{10} concentration at the closest receptor location on this stretch of the A12 is 27.4 $\mu g/m^3$ and the number of days when the concentration is predicted to be greater than 50 $\mu g/m^3$ is 19. This number of days when the PM_{10} concentration is predicted to be greater than 50 $\mu g/m^3$ has in-fact decreased from 27 to 19, even with the slight increase in the mapped background concentrations. The reduction is likely to be related to the updated traffic count information now available for the A154 and Port of Felixstowe Road. This shows the actual traffic flows in 2005 to be slightly lower than those predicted during the last round of review and assessment and the percentage of HDVs to also be lower than originally predicted. PM_{10} concentrations as the closest receptor location to the Dock Spur roundabout are therefore not predicted to exceed either of the objectives in 2005 and **no further assessment will be necessary.**

Additional information and investigations of emissions from activities on and associated with the Port of Felixstowe are provided in Chapter 11 of this report.

9.5.7 New Industrial sources

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A.

There is one authorised process within the Suffolk Coastal district with the potential to emit significant quantities of PM_{10} that is included in this section of the report - White Mountain Roadstone Limited, Foxhall Quarry No. 4, Foxhall Road, Brightwell. This is not actually a new process but there are unusual circumstances surrounding it, as follows.

This process has been operating for a number of years and was investigated during the last round of Review and Assessment. The findings were that emissions from the process had decreased since the previous round of Review and Assessment and the objectives would not be exceeeded at nearby receptor locations. Since the last assessment this process has acquired a new roadstone coating plant and discontinued the original plant. The new plant has much lower emissions of PM_{10} and is farther away from receptor locations, it is therefore expected that the objectives are not likely to be exceeded. The location of the plant within the quarry, however, has been changed and the stack is now at a higher level above the quarry face than previously. It was determined that the process therefore requires a new assessment.

To simplify the assessment of industrial PM_{10} emissions a series of nomograms have been prepared which estimate the emission rate in tonnes per annum that would produce a 1 $\mu g/m^3$ contribution to the 90^{th} percentile of 24-hour concentrations. If the actual process emission rate exceeds the thresholds it will be necessary to proceed to a Detailed Assessment. An excel spreadsheet which reproduces the nomogram graphs in LAQM.TG(03) is available on the UK National Air Quality Information Archive. This spreadsheet has been used to assess the emissions from this process and can be found at www.airquality.co.uk/archive/laqm/tools/IndustrialEmissionsScreeningToolsv2.xls.

The following information was obtained from the latest emissions testing of the plant (on 3 April 2006) in order to undertake the emissions assessment:

Rate of emission of PM_{10} in tonnes per annum = 0.51
Stack height = 16.5 m
Stack diameter = 0.76 m
Stack exit temperature = 59.7°C
Height of the tallest building within 5 stack heights of the chimney = quarry face which is 7 m
PM_{10} background concentration (include roadside contribution at relevant receptors) = 21.3 $\mu g/m^3$

The excel spreadsheet was run for this process and confirmed that the emission rate in tonnes per annum that would produce a 1 $\mu g/m^3$ contribution to the 90^{th} percentile of 24-hour concentrations is 4.4 tonnes per annum. As the process emits 0.51 tonnes per annum the air quality objectives are not likely to be exceeded and **no further assessment will be necessary.**

9.5.8 Industrial sources with substantially increased emissions or new relevant exposure

The technical guidance LAQM.TG(03) update advises that any emissions from a process which have increased by more than 30% since the last round of review and assessments are classed as substantially increased. Consideration must also be given to any new relevant exposure for processes since the last round of review and assessments.

All processes within the Suffolk Coastal district currently regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) are listed in Appendix A. There are two authorised process within the Suffolk Coastal district with the potential to emit significant quantities of PM_{10} in addition to the three processes mentioned in the previous section:

- British Energy Generation Limited, Sizewell B Power Station, near Leiston, Suffolk.

This process was investigated in the last round of review and assessment and was not considered to be a significant emitter of PM_{10}. The situation has not altered since this time and there is no new relevant exposure that needs to be considered for this process. **No further assessment will be necessary.**

- Cemex UK Cement Limited, Sinks Gravel Pit, Kesgrave (formerly known as Ipswich Coated Stone)

This is a roadstone coating process that was investigated in the last round of review and assessment. At that time emissions from the process had decreased when compared to those experienced during the first round of review and assessment and no further investigation was considered necessary.

The most recent report detailing emissions of PM_{10} from the process was for October 2005. Calculations using these emission details confirm that the rate of Total Particulate Matter emission from the process in 2005 was 1,871 kg compared with 781 kg in 2002 (when the process was assessed during the last round).

Emissions from this process have increased by approximately 58% and it therefore requires re-assessment in accordance with the Technical Guidance LAQM.TG(03) update.

To simplify the assessment of industrial PM_{10} emissions a series of nomograms have been prepared which estimate the emission rate in tonnes per annum that would produce a 1 $\mu g/m^3$ contribution to the 90^{th} percentile of 24-hour concentrations. If the actual process emission rate exceeds the thresholds it will be necessary to proceed to a Detailed Assessment. An excel spreadsheet which reproduces the nomogram graphs in LAQM.TG(03) is available on the UK National Air Quality Information Archive. This spreadsheet has been used to assess the emissions from this process and can be found at www.airquality.co.uk/archive/laqm/tools/IndustrialEmissionsScreeningToolsv2.xls.

The following information was obtained from the latest emissions testing of the plant (October 2005) in order to undertake the emissions assessment:

Rate of emission of PM_{10} in tonnes per annum = 1.68
Stack height = 14.5 m
Stack diameter = 1.03 m
Stack exit temperature = 85^oC
Height of the tallest building within 5 stack heights of the chimney = there are none within this distance
PM_{10} background concentration (include roadside contribution at relevant receptors) = 21.5 $\mu g/m^3$

The excel spreadsheet was run for this process and confirmed that the emission rate in tonnes per annum that would produce a 1 $\mu g/m^3$ contribution to the 90^{th} percentile of 24-hour concentrations is 4.56 tonnes per annum. As the process emits 1.68 tonnes per annum the air quality objectives are not likely to be exceeded and **no further assessment will be necessary.**

There are no industrial processes of relevance for PM_{10} within any of the neighbouring authorities that would impact within the Suffolk Coastal district.

9.5.9 Areas of domestic solid fuel burning

Defra have examined the results from previous Review and Assessment, which have shown that there are still areas where domestic solid fuel burning takes place. These can be significant sources of PM_{10}, any area of about 500 x 500 metre where there may be more than 50 houses burning solid fuel as their primary source of heating will require investigation. Solid fuel includes coal, anthracite, smokeless fuel and wood. The technical guidance LAQM.TG(03) update advises that if these types of location were specifically included during previous rounds then there is no need to proceed further unless there is any new relevant exposure.

In the previous round of Review and Assessment these types of location were fully investigated and findings presented in the Detailed Assessment Report (2004). It was concluded that there are unlikely to be any areas within Suffolk Coastal where burning of solid fuel as a primary source of heating for domestic purposes exceeds the trigger level of 50 houses in a 500 x 500 metre area.

In addition, the Southern England Regional Co-ordinator of the Approved Coal Merchants Scheme has also confirmed that the overall burn of solid fuel in domestic appliances in Suffolk has reduced since 2003. Two merchants have ceased trading, two others no longer offer a delivery service and none have increased their tonnage band. **No further investigation will be necessary**.

9.5.10 Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports

The technical guidance LAQM.TG(03) update states that there are a number of other sources of PM_{10} that may be significant, they include fugitive dust and other transport sources. Only sources not considered in the previous round of review and assessment or for which there is new relevant exposure need to be included in this report.

In the previous round of review and assessment all landfill sites and quarries within the district were assessed for fugitive emissions of PM_{10}. There were four quarries (Thorington, Waldringfield, Sinks Pit, Kesgrave and Foxhall Four) and four landfill sites (Waldringfield, Foxhall, Sweffling Lagoons and Grove Farm, Clopton) in operation within the district and one planned quarry site at Red House Farm, Bucklesham. The findings were that exceedance of the PM_{10} objectives at receptor locations was unlikely and no air quality management areas were declared.

Information provided by Suffolk County Council, who licence the quarries and landfill sites, has confirmed that quarrying at Thorington Quarry and Sinks Pit Quarry has now ceased. In addition, the landfill site at Grove Farm, Clopton has now closed and Sweffling Lagoons is no longer taking any landfill, although it has not officially closed as yet.

There are three quarries that we were not made aware of during the previous rounds of review and assessment: Chillesford, Foxes Farm at Nacton and Blyth River Valley at Wenhaston.

Below is an assessment of each of the three 'new' quarries, together with an update for each of the original quarries and landfill sites that are still in use:

- **Chillesford Quarry, Chillesford.** This quarry excavates Chillesford Clay for use by a local brick manufacturing company and has current planning permission until 2012. The site is excavated for 3-4 weeks each year between May and October. The LAQM.TG(03) update advises that relevant exposure 'near' to the dust source must be established, any recent complaints about dust collated and a visual inspection of the site for dust undertaken in order to determine whether further assessment will be necessary. The estimated 2004 annual mean PM_{10} background (obtained from background PM_{10} maps produced by netcen on behalf of Defra) for this site is 19.8 $\mu g/m^3$.

LAQM.TG(03) advises that where the background concentration is less than 26 μg/m^3 any relevant exposure within 200 metres of the dust source must be established. A visual inspection of the site determined that there are 7 residential properties within 200 metres of the dust sources, all are screened from the current excavations via an area of dense woodland. There have been no recent dust complaints received regarding this site. **No further investigation will be necessary for this site.**

- **Foxes Farm Quarry, Nacton.** This quarry excavates sand and gravel for local use. The site is in use for excavation for approximately a third of the year. The LAQM.TG(03) update advises that relevant exposure 'near' to the dust source must be established, any recent complaints about dust collated and a visual inspection of the site for dust undertaken in order to determine whether further assessment will be necessary. The estimated 2004 annual mean PM_{10} background (obtained from background PM_{10} maps produced by netcen on behalf of Defra) for this site is 23.4 μg/m^3. LAQM.TG(03) advises that where the background concentration is less than 26 μg/m^3 any relevant exposure within 200 metres of the dust source must be established. There are no residential properties within 200 metres of the dust sources. The closest receptors are also screened from the excavations via vegetation. There have been no recent dust complaints received regarding this site. **No further investigation will be necessary for this site.**

- **Blyth River Valley Quarry, Wenhaston.** This quarry excavates sand and has current planning permission until 2042. The LAQM.TG(03) update advises that relevant exposure 'near' to the dust source must be established, any recent complaints about dust collated and a visual inspection of the site for dust undertaken in order to determine whether further assessment will be necessary. The estimated 2004 annual mean PM_{10} background (obtained from background PM_{10} maps produced by netcen on behalf of Defra) for this site is 20.8 μg/m^3. LAQM.TG(03) advises that where the background concentration is less than 26 μg/m^3 any relevant exposure within 200 metres of the dust source must be established. A visual inspection of the site determined that there are no residential properties within 200 metres of the dust sources. There have been no recent dust complaints received regarding this site. **No further investigation will be necessary for this site.**

- **Waldringfield Quarry and Landfill site** (landfill site for inert waste to fill quarry excavations), Waldringfield Road, Brightwell, Suffolk. This site was investigated in the previous rounds of review and assessment and it was concluded that the air quality objectives were not likely to be exceeded at the closest receptor locations.

  The site currently has permission to quarry until 2013 and permission to landfill part of the quarry site with inert waste as the excavations are undertaken. Under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) the land-filling operation at the site, which has been operating for many years, is now classified as an A1 activity and is regulated by the Environment Agency under section 5.2 – the Disposal of Waste by Landfill. The land-filling operation, although now regulated, has not altered since the previous round of review and assessment, and neither has the quarrying undertaken at the site.

  Since the previous round of review and assessment there are two additions to the activities on site. A mobile concrete crushing plant is now present on site for one week every 2-3 months, this plant is owned by a contractor and regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended). Mobile concrete-crushing plant is not listed in LAQM.TG(03) as a significant emitter of PM_{10}, although there will be some local dust emissions associated with the plant. There is also new cement-batching process that moved to the site in summer 2006. This process is also regulated under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended), and is again not listed in LAQM.TG(03) as a significant of PM_{10}, although there will be some local dust emissions associated with the plant.

The LAQM.TG(03) update advises that relevant exposure 'near' to the dust source must be established, any recent complaints about dust collated and a visual inspection of the site for dust undertaken in order to determine whether further assessment will be necessary. The estimated 2004 annual mean PM_{10} background (obtained from background PM_{10} maps produced by netcen on behalf of Defra) for this site is 21.0 $\mu g/m^3$. LAQM.TG(03) advises that where the background concentration is less than 26 $\mu g/m^3$ any relevant exposure within 200 metres of the dust source must be established. A visual inspection of the site determined that there are no residential properties within 200 metres of the dust sources and no visual dust problems arising from the site. The main source of dust is the access road to the site but this dust is localised and is not really apparent beyond the site boundary. There have been no recent dust complaints received regarding this site. **No further investigation will be necessary for this site.**

- **Foxhall Four Quarry and Foxhall Landfill site** (landfill site for domestic and commercial wastes run by Viridor Waste Management). This site has two additional factors that need to be taken into account, it is located next to the **A12 trunk road**, and has a roadstone coating plant located within the site boundary - **White Mountain Roadstone Limited**. Previous rounds of review and assessment have investigated the effect of these combined emissions at receptor locations close to this site and concluded that exceedance of the objectives was unlikely and no further review and assessment was necessary.

  The site currently has permission to quarry until 2011 and permission to landfill until March 2019. Under the Pollution, Prevention and Control (England and Wales) Regulations 2000 (as amended) the land-filling operation at the site, which has been operating for many years, is now classified as an A1 activity and is regulated by the Environment Agency under section 5.2 – the Disposal of Waste by Landfill. The land-filling operation, although now regulated, has not altered since the previous round of review and assessment, and neither has the quarrying undertaken at the site.

  PM_{10} emissions from road traffic on the A12, using the Design Manual for Roads and Bridges Screening Methodology (DMRB), were predicted in both previous rounds of review and assessment. The results from DMRB in the second round of review and assessment (2002/2003) confirmed that road traffic emissions were actually lower than those obtained in the first round (1999). Updated traffic information has been obtained from Suffolk County Council, Environment and Transport Department, this shows that the volume of traffic on the section of the A12 near to Foxhall Quarry and Landfill site has decreased slightly between 2002 and 2005. Emissions of PM_{10} from the A12 will therefore not have altered since the previous round of review and assessment, and may in-fact have decreased slightly. Emissions of PM_{10} from White Mountain Roadstone Limited have been assessed in section 9.5.7 of this report, they now have a new plant with much lower emissions, sited in a new location within the quarry. The new site for the plant is farther away from the nearest receptor locations than the original site. Emissions from each of the individual sources have not increased since the first round.

  The LAQM.TG(03) update advises that relevant exposure 'near' to the dust source must be established, any recent complaints about dust collated and a visual inspection of the site for dust undertaken in order to determine whether further assessment will be necessary. The estimated 2004 annual mean PM_{10} background (obtained from background PM_{10} maps produced by netcen on behalf of Defra) for this site is 20.6 $\mu g/m^3$. LAQM.TG(03) advises that where the background concentration is less than 26 $\mu g/m^3$ any relevant exposure within 200 metres of the dust source must be established. There are no residential properties within 200 metres of the sites dust sources and no visual dust problems arising from the site. There have been no recent dust complaints received from members of the public regarding this site. Two complaints have been received from the Environment Agency, who now licence the landfill operation at the site. The first was regarding dust arising from the unmade access road to the quarry during a period of dry

weather in 2003, following the complaint the weather altered and rain damped down any dust emissions from the road, the Environment Agency had no further complaint regarding this issue. The second was again in 2003 regarding dust from fine soil used by the landfill operation to cover the site. The Environment Agency reported this to the Council but actually dealt with the issue under the site licence. No further complaints have been received regarding either of these issues or any other dust problems from the site since 2003. **No further investigation will be necessary for this site.**

- **Red House Farm Quarry, alongside the A14 in Bucklesham.** This is a sand and gravel extraction quarry which until recently had not been worked. There has been some site working in the far south-east corner of the site but it is now closed and will not be in use again until October 2006. The site owners have advised that the site will be worked intermittently as and when contracts require. The LAQM.TG(03) update advises that relevant exposure 'near' to the dust source must be established, any recent complaints about dust collated and a visual inspection of the site for dust undertaken in order to determine whether further assessment will be necessary. The estimated 2004 annual mean PM_{10} background (obtained from background PM_{10} maps produced by netcen on behalf of Defra) for this site is 20.6 $\mu g/m^3$. LAQM.TG(03) advises that where the background concentration is less than 26 $\mu g/m^3$ any relevant exposure within 200 metres must be established. There are no residential properties within 200 metres of the area currently being excavated and therefore the dust sources. A visual inspection of the site has not been possible as it is currently closed. There have been no recent dust complaints received regarding this site. **No further investigation will be necessary for this site.**

9.5.11 Aircraft

The technical guidance LAQM.TG(03) update advises that aircraft are not major sources of PM_{10} emissions, but they may contribute close to the source. Emissions from aircraft once they are above 200 metres will make a negligible contribution to ground-level concentrations and do not need to be considered. Only aircraft emissions at airports not considered during previous rounds of Review and Assessment or for which there has been any change in public exposure need to be assessed.

LAQM.TG(03) provides information to assess emissions from aircraft at airports by the annual throughput of passengers and/or freight, and states that assessment is only necessary where there is relevant exposure within 500 metres of the airport boundary.

There are no commercial airports that carry passengers or freight within the Suffolk Coastal district. There is, however, a military airbase owned by the Ministry of Defence that is still operational at Woodbridge Airfield. There are relevant receptor locations within 500 metres of the airfield, the nearest being approximately 300 metres from the boundary.

In the last round of Review and Assessment information was obtained from the Ministry of Defence, Wattisham Air Traffic Services, with regard to aircraft movements from the airfield in 2002. From January to December 2002 there was a total of 257 aircraft movements from the site. Advice was sought from Defra's Review and Assessment Helpdesk, and they confirmed that the number of aircraft movements from Woodbridge Airfield in 2002 was insufficient to produce significant emissions of PM_{10} to cause an exceedance of the objectives at receptor locations near the site.

Information has been obtained from the Ministry of Defence, Wattisham Air Traffic Services, with regard to aircraft movements from the airfield in 2005. From January to December 2005 there was a total of 110 aircraft movements from the site, a reduction by more than a half since 2002. **No further investigation will be necessary.**

9.6 Conclusion

Suffolk Coastal District Council concludes that there may be a risk of the air quality objectives for PM_{10} being exceeded at receptor locations within the Suffolk Coastal district.

Investigations into PM_{10} emissions from activities on and associated with the Port of Felixstowe are being undertaken as part of a Detailed Assessment of this site and the main A14 access route. This investigation includes assessment of the current situation, together with future predictions with the Felixstowe South Reconfiguration and Bathside Bay, Harwich developments in place. Further information is presented in Chapter 11 of this report.

10. Air quality update for the junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge (the Woodbridge junction)

At the time of publication of the Progress Report (May 2005) the results of a 12-month monitoring programme undertaken to investigate concentrations of nitrogen dioxide (NO_2) arising from vehicle exhaust emissions at the Woodbridge junction, as part of a Detailed Assessment, were not available. The Progress Report concluded that a full report with the results and conclusions of the detailed monitoring and subsequent computer modelling undertaken for the Woodbridge junction would be published later that year (2005). The findings would determine whether it would be necessary to consider the declaration of an Air Quality Management Area (AQMA) at the junction.

In September 2005, following completion of the monitoring and modelling, a Detailed Assessment report was produced for the Woodbridge junction. The report was produced by AEA Technology, on behalf of Suffolk Coastal District Council. The report concluded that the annual mean objective for NO_2 is likely to be exceeded at properties on the western side of the Thoroughfare / Melton Hill arm of the junction and that declaration of an AQMA should be considered in order to tackle these exceedances.

The findings of the report were approved by the Suffolk Coastal's Cabinet at the meeting held on 4 October 2005. The findings were subsequently approved by Defra who confirmed that Suffolk Coastal District Council was required, under section 83(1) of the Environment Act 1995, to declare an AQMA for the junction.

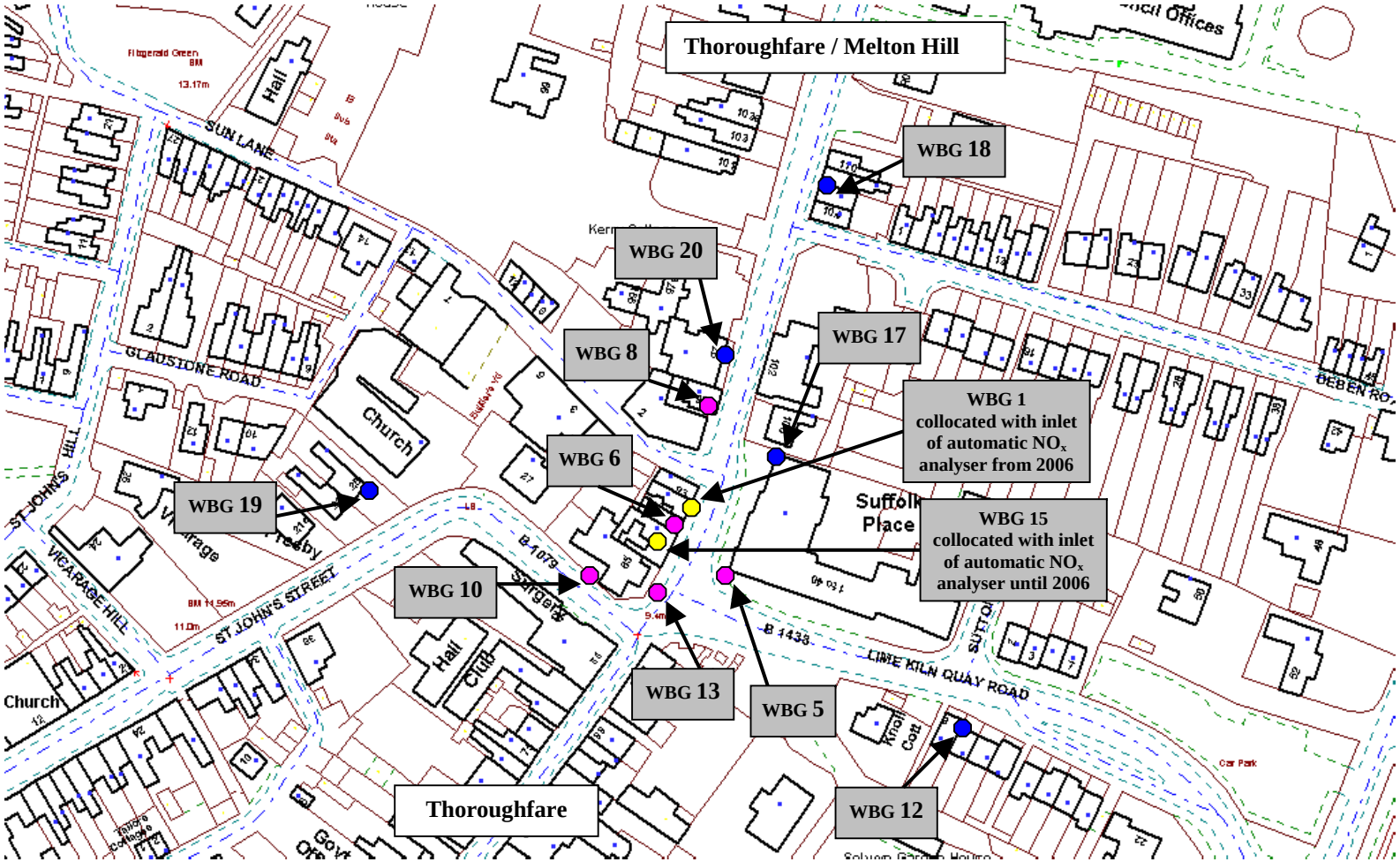
On 3 March 2006 Suffolk Coastal District Council made an Air Quality Management Area Order for the junction, which came into effect on 3 April 2006. A copy of the AQMA Order is provided in Appendix G. The area designated in the AQMA Order incorporates seven buildings on the western side of the Thoroughfare / Melton Hill arm of the junction, of which four are residential properties.

In accordance with section 84(1) of the Environment Act 1995 the Council is now required to undertake a Further Assessment of existing and likely future annual mean NO_2 concentrations in the AQMA. Section 84(2)(a) of the Environment Act 1995 requires local authorities to report on the Further Assessment within 12 months of designating the AQMA. The Further Assessment is intended to supplement the information that the Council has already in relation to the AQMA.

In addition to the Further Assessment, the Council is also required under section 84(2)(b) of the Environment Act 1995 to produce a written Action Plan for the AQMA setting out what measures will be introduced in pursuit of the achievement of the annual mean NO_2 air quality objective. The Environment Act 1995 does not specify a timeframe for production of the Action Plan, however Defra suggest completion 12–18 months after the AQMA is designated.

Since production of the Progress Report (May 2005) an automatic NO_x analyser has remained at the junction of Lime Kiln Quay Road / Thoroughfare / St. John's Street, Woodbridge, in order to collect data as part of the Further Assessment. The location of the monitoring site can be seen in Map 10.1 overleaf. The data used to inform the Detailed Assessment for this site was collected from 5 April 2004 to 31 March 2005. The analyser has continued to collect data since this time and a 12-month ratified data set has been obtained for 2005. A summary of the average measured NO_2 concentration and the maximum hourly mean concentration for the monitoring period can be seen in Table 10.1. Detailed summary tables and graphs of the monitoring results can be seen in Appendix D. Further information regarding the automatic analyser, including quality assurance / control protocols is provided in section 7.5.1 of Chapter 7 in this report.

Map 10.1 Location of NO_2 diffusion tubes and automatic NO_x analyser at the junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge



The results in Table 10.1 show that the average NO_2 concentration over the 12-month monitoring period in 2005 was 42 $\mu g/m^3$, confirming that the annual mean concentration at the monitoring site is above the annual mean objective of 40 $\mu g/m^3$. The maximum hourly mean recorded at the site in 2005 was 187 $\mu g/m^3$, which does not exceed the 1-hour objective of 200 $\mu g/m^3$ not to be exceeded more than 18 times per year.

Table 10.1 Summary of 12-month ratified NO_2 data collected by the automatic analyser located at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge from 1 January to 31 December 2005.

	Concentration
Period Mean NO_2	42 $\mu g/m^3$
Maximum hourly mean NO_2	187 $\mu g/m^3$
Data capture NO_2	98.7 %

In addition, monitoring using diffusion tubes has continued at seven sites around the junction during 2005. One site was removed from the survey in 2005 (Woodbridge 14), as it was not representative of a receptor location and the annual mean concentration of NO_2 was below the objective levels. The location of each monitoring site is shown in Map 10.1. General details regarding diffusion tube monitoring are presented in section 7.5.1 of Chapter 7 in this report.

Diffusion tubes can over or under read and the annual average should be corrected for laboratory bias. Woodbridge 15 was collocated with the automatic analyser in 2005 in order to provide this bias correction factor for the diffusion tubes, further information is provided in Appendix B.

Table 10.2 shows the bias corrected annual average diffusion tube results in 2003, 2004 and 2005. The 2005 results are directly comparable with the annual mean NO_2 objective. The monthly results of sampling for 2005 together with the bias correction calculations are detailed in Appendix B.

Table 10.2 Bias corrected annual mean NO_2 concentrations recorded at sites on the Woodbridge junction in 2003, 2004 and 2005, figures in micrograms per cubic metre ($\mu g/m^3$)

Site and location	**Annual mean NO_2 concentration ($\mu g/m^3$) 2003**	**Annual mean NO_2 concentration ($\mu g/m^3$) 2004**	**Annual mean NO_2 concentration ($\mu g/m^3$) 2005**
Woodbridge 1 – Thoroughfare	**48.3**	**47.9**	**48.3**
Woodbridge 5 – Thoroughfare	34.3	30.6	31.9
Woodbridge 6 – Thoroughfare	**46.6**	**44.3**	**46.8**
Woodbridge 8 – Thoroughfare	**41.0**	**40.6**	**42.4**
Woodbridge 10 - St. John's Street	34.9	33.5	35.2
Woodbridge 13 – Thoroughfare	~	33.7	38.2
Woodbridge 14 - St. John's Street	~	33.1	~
Woodbridge 15 – Thoroughfare	~	37.5	**42.3**

The results in Table 10.2 show 4 sites at the junction (highlighted in grey) with an annual mean concentration above the objective of 40μg/m^3 in 2005 - Woodbridge 1, 6, 8 and 15. These sites are all within the designated AQMA. Results for sites Woodbridge 1, 6, and 8 were also above the annual mean objective in 2003 and 2004. The site at Woodbridge 15 was set up in 2004, the results collected show that concentrations at this location have increased from 2004 to 2005 to above the annual mean objective. Concentrations at all monitoring sites in 2004 are lower than those seen in 2003 and 2005.

In January 2006 the automatic NO_x analyser was moved approximately 20 metres, following the availability of a new site, in order that measurements could be collected at the point of highest diffusion tube readings, site Woodbridge 1. Historically it was not possible to monitor from this point as a safe site for location of the equipment was not available. Locations of the original and new monitoring point are shown on Map 10.1.

As part of the Further Assessment for the AQMA, a number of new diffusion tube monitoring sites were established around the junction in January 2006 in order to confirm NO_2 concentrations. The location of these sites is shown on Map 10.1.

The results of continued monitoring in 2006 will be presented in the Further Assessment report, due in March / April 2007. A full public consultation was undertaken earlier this year on the findings of the Detailed Assessment and the declaration of the AQMA. Comments and suggestions were welcomed, and o date we have received many responses including ideas for ways to decrease NO_2 emissions at the junction.

A working group has been established, which includes representatives from Suffolk County Council, Environment and Transport Department, and from the Environmental Protection and Planning Teams at Suffolk coastal District Council. The group is looking at all possible solutions to decrease the NO_2 concentrations in the AQMA and at the junction in general, and all consultation responses suggestions received are being investigated in order to formulate the Action Plan.

Once the options have been investigated the draft Action Plan will be drawn up and fully consulted upon in order to obtain public opinion before the final version is submitted to Defra.

11. Continued Assessment of Emissions Generated by the Port of Felixstowe

11.1 Introduction

The Progress Report (May 2005) provided in-depth information on the review and assessment history of emissions generated by activities on and associated with the Port of Felixstowe and it's main access route, the A14 trunk road. This information is attached as Appendix H for completeness.

The Progress Report concluded that the findings of the detailed computer modelling undertaken as part of the Environmental Statement for the Felixstowe South Reconfiguration (FSR) planning application for **nitrogen dioxide (NO_2)** were inconsistent with results from diffusion tube monitoring undertaken by Suffolk Coastal District Council. It was determined that results from seven new diffusion tube monitoring sites established in 2005 at receptor locations close to the Port of Felixstowe and along the A14 would be obtained in order to provide further information on any potential exceedances of the objectives. Monitoring undertaken in 2004 at the Dooley Inn Public House, Ferry Lane, Felixstowe (close to the Port of Felixstowe boundary at the Dock Gate 2 entrance) using diffusion tubes suggested exceedance of the annual mean objective, which was not predicted by the FSR detailed modelling. The reliability of monitoring results obtained at the Dooley Inn was questioned following observations that vehicles were parking in much closer proximity to the diffusion tubes (within 1-2 metres) than previously realised. Concern was raised that the readings obtained were not representative of ambient levels at the monitoring site. In addition, confirmation was received that only the top floor of the building is used for residential purposes and is therefore the relevant receptor location for annual mean NO_2 concentrations. Two new diffusion tube sites were established on the building in 2005 at the height of the receptor location, one immediately above the historic site and one at the side of the building facing the Port of Felixstowe but away from the car parking areas at the pub. The results from these sites will determine whether there is the potential for exceedance of the annual mean objective and the need for Detailed Assessment of this site.

The findings of the FSR detailed computer modelling were assessed by independent consultants, netcen. They expressed concern that for **sulphur dioxide (SO_2)** emissions a risk exists for the discharge of plumes from ships at berth to combine when the wind is from the north-west or south-east, and cause exceedances of the objectives at receptor locations. It was concluded that shipping data would be obtained from the Port of Felixstowe to determine whether a Detailed Assessment of SO_2 emissions is required.

The findings of the FSR detailed computer modelling for **particles (PM_{10})** stated that the objectives would be met at receptor locations near to the Port of Felixstowe and along the A14. These findings were accepted in the Progress Report and it was determined that no further investigation would be necessary. Following submission of the Progress Report to Defra they had the following comment to make:

> 'Considering the discrepancies highlighted between the available NO_2 monitoring data and the modelling results reported from the Felixstowe South reconfiguration Environmental Statement, it is surprising that more caution is not expressed regarding the model results for PM_{10} as these are likely to be based on similar emissions sources but, due to a lack of PM_{10} monitoring data to verify them, appear to be accepted unquestioningly.'

Defra's comments have been taken on board and further assessment of PM_{10} emissions from the Port of Felixstowe is also be undertaken in addition to NO_2 and SO_2.

Since publication of the Progress Report, the Public Inquiries held for the Felixstowe South Reconfiguration and Bathside Bay, Harwich planning applications have reached their decisions and

both applications have been approved. The impact of both developments on emissions of each pollutant and subsequent pollutant concentrations at receptor locations will be determined in addition to the current situation.

11.2 Results of NO_2 diffusion tube monitoring undertaken in 2005

Monitoring using diffusion tubes has continued at seven sites in Felixstowe in 2005 and nine new sites have been added to the survey. The locations of the monitoring sites are shown in the maps provided in Appendix C. The location of the three sites at the Dooley Inn Public House in Ferry Lane can be seen on Map 11.1 overleaf. General details regarding diffusion tube monitoring are presented in section 7.5.1 of Chapter 7 in this report.

Diffusion tubes can over or under read and the annual average should be corrected for laboratory bias. A collocation study with an automatic analyser was undertaken at a site in Woodbridge during 2005 in order to provide a bias correction factor for the diffusion tubes, further information is provided in Appendix B.

Table 11.1 below shows the bias corrected annual average diffusion tube results in 2003, 2004 and 2005. The results for 2005 are directly comparable with the annual mean NO_2 objective. The monthly results of sampling for 2005 together with the bias correction calculations are detailed in Appendix B.

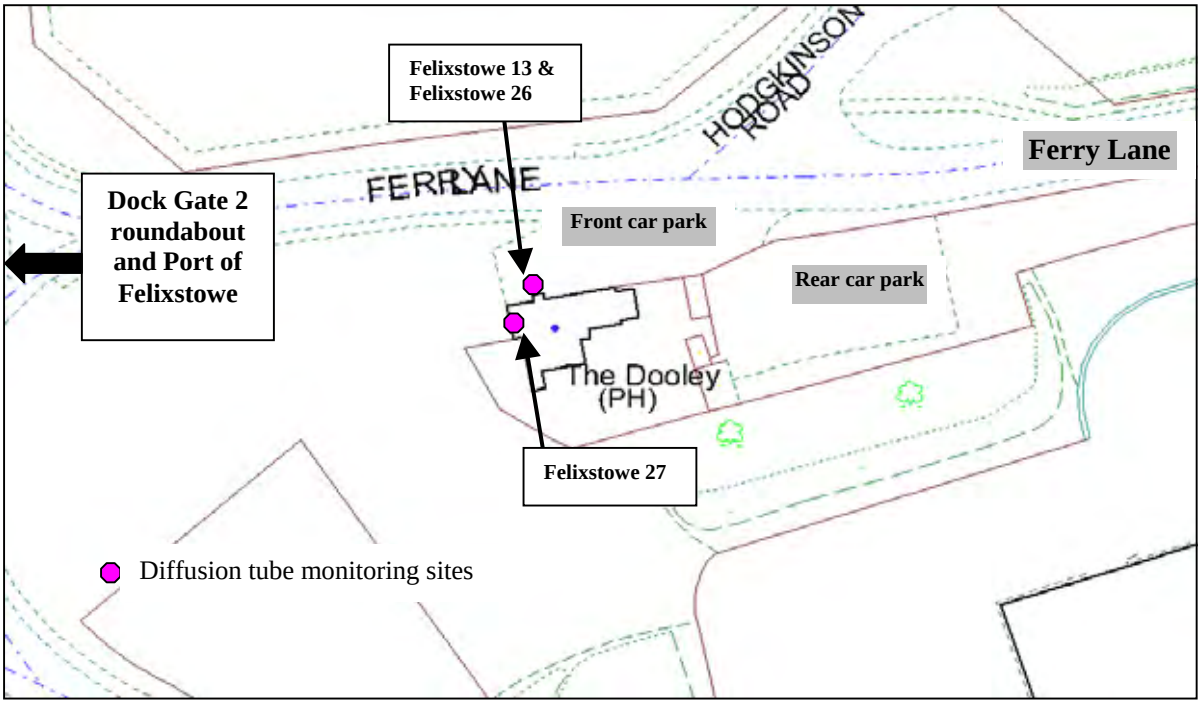
Table 11.1 Bias corrected annual mean NO_2 concentrations recorded at sites in Felixstowe in 2003, 2004 and 2005, figures in micrograms per cubic metre ($\mu g/m^3$)

Site and location	Annual mean NO_2 concentration ($\mu g/m^3$) 2003	Annual mean NO_2 concentration ($\mu g/m^3$) 2004	Annual mean NO_2 concentration ($\mu g/m^3$) 2005
Felixstowe 4 – Lynwood Avenue	24.7	25.4	23.6
Felixstowe 12 – Hamilton Road	33.8	34.0	33.3
Felixstowe 13 – Ferry Lane (ground floor)	**40.9**	**46.5**	**45.2**
Felixstowe 14 – Adastral Close	34.9	39.1	**41.7**
Felixstowe 17 – Spriteshall Lane	~	28.2	32.1
Felixstowe 18 – Kirton Road	~	32.6	33.3
Felixstowe 19 – Welbeck Close	~	25.9	29.1
Felixstowe 20 – Glemsford Close	~	~	28.5
Felixstowe 21 – Kings Fleet Road	~	~	30.0
Felixstowe 22 – Levington Road	~	~	27.2
Felixstowe 23 – Heathgate Piece	~	~	35.4
Felixstowe 24 – Brandon Road	~	~	32.1
Felixstowe 25 –Rendlesham Road	~	~	29.6
Felixstowe 26 – Ferry Lane (first floor)	~	~	**43.3**
Felixstowe 27 – Ferry Lane (first floor)	~	~	**40.4**
Felixstowe 28 – Blyford Way	~	~	29.2

The results in Table 11.1 show 4 sites (highlighted in grey) with an annual mean concentration above the objective of 40 μg/m^3 in 2005 – Felixstowe 13, 14, 26 and 27. Results for site Felixstowe 13 were also above the annual mean objective in 2003 and 2004.

Felixstowe 13, 26 and 27 are all on located the Dooley Inn Public House in Ferry Lane, Felixstowe and are shown on Map 11.1 below. There is a difference in the concentrations recorded at each location. The highest concentration of 45.2 μg/m^3 is recorded at the historic site Felixstowe 13 which is located at the ground floor level of the building in the front car parking area of the pub. Felixstowe 26 is located directly above Felixstowe 13 at first floor level (the receptor location) and has a lower concentration of 43.3 μg/m^3. This indicates that our concerns regarding emissions from vehicles parked close to the diffusion tubes at Felixstowe 13 raising the ambient concentrations may be correct. The site on the side of the building facing the Port of Felixstowe (Felixstowe 27) has the lowest concentration of NO_2 at 40.4 μg/m^3, only slightly above the annual mean objective of 40μg/m^3.

Map 11.1 Site map showing the location of NO_2 diffusion tubes at The Dooley Inn Public House, Ferry Lane, Felixstowe

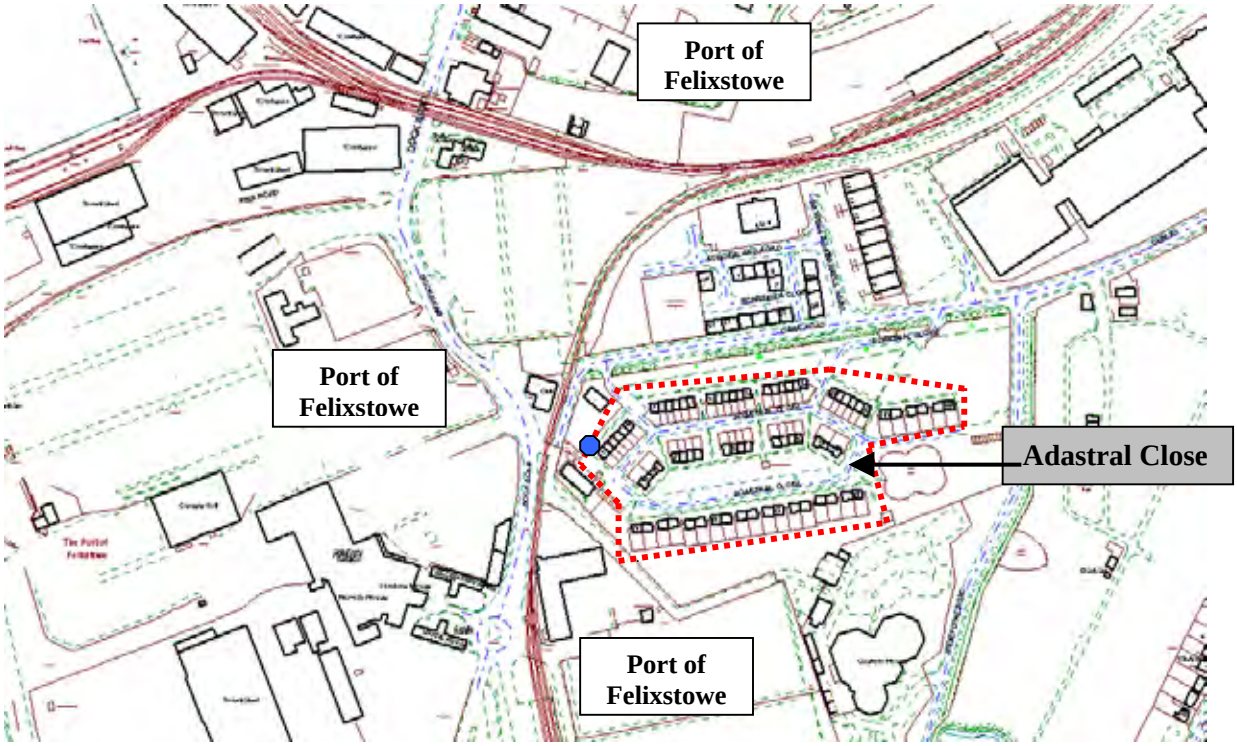


Not to scale

N

Felixstowe 14 is located in Adastral Close, which is in close proximity to the Port of Felixstowe boundary, the site location is detailed on Map 11.2 overleaf. The site has an annual mean NO_2 concentration of 41.7 μg/m^3 in 2005. NO_2 concentrations at this site have risen since 2003, and 2005 is the first year that the site has shown levels above the annual mean objective.

Map 11.2 Site map showing the location of Adastral Close in relation to the Port of Felixstowe and the current NO_2 diffusion tube monitoring site



Not to scale

N

Diffusion tube monitoring site

Adastral Close – area of domestic housing

11.3 Detailed Assessment requirements for NO_2, SO_2 and PM_{10}

In order to undertake the Detailed Assessment requirements for all three pollutants, the Council made an application under the Air Quality Grant Programme 2006/2007 in March 2006. The grant bid was successful and money has been secured to enable us to complete a Detailed Assessment for all three pollutants, as follows:

- Purchase of a continuous analyser for oxides of nitrogen (NO_x) to be sited at the Dooley Inn Public House, Ferry Lane, Felixstowe to provide 12 months of monitoring data. The equipment has been ordered and contracts put in place for service and maintenance and quality assurance/quality control. The exact location of the equipment at the pub is still to be agreed with the site owners and the monitoring will begin in January 2007 to provide a full calendar year of monitoring data. Diffusion tubes will be collocated with the analyser in order to provide bias correction to all Felixstowe diffusion tube sites. This will enable the Council to determine if the air quality objectives are being exceeded at the Dooley Inn Public House and whether declaration of an Air Quality Management Area at this site is necessary.

- Purchase of a 12-month data set for NO_2, SO_2 and PM_{10} at a suitable location near to the Port of Felixstowe boundary. This data set will be used to verify the output of detailed air dispersion modelling to be undertaken for emissions from the Port of Felixstowe and the A14, outlined below. The monitoring is likely to be undertaken at Adastral Close, Felixstowe if permission can be obtained for siting of the equipment and the location is deemed suitable by the consultants employed to undertake the monitoring. This will enable data to be collected at the closest receptor locations to the Port of Felixstowe boundary and will provide detailed information following the exceedance of the annual mean NO_2 objective indicated by the diffusion tube site in 2005. A number of additional diffusion tube monitoring sites will be located within Adastral Close to provide information regarding the extent of any objective exceedances. A contract has been put in place to provide the 12-month data set and the monitoring will begin in January 2007 in order to provide a full calendar year of data to coincide with the monitoring undertaken at the Dooley Inn Public House.

- Purchase of air dispersion modelling to assess concentrations of NO_2, SO_2 and PM_{10} at receptor locations close to the Port of Felixstowe boundary and along the A14 trunk road. The modelling will look at the current situation and also provide future predictions with Felixstowe South Reconfiguration and Bathside Bay Container Port developments in place. The modelling will include emissions from all activities on and associated with the Port of Felixstowe and the results from the continuous monitoring, as outlined above, will enable verification of the modelling outputs. A contract has been put in place for the modelling and liaison with the Port of Felixstowe to enable data collection has begun.

As the Detailed Assessment findings will not be available until 2008 the Council has already approached and begun to work with the Port of Felixstowe on an informal basis. The Port has already begun to look at emissions from different pieces of equipment on the site and investigate possible ways to try and reduce them where possible. They have an Environmental Group, which looks at many issues relating to the Port and its activities, and they will be considering emission reductions as part of their remit. The Port has a number of schemes planned for the future which will assist in emission reduction from a number of different sources, and the Council will be following the implementation of each of the schemes. The Port has also recently appointed an Environmental Manager who will form the main point of contact with the Council. In addition, the Council has representatives on a group set up to consider the Felixstowe South Reconfiguration development as it begins.

12. Summary and Recommendations

This Updating and Screening Assessment of air quality within the Suffolk Coastal district considers the present and likely future quality of air against the standards and objectives in the Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002. The pollutants considered in this assessment are carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide, sulphur dioxide and particulate matter (PM_{10}). The assessment begins the third round of Local Air Quality Management review and assessments, under Part IV of the Environment Act 1995.

The aim of this Updating and Screening Assessment is to identify those matters that have changed since the first round of review and assessment was finished, and which may now require further assessment. Where the Updating and Screening Assessment identifies a risk that an air quality objective will be exceeded at a location with relevant public exposure, the authority is then required to undertake a Detailed Assessment, to identify with reasonable certainty whether or not a likely exceedance will occur.

The first round of review and assessment for Suffolk Coastal concluded that the Air Quality Objectives for all seven pollutants would be met within the Suffolk Coastal district and no AQMAs were declared. The second round of review and assessment concluded that the risk of exceedance of the Air Quality Objectives for benzene, 1,3-butadiene, lead and carbon monoxide is unlikely, and no further assessment is necessary. For NO_2, SO_2 and PM_{10} the review and assessment concluded that there was a potential risk of the air quality objectives being exceeded. Further investigation was required to assess emissions of NO_2 from traffic using the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge (Woodbridge junction), and emissions of NO_2, SO_2 and PM_{10} from activities on and associated with the Port of Felixstowe.

In September 2005 a Detailed Assessment report was produced for the Woodbridge junction which concluded that the annual mean objective for NO_2 is likely to be exceeded at two receptor locations. On 3 April 2006 an Air Quality Management Area Order made by Suffolk Coastal District Council for the Woodbridge junction on 3 March 2006 came into effect. A Further Assessment is now being undertaken for the junction which must be completed within 12 months of the AQMA declaration. A working group has been established to look at all possible solutions to decrease the NO_2 concentrations in the AQMA and at the junction in general. Once the options have been investigated the draft Action Plan will be drawn up and fully consulted upon in order to obtain public opinion before the final version is submitted to Defra.

This Updating and Screening Assessment for the Suffolk Coastal district has determined that the risk of exceedance of the Air Quality Objectives for carbon monoxide, benzene, 1,3-butadiene and lead is unlikely, and no further assessment will be necessary

This Updating and Screening Assessment for the Suffolk Coastal district has determined that for NO_2, SO_2 and PM_{10} there is a potential risk of emissions from activities on and associated with the Port of Felixstowe causing exceedance of the air quality objectives at receptor locations. A Detailed Assessment will be undertaken to investigate these emissions, as follows:

- A continuous analyser for oxides of nitrogen (NO_x) will be sited at the Dooley Inn Public House, Ferry Lane, Felixstowe to provide 12 months of monitoring data beginning in January 2007. Diffusion tubes will be collocated with the analyser in order to provide bias correction to all Felixstowe diffusion tube sites. This will enable the Council to determine if the air quality objectives are being exceeded at the Dooley Inn Public House and whether declaration of an Air Quality Management Area at this site is necessary.

- A 12-month data set for NO_2, SO_2 and PM_{10} will be obtained at a suitable location near to the Port of Felixstowe boundary using continuous monitoring equipment. The monitoring will begin in

January 2007 in order to provide a full calendar year of data. The monitoring is likely to be undertaken at Adastral Close, Felixstowe which will enable data to be collected at the closest receptor locations to the Port of Felixstowe boundary and provide detailed information following the exceedance of the annual mean NO_2 objective indicated by the diffusion tube site in 2005. A number of additional diffusion tube monitoring sites will be located within Adastral Close to provide information regarding the extent of any objective exceedances.

- Air dispersion modelling will be used to assess concentrations of NO_2, SO_2 and PM_{10} at receptor locations close to the Port of Felixstowe boundary and along the A14 trunk road. The modelling will look at the current situation and also provide future predictions with Felixstowe South Reconfiguration and Bathside Bay Container Port developments in place. The modelling will include emissions from all activities on and associated with the Port of Felixstowe and the results from the continuous monitoring, as outlined above, will enable verification of the modelling outputs.

13. References

1. *Environment Act 1995*, Chapter 25. HMSO, 1997.

2. *Air Quality Regulations 1997* – S.I 1997, No 3043. HMSO, 1997.

3. *Air Quality (England) Regulations 2000* – S.I 2000, No 928. HMSO, 2000.

4. *Air Quality (England) Amendment Regulations 2002* – S.I 2002, No. 3043. HMSO, 2002.

5. *Pollution Prevention and Control (England & Wales) Regulations 2000* – S.I 2000, No. 1973. HMSO, 2000.

6. *Pollution Prevention and Control (England & Wales) (Amendment) Regulations 2001* – S.I 2001, No. 503. HMSO, 2001.

7. *Part IV of the Environment Act 1995, Local Air Quality Management, Technical Guidance. LAQM.TG(03).* Report by the Department of Environment, Food and Rural Affairs, Scottish Executive, National Assembly for Wales and the Department of the Environment in Northern Ireland. Defra Publications, February 2003

8. *Part IV of the Environment Act 1995, Local Air Quality Management, Technical Guidance. LAQM.TG(03) update (January 2006).* Guidance update provided by the Department of Environment, Food and Rural Affairs, Scottish Executive, National Assembly for Wales and the Department of the Environment in Northern Ireland. Defra Publications, January 2006.

9. *Part IV of the Environment Act 1995, Local Air Quality Management, Policy Guidance. LAQM.PG(03).* Report by the Department of Environment, Food and Rural Affairs, Scottish Executive, National Assembly for Wales and the Department of the Environment in Northern Ireland. Defra Publications, February 2003.

10. *Report on the Updating and Screening Assessment of Air Quality in the Suffolk Coastal District.* Produced by Suffolk Coastal District Council, June 2003.

11. *Report on the Detailed Assessment and Continued Updating and Screening Assessment of Air Quality in the Suffolk Coastal District.* Produced by Suffolk Coastal District Council, March 2004.

12. *Progress Report – Air Quality in the Suffolk Coastal District.* Produced by Suffolk Coastal District Council, May 2005.

13. *Suffolk Coastal District Council website* – all air quality reports produced by Suffolk Coastal District Council are at http://www.suffolkcoastal.gov.uk/yourdistrict/envprotection/airquality

14. *National Air Quality Information Archive* – information from which can be viewed at www.airquality.co.uk/archive/laqm/tools.php. Defra.

15. *Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, Air Quality.* Report by the Highways Agency, Scottish Executive Development Department, Welsh Assembly Government and the Department for Regional Development Northern Ireland. HMSO, February 2003.

16. *Port of Felixstowe website.* Information provided on the Port of Felixstowe including news updates can be viewed at http://www.portoffelixstowe.co.uk

17. *The Planning Inspectorate website.* Information relating to the Public Inquiry for Felixstowe South Reconfiguration planning application, including all documents submitted as part of the Inquiry can be viewed at http://www.planning-inspectorate.gov.uk/felixstowe/index.htm

18. *The Planning Inspectorate website*. Information relating to the Public Inquiry for The Bathside Bay Container Terminal planning application, including all documents submitted as part of the Inquiry can be viewed at http://www.planning-inspectorate.gov.uk/bathsidebay

Appendix A

Processes regulated under the Pollution Prevention and Control (England and Wales) Regulations 2000 (as amended) within the Suffolk Coastal district

Table A-1 List of processes regulated under the Pollution Prevention and Control (England and Wales) Regulations 2000 (as amended) within the Suffolk Coastal district, and indication of whether they are classed as a potentially significant emitter of any pollutant specified in LAQM.TG(03).

Table A-1 **List of processes regulated under the Pollution Prevention and Control (England and Wales) Regulations 2000 (as amended) within the Suffolk Coastal district, and indication of whether they are classed as a potentially significant emitter of any pollutant specified in LAQM.TG(03).**

Name and address of authorised process	Authority issuing authorisation (Public Register file reference – where applicable)	Grid reference for process	Installation Activity and Section number under which process is authorised	Process description	Pollutants (if any) for which this process is a potentially significant emitter, as specified in LAQM.TG(03) **
Linstead Garage Linstead Parva	Suffolk Coastal District Council (EPA 01)	63339 27782	Combustion Activity Section 1.1	Waste Oil Burner; less than 0.4MW	~
Samkin of Saxmundham Ltd Chantry Road, Saxmundham	Suffolk Coastal District Council (EPA 02)	63846 26301	Combustion Activity Section 1.1	Waste Oil Burner; less than 0.4MW	~
Standard Bait Co. Ltd Oak Hill, Bramfield	Suffolk Coastal District Council (EPA 03)	63955 27551	Treatment of Animal and Vegetable Matter Section 6.8	Maggot Breeding	~
Bridge Garage Charsfield	Suffolk Coastal District Council (EPA 05)	62642 25609	Combustion Activity Section 1.1	Waste Oil Burner; less than 0.4MW	~
Cemex Materials UK (Eastern) Sinks Pit, Kesgrave	Suffolk Coastal District Council (EPA 07)	62288 24636	Production of Cement and Lime Section 3.1	The blending of cement in bulk	~
Cemex Materials UK (Eastern) Theberton Airfield, Leiston	Suffolk Coastal District Council (EPA 08)	64134 26438	Production of Cement and Lime Section 3.1	The blending of cement in bulk	~
RMC Aggregates (Eastern Counties) Ltd – Trading as Local Aggregates Sinks Pit, Kesgrave	Suffolk Coastal District Council (EPA 11)	62276 24639	Other Mineral Activities Section 3.5	Coating of road stone with tar or bitumen	**PM_{10}**
The Paddocks Hacheston	Suffolk Coastal District Council (EPA 13)	63075 25945	Combustion Activity Section 1.1	Waste Oil Burner; less than 0.4MW	~
Calor Gas Ltd Felixstowe Terminal, Dock Road, Felixstowe	Suffolk Coastal District Council (EPA 31)	62858 23347	Gasification, Liquefaction and Refining Activities Section 1.2	Odourising Natural Gas	~
RE & FM Desborough Church Farm, Wenhaston	Suffolk Coastal District Council (EPA 33)	64208 27526	Other Mineral Activities Section 3.5	Crushing, grinding or size reduction of bricks, tiles or concrete (mobile)	~

Name and address of authorised process	Authority issuing authorisation (Public Register file reference – where applicable)	Grid reference for process	Installation Activity and Section number under which process is authorised	Process description	Pollutants (if any) for which this process is a potentially significant emitter, as specified in LAQM.TG(03) **
Brett Concrete Ltd Foxhall Four Quarry, Foxhall Road, Brightwell	Suffolk Coastal District Council (EPA 34)	62433 24367	Production of Cement and Lime Section 3.1	The blending of cement in bulk	~
The Garage Church Road, Dallinghoo	Suffolk Coastal District Council (EPA 36)	62642 25495	Combustion Activity Section 1.1	Waste Oil Burner; less than 0.4MW	~
Shell Garage A12 Northbound (Woodbridge), 715 Grove Road, Woodbridge	Suffolk Coastal District Council (EPA 38)	62598 24951	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
Shell Garage A12 Southbound (Woodbridge) 805 Grove Road, Woodbridge	Suffolk Coastal District Council (EPA 39)	62605 24950	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
Haynings Service Station Saxmundham Road, Framlingham	Suffolk Coastal District Council (EPA 40)	62885 26349	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
CDC Demolition Ltd Chapel Works, Waldringfield	Suffolk Coastal District Council (EPA 41)	62741 24380	Other Mineral Activities Section 3.5	Crushing, grinding or size reduction of bricks, tiles or concrete (mobile)	~
WM Morrisons Plc Grange Farm Avenue, Cavendish Park Estate, Felixstowe	Suffolk Coastal District Council (EPA 42)	62863 23477	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
Solar Garage High Road West, Felixstowe	Suffolk Coastal District Council (EPA 44)	63034 23520	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
Sainsbury's Supermarkets Ltd Felixstowe Road, Purdis Farm	Suffolk Coastal District Council (EPA 45)	62015 24235	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
Martlesham Heath Services Service Area, Anson Road, Martlesham Heath	Suffolk Coastal District Council (EPA 47)	62466 24586	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
Felixstowe Dock Service Area Anzani Avenue, Felixstowe	Suffolk Coastal District Council (EPA 49)	62798 23451	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~

Name and address of authorised process	Authority issuing authorisation (Public Register file reference – where applicable)	Grid reference for process	Installation Activity and Section number under which process is authorised	Process description	Pollutants (if any) for which this process is a potentially significant emitter, as specified in LAQM.TG(03) **
Tesco Stores Ltd Anson Road, Martlesham Heath	Suffolk Coastal District Council (EPA 50)	62473 24592	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
Stratford Service Station A12 Main Road, Stratford St Andrew	Suffolk Coastal District Council (EPA 52)	63578 26007	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
L. B. Shotter & Sons Waterloo Avenue, Leiston	Suffolk Coastal District Council (EPA 55)	64377 26260	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
R. C. Edmundson (Woodbridge Ltd) Melton Road, Melton	Suffolk Coastal District Council (EPA 56)	62785 24987	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
A. G. Potter Ltd. Station Road, Framlingham	Suffolk Coastal District Council (EPA 58)	62852 26285	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
Mr. M. Ladd, Vehicle Surgeon Grundisburgh Road, Hasketon	Suffolk Coastal District Council (EPA 59)	62420 25002	Combustion Activity Section 1.1	Waste Oil Burner; less than 0.4MW	~
Smith & Wesby (Sax) Limited Service Station, Main Road, A12, Darsham	Suffolk Coastal District Council (EPA 62)	64061 26980	Gasification, Liquefaction and Refining Activities Section 1.2	Unloading of petrol into storage tanks at a Service Station	~
Brett Concrete Limited Waldringfield Quarry, Martlesham Heath	Suffolk Coastal District Council (PPC 01)	62568 24485	Production of Cement and Lime Section 3.1	The blending of cement in bulk	~
VAS Autoservices Ltd 3/4 Quayside, Woodbridge	Suffolk Coastal District Council (PPC 02)	62759 24892	Combustion Activity Section 1.1	Waste Oil Burner; less than 0.4MW	~
Fleet Vehicle Garage H.M.Prison & Y.O.I., Hollesley Bay	Suffolk Coastal District Council (PPC 03)	63677 24498	Combustion Activity Section 1.1	Waste Oil Burner; less than 0.4MW	~
Ro-Truck Limited 6 Hodgkinson Road, Felixstowe	Suffolk Coastal District Council (PPC 04)	62810 23446	Combustion Activity Section 1.1	Waste Oil Burner; less than 0.4MW	~

Name and address of authorised process	Authority issuing authorisation (Public Register file reference – where applicable)	Grid reference for process	Installation Activity and Section number under which process is authorised	Process description	Pollutants (if any) for which this process is a potentially significant emitter, as specified in LAQM.TG(03) **
Nationwide Crash Repair Centres Ltd. 29 Gloster Road, Martlesham Heath	Suffolk Coastal District Council (PPC 05)	62481 24562	Coating Activity Section 6.4	Respraying of Road Vehicles	~
Whitemountain Roadstone Ltd Foxhall Four Quarry, Foxhall Road Brightwell	Suffolk Coastal District Council (PPC 06)	62446 24375	Other Mineral Activities Section 3.5	Coating of road stone with tar or bitumen	**PM_{10}**
William C Reade of Aldeburgh Ltd. Aldeburgh Brickworks, Saxmundham Road, Aldeburgh	Suffolk Coastal District Council (IPPC 01)	64510 25705	Ceramic Production Section 3.6 A2	Manufacturing bricks etc. by firing in kilns	~
British Energy Generation Ltd Sizewell B Power Station, Leiston	Environment Agency (EPA 30)	64736 26397	Combustion Activity Section 1.1	Part A1activity (Essential Supplies Diesel Generators on site)	**Carbon monoxide, benzene, 1,3-butadiene, lead, NOx, SO_2, PM_{10}**
British Energy Generation Ltd Sizewell B Power Station, Leiston	Environment Agency (EPA 30)	64736 26397	Combustion Activity Section 1.1	Part A1activity (Auxiliary boilers on site)	**SO_2** **PM_{10}**
British Energy Generation Ltd Sizewell B Power Station, Leiston	Environment Agency (EPA 22)	64736 26397	Disposal of non-hazardous waste by Incineration Section 5.1	Part A1activity (Incinerator on site)	~
Viridor Waste Management Foxhall Landfill Site, Foxhall Road, Brightwell	Environment Agency (IPPC 03)	62399 24390	Disposal of Waste by Landfill Section 5.2	Part A1 activity	**~**
Brett Aggregates Ltd Waldringfield Quarry, Martlesham Heath	Environment Agency (IPPC 04)	62619 24475	Disposal of Waste by Landfill Section 5.2	Part A1 activity	~

****** **The Technical Guidance LAQM.TG(03) advises that a process is only classed as a significant emitter of SO_2 if it burns coal or heavy fuel oil.**

Appendix B

Monthly and annual mean nitrogen dioxide (NO_2) concentrations in air recorded by diffusion tubes at sites in Felixstowe, Kesgrave, Woodbridge, and Melton in 2005.

Figure B-1

Information regarding NO_2 diffusion tubes, including analyst laboratory details and site descriptions for diffusion tube locations.

Analyst laboratory details and general NO_2 diffusion tube information

Local monitoring of monthly concentrations of NO_2 has been undertaken at a large number of locations within the Suffolk Coastal district since March 1993. This Updating and Screening Assessment Report provides an update on data collected in 2005. Monitoring for NO_2 was conducted using Palmes passive diffusion tubes, with an absorbent of 50% triethanloamine (TEA) in acetone, which were exposed on a monthly basis. The analytical laboratory used for supply and analysis of diffusion tubes was Harwell Scientifics. The laboratory is formally accredited for analysis of NO_2 diffusion tubes under the United Kingdom Accreditation Scheme (UKAS). Harwell Scientifics participate in the Workplace Analysis Scheme for Proficiency (WASP) for analysis of diffusion tubes. This is an inter laboratory comparison study for analysing spiked diffusion tubes and the results show Harwell Scientifics as a Category 'Good' laboratory.

Site descriptions for diffusion tube locations.

Diffusion tubes were located at numerous sites to assess concentrations of NO_2 from road traffic, industrial emissions and background concentrations for these areas. Monthly and annual mean NO_2 concentrations were recorded at each site. In order to provide a reasonable estimate of the annual mean concentration at a monitoring site, concentrations for at least 6 months of the year are needed, therefore, the annual means have not been presented where there are less than 6 months of data.

There are eight 'site types', as defined in LAQM.TG(03), for diffusion tube monitoring. Several of these 'site types' were located within the Suffolk Coastal district during 2005. Definitions for each site type located within the Suffolk Coastal district are as follows;

- **Urban background site** – an urban location distanced from sources and therefore broadly representative of city-wide background conditions, e.g. urban residential areas.
- **Roadside site** – a site sampling between 1 metre of the kerbside of a busy road and the back of the pavement. Typically this will be within 5 metres of the road, but could be up to 15 metres.
- **Kerbside site** – a site sampling within 1 metre of the kerb of a busy road.
- **Industrial site** – an area where industrial sources make an important contribution to the total pollution burden.

All diffusion tubes were sited using the following local siting criteria, outlined in LAQM.TG(03); tubes were located in an open setting in relation to any surrounding buildings; the tubes were open to the sky immediately above with no overhanging trees or buildings; and the tubes were located at a height of between 1.4 and 4 metres. A more specific site description for each location is detailed below and maps showing diffusion tube locations are in Appendix C of this report.

Felixstowe and the Trimleys (FLX)

FLX 4 – Urban background site located to provide background concentrations of NO_2 for comparison with other sites in Felixstowe. Sited on a lamp-post in Lynwood Avenue, a quiet residential street located approximately 140 metres from the nearest busy road.

FLX 12 – Roadside site to record NO_2 concentrations derived from road traffic emissions on Hamilton Road in Felixstowe. This is a busy high street in Felixstowe often with very slow moving traffic due to congestion. Hamilton Road is fairly wide, there are shops with residential flats above them along either side of the road which are set back approximately 5 metres from the kerb. Site is near the junction with York Road on a shop front approximately 5 metres from the kerb, located at relevant receptor.

FLX 13 a, b & c – Industrial / Roadside site to record NO_2 concentrations derived from emissions at the Port of Felixstowe together with emissions from vehicles entering and exiting the Port of Felixstowe at Dock Gate 2 roundabout. This is one of the closest relevant receptor locations to the Port of Felixstowe and is close to one of the major site entrances for Port traffic. The Port of Felixstowe has a number of potential sources of NO_2 emissions, the main one being heavy goods vehicles, with other potential emissions from shipping, and on site equipment and activities. Triplicate site located on at The Dooley Inn Public House, the upstairs of which is residential. Site is approximately 100 metres from boundary of the Port of Felixstowe at Dock Gate 2, and 72 metres from the kerbside of Dock Gate 2 roundabout.

FLX 14 a, b & c – Industrial site to record NO_2 concentrations derived from emissions at the Port of Felixstowe at another of the nearest relevant receptor locations. The Port of Felixstowe has a number of potential sources of NO_2 emissions, the main one being heavy goods vehicles using the Port with other potential emissions from shipping, and on site equipment and activities. Triplicate site located on a residential property in Adastral Close, approximately 40 metres from the Port of Felixstowe boundary.

FLX 17 a, b & c – Roadside site, a new site in 2004 set up to record NO_2 concentrations derived from road traffic emissions on the A14 trunk road at the Dock Spur roundabout. The traffic using this road is predicted to increase in the future due to development of the Port of Felixstowe, this site will provide current information on concentrations of NO_2 before the traffic increases begin. Triplicate site located on the closest residential property to the roundabout in Spriteshall Lane, Trimley St. Mary, approximately 31 metres from the kerb.

FLX 18 a, b & c - Roadside site, a new site in 2004 set up to record NO_2 concentrations derived from road traffic emissions on the A14 trunk road. The traffic using this road is predicted to increase in the future due to development of the Port of Felixstowe, this site will provide current information on concentrations of NO_2 before the traffic increases begin. Triplicate site located on a lamp-post adjacent to, and at the same distance as, the closest residential property to the kerb in Kirton Road, Trimley St. Martin, approximately 23 metres from the kerb.

FLX 19 - Urban background site, a new site in 2004 set up to provide background concentrations of NO_2 for comparison with concentrations recorded at above the roadside sites monitoring A14 road traffic emissions. Sited on a lamp-post in Welbeck Close, Trimley St Mary, a quiet residential street located approximately 140 metres from the nearest busy road.

FLX 20 – Industrial / Roadside site, a new site in 2005 set up to record NO_2 concentrations derived from emissions at the Port of Felixstowe at a housing estate close to the A14 trunk Road / Port of Felixstowe Road and Dock Gate 1, one of the main site entrances. The Port of Felixstowe has a number of potential sources of NO_2 emissions, the main one being heavy goods vehicles using the Port with other potential emissions from shipping, and on site equipment and activities. The traffic using this road is predicted to increase in the future due to development of the Port of Felixstowe. This site will provide current information on concentrations of NO_2 before the traffic increases begin. Sited in rear garden of one of the closest residential properties on this housing estate to the Port of Felixstowe boundary in Glemsford Close, Felixstowe approximately 200 metres from the boundary of the Port of Felixstowe near Dock Gate 1.

FLX 21 – Urban Background site, a new site in 2005 set up to provide background concentrations of NO_2 for comparison with concentrations recorded close to the A14 trunk road and the Port of Felixstowe boundary. Sited on a lamp-post in Kings Fleet Road, Felixstowe a quiet residential street located approximately 190 metres from the nearest busy road.

FLX 22 – Industrial site, a new site in 2005 set up to record NO_2 concentrations derived NO_2 from emissions at the Port of Felixstowe to the East of the site. This site will provide current information on concentrations of NO_2 in this locality before the Port expansion begins. Sited on drainpipe of residential property in Levington Road, Felixstowe approximately 50 metres from the boundary of the Port of Felixstowe. Site is also only 27 metres from the South rail line serving the Port.

FLX 23 a & b – Roadside site, a new site in 2005 set up to record NO_2 concentrations derived from road traffic emissions on the A14 trunk road in Trimley St. Mary. The traffic using this road is predicted to increase in the future due to development of the Port of Felixstowe, this site will provide current information on concentrations of NO_2 before the traffic increases begin. Duplicate site located on the rear of the closest residential property to the A14 trunk road at this location in Heathgate Piece, Trimley St. Mary, approximately 25 metres from the kerb.

FLX 24 – Roadside site, a new site in 2005 set up to record NO_2 concentrations derived from road traffic emissions on the A14 trunk road / Port of Felixstowe Road at the end of the exit slip road for Dock Gate 2. At this location the A14 trunk road is at a higher level than the houses and the exit road at a lower level than the houses. The traffic using these roads is predicted to increase in the future due to development of the Port of Felixstowe, this site will provide current information on concentrations of NO_2 before the traffic increases begin. Located on the rear of the closest residential property to the A14 trunk road and the Dock Gate 2 exit at this location in Brandon Road, Felixstowe, approximately 52 metres from the A14 and 32 metres from the exit road.

FLX 25 - Roadside site, a new site in 2005 set up to record NO_2 concentrations derived from road traffic emissions on the A14 trunk road / Port of Felixstowe Road at one of the closest residential properties to the kerbside. At this location properties are elevated above the A14. The traffic using this road is predicted to increase in the future due to development of the Port of Felixstowe, this site will provide current information on concentrations of NO_2 before the traffic increases begin. Located on the side of the closest residential property to the A14 / Port of Felixstowe Road in Rendlesham Road, Felixstowe, approximately 23 metres from the kerbside.

FLX 26 – Industrial / Roadside site, to provide additional information regarding NO_2 concentrations at The Dooley Inn Public House (FLX 13). Single site located on the same drainpipe as Felixstowe 13 but at the height of the first floor windows of the building. This site is elevated away from the direct exhaust emissions of cars using the car park at the very front of the building and at the height of the residential part of the building.

FLX 27 – Industrial / Roadside site, to provide additional information regarding NO_2 concentrations at The Dooley Inn Public House (FLX 13). Single site located on the south-west side of the building away from the car park at the front of the pub, facing towards the Port of Felixstowe and Dock Gate 2 roundabout, and at the height of the first floor windows of the building - the residential part of the building.

FLX 28 – Roadside site, a new site in 2005 set up to record NO_2 concentrations derived from road traffic emissions on the A14 trunk road / Port of Felixstowe Road at the start of the exit slip road for Dock Gate 2. At this location the A14 trunk road is at a higher level than the houses and the exit road at the same level as the houses. The traffic using these roads is predicted to increase in the future due to development of the Port of Felixstowe, this site will provide current information on concentrations of NO_2 before the traffic increases begin. Located on the closest residential property to the A14 trunk road and the Dock Gate 2 exit at this location in Blyford Way, Felixstowe, approximately 70 metres from the A14 and 38 metres from the exit road.

Kesgrave (KSG)

KSG 1 – Roadside site to record NO_2 concentrations derived from road traffic emissions on the A1214 at Kesgrave. Sited opposite Kesgrave High School on a lamp-post 3 metres from the kerb. At this point the A1214 is fairly open, with domestic houses set back 15-20 metres from the kerb along one side of the road and the High School set back approximately 40 metres from the kerb on the other side.

KSG 4 – Urban background site located to provide background concentrations of NO_2 for comparison with other sites in Kesgrave. Sited on a drainpipe within Kesgrave High School and located approximately 65 metres from the A1214.

KSG 6 – Roadside site to record NO_2 concentrations derived from road traffic emissions on the A1214 in Kesgrave near the junction with Bell Lane. This section of the A1214 is approximately 125 metres from the junction with Bell Lane, which is controlled by traffic lights, it experiences stationary traffic queuing at peak times and is fairly narrow with a mix of domestic houses and retail outlets along either side. Site located on a drainpipe of The Bell Inn Public House, the closest receptor on this side of the A1214, 2.6 m from kerb.

KSG 9 – Roadside site, to record NO_2 concentrations derived from road traffic emissions on the A1214 in Kesgrave near the junction with Bell Lane. This section of the A1214 is approximately 125 metres from the junction with Bell Lane, which is controlled by traffic lights, it experiences stationary traffic queuing at peak times and is fairly narrow with a mix of domestic houses and retail outlets along either side. Site located on the opposite side of the road to KSG 6, on a lamp-post 1-2 metres from the kerb. The closest residential property on this side of the road is approximately 2 metres from the kerb.

Woodbridge (WBG)

WBG 1 a, b & c - Kerbside site to record NO_2 concentrations derived from road traffic emissions at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge. This junction is controlled by traffic lights and is characterised by standing traffic on all arms at peak times. The junction has a mix of residential properties and retail shops. Triplicate site on the drainpipe of a shop which has a residential flat above it, in Thoroughfare near Sun Lane, approximately 1 metre from the kerb and 14 metres from the traffic lights at the junction. This area of the junction is very narrow and enclosed by tall buildings, creating a canyon effect.

WBG 3 - Urban background site located to provide background concentrations of NO_2 for comparison with the roadside sites at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge. Sited on a lamp-post in Kingston Farm Road, a quiet residential street approximately 100 metres from any busy roads.

WBG 5 a, b & c - Roadside site to record NO_2 concentrations derived from road traffic emissions at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge. This junction is described above. Triplicate site on the drainpipe of a residential home in Lime Kiln Quay Road, approximately 2-3 metres of the kerb. Site parallel with the traffic lights in Thoroughfare, on the corner building of the junction, area is more open in character.

WBG 6 – Roadside site to record NO_2 concentrations derived from road traffic emissions at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge. This junction is described above. Sited on the drainpipe of a residential receptor location, in Thoroughfare near Sun Lane, approximately 2 metres from the kerb and 9 metres from WBG 1, towards the traffic lights. This area of the junction is very narrow and enclosed by tall buildings, creating a canyon effect.

WBG 8 – Roadside site to record NO_2 concentrations derived from road traffic emissions at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge. This junction is described above. Sited on the drainpipe of a residential receptor location, approximately 3 metres from the kerb on Thoroughfare going away from the junction itself past Sun Lane, approximately 38 metres from the traffic lights and 21 metres from WBG 1. This area of the junction is still narrow and enclosed by tall buildings, creating a canyon effect. Traffic regularly queues up to and past this location.

WBG 10 – Roadside site to record NO_2 concentrations derived from road traffic emissions at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge. This junction is described above. Sited on a signpost in St John's Street approximately 2 metres from the kerb, the same distance as the closest receptor location. Site is approximately 12 metres from the traffic lights at the junction. This area of the junction is also narrow with queuing traffic up to and beyond this point at most times.

WBG 13 – Roadside site to record NO_2 concentrations derived from road traffic emissions at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge. This junction is described above. Sited on traffic lights at the junction itself, at the boundary of a residential property garden in Thoroughfare, approximately 2-3 metres from the kerb. This area of the junction is more open and the traffic usually free flowing as it is on the junction itself.

WBG 15 – Roadside site, a new site in 2004 to record NO_2 concentrations derived from road traffic emissions at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge. This junction is described above. This is a triplicate site located on the inlet of an automatic NO_x analyser and provides a collocation study at this junction. Sited on the first floor guttering of a residential receptor location, in Thoroughfare near Sun Lane, approximately 2 metres from the kerb and 14 metres from WBG 1, towards the traffic lights. This area of the junction is very narrow and enclosed by tall buildings, creating a canyon effect.

Melton (MEL)

MEL 2 – Urban background site located to provide background concentrations of NO_2 for comparison with the roadside site at the junction of the A1152 and B1438 in Melton. Sited on the drainpipe of a residential building in Hall Farm Road, a quiet residential street approximately 430 metres from the junction and 350 metres from any other busy roads.

MEL 5 a, b & c - Roadside site to record NO_2 concentrations derived from road traffic emissions at the junction of the A1152 and B1438 in Melton. This junction is controlled by traffic lights, and all arms of the junction experience traffic queues at peak times. The junction has domestic housing and a primary school located on it. Triplicate site located at the closest receptor location to the junction, on the garden boundary of a domestic property 3.9 metres from the kerb.

Figure B-2

Bias adjustment calculations for diffusion tube data recorded in 2005

Diffusion tubes can under or over read and the technical guidance (LAQM.TG(03)) recommends that, where possible, local authorities should verify their nitrogen dioxide diffusion tubes by collocating them with a continuous analyser to ascertain a correction factor for any inaccuracies. This process in known as ratification or bias adjustment of the diffusion tube data and will increase the accuracy of the results. Further advice posted on the Review and Assessment Helpdesk website (www.uwe.ac.uk/aqm/review) recommends that in many situations local authorities should use the combined results of a number of collocation studies, so as to minimise the uncertainty associated with any single study. To assist with this, an inventory of bias adjustment factors has been compiled by Air Quality Consultants Limited (on behalf of Defra and the Devolved Administrations) and is published on the Review and Assessment Helpdesk website. A combined bias adjustment factor can be obtained for a particular analyst laboratory in a specified year by using this inventory.

Three diffusion tubes were co-located with an automatic chemiluminesence NO_x analyser, sited in Woodbridge, from January to December 2005. The collocated diffusion tubes were at site Woodbridge 15, see Figure B-1, and Table B-3 in this appendix for site description and monitoring results, and Map C-5 in Appendix C for site location. Details regarding the automatic analyser and diffusion tubes are provided in the main body of this report.

In order to calculate a bias correction factor for diffusion tubes collocated with the automatic NO_x analyser a 12-month data set (4 January 2005 to 3 January 2006) was produced in line with the exposure periods of the diffusion tubes each month. A summary of the data collected by the automatic analyser and the diffusion tubes is shown in the table below.

Data used for diffusion tube bias adjustment from automatic NO_x analyser and triplicate collocated diffusion tube site in Woodbridge, 4 January 2005 to 3 January 2006.

	Diffusion tube monthly mean for Woodbridge 15 a, b & c (µg/m^3) *	**Continuous NO_x analyser period mean**	**Data capture of continuous NO_x analyser**
Jan	47	32	99.6 %
Feb	47	36	96.9 %
Mar	55	45	95.3 %
Apr	44	51	99.3 %
May	44	39	99.2 %
Jun	43	40	99.3 %
Jul	33	39	99.3 %
Aug	40	41	96.8 %
Sep	41	46	99.3 %
Oct	53	42	99.1 %
Nov	51	50	98.8 %
Dec	48	50	99.2 %
Average	**46**	**43**	**98.5 %**

***** Monthly results for each of the diffusion tubes can also be seen in Table B-3 later in this Appendix.

From the above table it can be seen that the diffusion tubes exposed at this site recorded an average NO_2 concentration of 46 $\mu g/m^3$ over the 12-month period in 2005. Over the same time period the continuous analyser recorded an average NO_2 concentration of 43 $\mu g/m^3$.

The diffusion tube bias adjustment factor was calculated as stated in box 6.4 of the technical guidance LAQM.TG(03) as follows:

Annual mean continuous analyser concentration ÷ Annual mean diffusion tube concentration

Therefore: 43 $\mu g/m^3$ ÷ 46 $\mu g/m^3$ = **0.93**

The bias adjustment factor for the analyst laboratory, Harwell Scientifics, was obtained from the Review and Assessment Helpdesk website inventory (as outlined above) for comparison purposes. The inventory bias adjustment factor used the results from 10 other local authority collocation studies and was 0.93, the same as that obtained from our local collocation study.

The diffusion tube bias adjustment factor used for 2005 was therefore 0.93, and results from all diffusion tube sites were multiplied by this adjustment factor to correct for the over read of the diffusion tubes. Bias adjustment of annual mean results for each diffusion tube site is shown in tables B-1 to B-4 later in this appendix.

Table B-1 **Monthly and annual mean nitrogen dioxide (NO_2) concentrations recorded at sites in Felixstowe during 2005, figures in micrograms per cubic metre ($\mu g/m^3$). Annual mean concentration ratified where relevant to correct for diffusion tube bias.**

Site	Time in months												Annual mean ($\mu g/m^3$)	Ratification of annual mean using bias correction factor ($\mu g/m^3$) (x 0.93) #
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
FLX 4	32.7	30.8	37.9	24.4	15.9	17.7	18.0	20.8	24.4	30.2	no data	26.1	**25.4**	**23.6**
FLX 12	31.1	41.9	45.4	34.9	21.4	30.2	24.6	33.7	36.7	38.3	46.5	45.3	**35.8**	**33.3**
FLX 13a	62.6	53.6	53.4	49.1	38.3	45.1	43.5	39.7	40.3	46.1	54.6	51.9	See FLX 13 mean	n/a
FLX 13b	60.2	46.4	55.6	50.2	44.8	42.3	37.7	46.3	52.4	50.2	59.9	54.2	See FLX 13 mean	n/a
FLX 13c	58.8	47.7	57.2	44.2	40.2	41.2	28.7	43.4	44.6	57.4	58.1	51.4	See FLX 13 mean	n/a
FLX 13 a,b,c – mean	60.5	49.2	55.4	47.8	41.1	42.9	36.6	43.1	45.8	51.2	57.5	52.5	**48.6**	**45.2**
FLX 14a	56.7	49.1	53.7	46.2	33.1	33.5	no data	46.2	38.6	35.6	78.2	43.3	See FLX 14 mean	n/a
FLX 14b	64.8	53.3	58.0	41.6	42.8	32.6	31.2	38.7	34.0	35.3	no data	50.4	See FLX 14 mean	n/a
FLX 14c	49.8	46.2	45.7	39.2	31.8	30.4	24.3	34.8	42.0	38.8	68.4	63.7	See FLX 14 mean	n/a
FLX 14 a,b,c - mean	57.1	49.5	52.5	42.3	35.9	32.2	27.8	39.9	38.2	36.6	73.3	52.5	**44.8**	**41.7**
FLX 17a	37.1	37.9	43.9	32.3	27.3	34.3	20.4	29.5	26.6	44.0	42.2	40.1	See FLX 17 mean	n/a
FLX 17b	No data	37.1	46.7	35.8	25.3	34.4	18.6	29.9	29.1	42.4	no data	32.8	See FLX 17 mean	n/a
FLX 17c	39.2	31.7	44.7	38.8	27.6	31.5	22.7	25.4	31.9	40.8	no data	37.2	See FLX 17 mean	n/a
FLX 17 a,b,c - mean	38.2	35.6	45.1	35.6	26.7	33.4	20.6	28.3	29.2	42.4	42.2	36.7	**34.5**	**32.1**
FLX 18a	40.2	35.9	33.7	29.9	27.7	21.2	24.2	23.8	27.2	46.7	51.5	42.6	See FLX 18 mean	n/a
FLX 18b	45.3	34.7	42.9	39.3	37.2	17.9	17.7	31.9	37.9	50.8	no data	43.1	See FLX 18 mean	n/a
FLX 18c	41.8	33.6	45.8	29.5	31.1	30.0	24.0	25.9	33.3	48.1	46.6	45.0	See FLX 18 mean	n/a
FLX 18 a,b,c - mean	42.4	34.7	40.8	32.9	32.0	23.0	22.0	27.2	32.8	48.5	49.1	43.6	**35.8**	**33.3**
FLX 19	39.8	37.5	41.2	30.2	21.2	20.3	18.1	27.3	27.8	42.0	no data	38.8	**31.3**	**29.1**
FLX 20	no data	29.0	39.7	31.2	23.6	22.1	20.9	25.7	31.0	33.2	42.5	37.6	**30.6**	**28.5**
FLX 21	43.6	33.9	42.2	33.7	21.3	19.8	20.9	18.9	25.7	34.5	43.4	44.5	**31.9**	**30.0**
FLX 22	36.1	29.9	37.0	27.1	22.0	22.5	18.8	27.2	30.0	29.7	no data	41.1	**29.2**	**27.2**
FLX 23a	41.9	44.3	45.3	38.4	34.6	41.3	24.7	35.4	37.6	41.9	40.6	40.4	See FLX 23 mean	n/a
FLX 23b	~	~	~	35.7	26.5	36.7	no data	33.0	38.0	45.7	no data	35.9	See FLX 23 mean	n/a
FLX 23 a,b - mean	41.9	44.3	45.3	37.1	30.6	39.0	24.7	34.2	37.8	43.8	40.6	38.2	**38.1**	**35.4**
FLX 24a	no data	46.2	24.2	36.3	29.1	18.7	30.9	36.5	42.3	37.1	50.8	37.8	See FLX 24 mean	n/a
FLX 24b	~	~	~	34.8	27.3	25.5	19.4	29.2	35.2	42.0	no data	34.6	See FLX 24 mean	n/a
FLX 24 a,b - mean	no data	46.2	24.2	35.6	28.2	22.1	25.2	32.9	38.8	39.6	50.8	36.2	**34.5**	**32.1**
FLX 25	~	38.6	22.0	35.3	21.1	27.3	25.0	29.0	38.7	40.2	45.4	27.6	**31.8**	**29.6**
FLX 26	~	~	~	48.1	39.3	42.9	41.0	41.9	51.3	51.2	no data	57.4	**46.6**	**43.3**
FLX 27	~	47.9	50.0	42.8	40.2	37.5	30.1	40.4	38.9	46.2	52.7	50.7	**43.4**	**40.4**
FLX 28	~	~	~	32.2	27.9	29.4	24.4	28.1	34.4	32.4	no data	42.7	**31.4**	**29.2**

Key to table on next page

Key:			
	FLX 4	Urban background site	Lamp-post outside 37 Lynwood Avenue, Felixstowe
	FLX 12	Roadside site	Drainpipe at 119 Hamilton Road, 'Ford bros. Bike Shop', Felixstowe.
	FLX 13 a, b & c	Industrial / Roadside site	Drainpipe on The Dooley Inn Public House, Ferry Lane, Felixstowe **(triplicate site).**
	FLX 14 a, b & c	Industrial site	Drainpipe on 1 Adastral Close, Felixstowe **(triplicate site).**
	FLX 17 a, b & c	Roadside site	Drainpipe on 38 Spriteshall Lane, Trimley St. Mary **(triplicate site).**
	FLX 18 a, b & c	Roadside site	Lamp-post at 67 Kirton Road, Trimley St. Martin **(triplicate site).**
	FLX 19	Urban background site	Lamp-post at 4 Welbeck Close, Trimley St. Mary.
	FLX 20	Industrial / Roadside site	Rear garden of 73 Glemsford Close, Felixstowe. **New site from January 2005.**
	FLX 21	Urban background site	Lamp-post at 4 Kings Fleet Road, Felixstowe. **New site from January 2005.**
	FLX 22	Industrial site	Drainpipe on 13 Levington Road, Felixstowe. **New site from January 2005.**
	FLX 23 a & b	Roadside site	Drainpipe on 23 Heathgate Piece, Trimley St. Mary. **New site from January 2005 (duplicate site).**
	FLX 24 a & b	Roadside site	Rear garden of 22 Brandon Road, Felixstowe. **New site from January 2005 (duplicate site).**
	FLX 25	Roadside site	Drainpipe on 46 Rendlesham Road, Felixstowe. **New site from February 2005.**
	FLX 26	Industrial / Roadside site	First floor window over front car park at The Dooley Inn, Ferry Lane, Felixstowe. **New site from April 2005.**
	FLX 27	Industrial / Roadside site	First floor front window facing the Docks at The Dooley Inn, Ferry Lane, Felixstowe. **New site from February 2005.**
	FLX 28	Roadside site	Rear garden of 63 Blyford Way, Felixstowe. **New site from April 2005.**

Diffusion tube annual mean is ratified to improve accuracy. The bias adjustment factor for the diffusion tubes must either be obtained from the analyst laboratory or calculated from a collocation study with a continuous analyser by the authority themselves. In 2005 a collocation study was undertaken by Suffolk Coastal District Council using results from a continuous NO_x analyser located at a site in Woodbridge. The bias correction factor for 2005 was calculated, from this study, as 0.93 and details are available in Figure B-2 in this appendix. Annual mean diffusion tube concentrations were, therefore, multiplied by a factor of 0.93.

Table B-2 **Monthly and annual mean nitrogen dioxide (NO_2) concentrations recorded at sites in Kesgrave during 2005, figures in micrograms per cubic metre ($\mu g/m^3$). Annual mean concentration ratified where relevant to correct for diffusion tube bias.**

Site	Time in months												Annual mean ($\mu g/m^3$)	Ratification of annual mean using bias correction factor ($\mu g/m^3$) (x 0.93) #
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
KSG 1	32.7	no data	37.2	26.8	18.3	19.6	16.8	23.3	27.9	31.9	39.3	40.3	**28.6**	**26.6**
KSG 4	25.0	25.0	29.3	22.6	no data	14.3	14.1	16.1	23.7	26.1	31.6	31.6	**23.6**	**21.9**
KSG 6	31.4	28.2	37.1	no data	23.2	29.5	21.6	27.2	35.4	35.9	39.0	34.4	**31.2**	**29.0**
KSG 9	36.2	36.8	44.2	35.1	no data	40.6	21.7	28.6	41.4	48.1	no data	43.2	**37.6**	**35.0**

Key:

KSG 1	Roadside site	Roadside lamp-post outside 203 Main Road, Kesgrave
KSG 4	Urban background site	Kesgrave High School, Main Road, Kesgrave
KSG 6	Roadside site	All Saints Church / The Bell Inn, Main Road, Kesgrave.
KSG 9	Roadside site	Roadside lamp-post outside 118 Main Road, Kesgrave.

Diffusion tube annual mean is ratified to improve accuracy. The bias adjustment factor for the diffusion tubes must either be obtained from the analyst laboratory or calculated from a collocation study with a continuous analyser by the authority themselves. In 2005 a collocation study was undertaken by Suffolk Coastal District Council using results from a continuous NO_x analyser located at a site in Woodbridge. The bias correction factor for 2005 was calculated, from this study, as 0.93 and details are available in Figure B-2 in this appendix. Annual mean diffusion tube concentrations were, therefore, multiplied by a factor of 0.93.

Table B-3 **Monthly and annual mean nitrogen dioxide (NO_2) concentrations recorded at sites in Woodbridge during 2005, figures in micrograms per cubic metre ($\mu g/m^3$). Annual mean concentration ratified where relevant to correct for diffusion tube bias.**

Site	Time in months												Annual mean ($\mu g/m^3$)	Ratification of annual mean using bias correction factor ($\mu g/m^3$) (x 0.93) #
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
WBG 1a	56.0	57.1	no data	54.4	48.2	55.3	32.7	no data	no data	62.8	61.7	49.2	See WBG 1 mean	n/a
WBG 1b	53.6	48.5	51.7	45.2	37.7	56.4	46.0	55.2	55.8	51.4	62.5	41.2	See WBG 1 mean	n/a
WBG 1c	55.0	51.5	42.6	49.2	45.8	53.5	49.4	no data	58.5	60.6	60.3	no data	See WBG 1 mean	n/a
WBG 1a,b,c – mean	54.9	52.4	47.2	49.6	43.9	55.1	42.7	55.2	57.2	58.3	61.5	45.2	**51.9**	**48.3**
WBG 3	19.8	20.0	23.4	19.3	no data	no data	12.0	12.2	20.6	28.9	30.1	26.1	**21.2**	**19.7**
WBG 5a	31.8	28.6	37.0	37.2	21.6	36.1	22.3	30.3	40.9	45.4	no data	31.9	See WBG 5 mean	n/a
WBG 5b	38.0	38.1	42.2	33.8	no data	37.8	21.9	28.5	41.0	44.5	38.9	no data	See WBG 5 mean	n/a
WBG 5c	32.5	39.6	35.4	39.8	26.5	33.7	15.7	27.1	39.9	42.6	39.5	36.7	See WBG 5 mean	n/a
WBG 5a,b,c - mean	34.1	35.4	38.2	36.9	24.1	35.9	20.0	28.6	40.6	44.2	39.2	34.3	**34.3**	**31.9**
WBG 6	51.6	51.1	no data	51.5	39.1	53.7	37.0	47.5	52.5	55.4	57.9	56.5	**50.3**	**46.8**
WBG 8	51.5	49.3	57.2	39.1	38.9	44.5	32.1	42.3	44.5	52.8	no data	49.4	**45.6**	**42.4**
WBG 10	35.7	38.2	45.4	36.3	32.5	39.5	27.2	35.3	33.1	50.1	43.7	38.0	**37.9**	**35.2**
WBG 13	40.5	45.8	50.8	39.2	33.4	36.5	29.3	no data	44.3	46.7	no data	44.5	**41.1**	**38.2**
WBG 15a	50.0	39.8	55.5	47.3	68.2	38.7	28.9	41.3	43.9	50.5	48.2	52.6	See WBG 15 mean	n/a
WBG 15b	50.9	50.6	53.5	40.0	32.6	43.5	37.2	no data	28.6	55.7	48.5	42.6	See WBG 15 mean	n/a
WBG 15c	41.1	51.4	55.5	46.0	31.6	46.2	31.5	37.7	50.7	53.8	55.4	49.3	See WBG 15 mean	n/a
WBG 15a,b,c - mean	47.3	47.3	54.8	44.4	44.1	42.8	32.5	39.5	41.1	53.3	50.7	48.2	**45.5**	**42.3**

Key:

WBG 1 a, b & c	Kerbside site	Signpost outside 93 Thoroughfare, Woodbridge **(triplicate site)**
WBG 3	Urban background site	Lamp-post outside 8 Kingston Farm Road, Woodbridge
WBG 5 a, b, & c	Roadside site	Drainpipe on Suffolk Place, Lime Kiln Quay Road, Woodbridge **(triplicate site)**
WBG 6	Roadside site	Drainpipe on 87 Thoroughfare, Woodbridge
WBG 8	Roadside site	Drainpipe on 95 Thoroughfare, Woodbridge
WBG 10	Roadside site	Signpost in St. John's Street (opposite Surgery), Woodbridge
WBG 13	Roadside site	Traffic lights at front of 85 Thoroughfare, Woodbridge.
WBG 15 a, b, & c	Roadside site	Drainpipe on 87 Thoroughfare, Woodbridge **(triplicate site co-located with continuous monitor)**

Diffusion tube annual mean is ratified to improve accuracy. The bias adjustment factor for the diffusion tubes must either be obtained from the analyst laboratory or calculated from a collocation study with a continuous analyser by the authority themselves. In 2005 a collocation study was undertaken by Suffolk Coastal District Council using results from a continuous NO_x analyser located at a site in Woodbridge. The bias correction factor for 2005 was calculated, from this study, as 0.93 and details are available in Figure B-2 in this appendix. Annual mean diffusion tube concentrations were, therefore, multiplied by a factor of 0.93.

Table B-4 **Monthly and annual mean nitrogen dioxide (NO_2) concentrations recorded at sites in Melton during 2005, figures in micrograms per cubic metre ($\mu g/m^3$). Annual mean concentration ratified where relevant to correct for diffusion tube bias.**

Site	Time in months												Annual mean ($\mu g/m^3$)	Ratification of annual mean using bias correction factor ($\mu g/m^3$) (x 0.93) #
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
MEL 2	17.4	18.3	21.4	17.6	8.8	10.4	10.1	11.7	18.9	23.2	22.9	no data	**16.4**	**15.3**
MEL 5a	31.5	34.0	40.0	26.1	24.5	27.0	23.5	26.4	28.9	41.9	44.0	37.6	See MEL5 mean	n/a
MEL 5b	36.7	37.1	no data	29.3	27.5	24.9	22.1	28.2	25.6	42.1	44.3	40.2	See MEL5 mean	n/a
MEL 5c	37.7	33.7	40.4	31.8	26.5	23.0	26.4	21.8	35.4	40.9	42.4	41.7	See MEL5 mean	n/a
MEL 5 a,b,c - mean	35.3	34.9	40.2	29.1	26.2	25.0	24.0	25.5	30.0	41.6	43.6	39.8	**32.9**	**30.6**

Key:

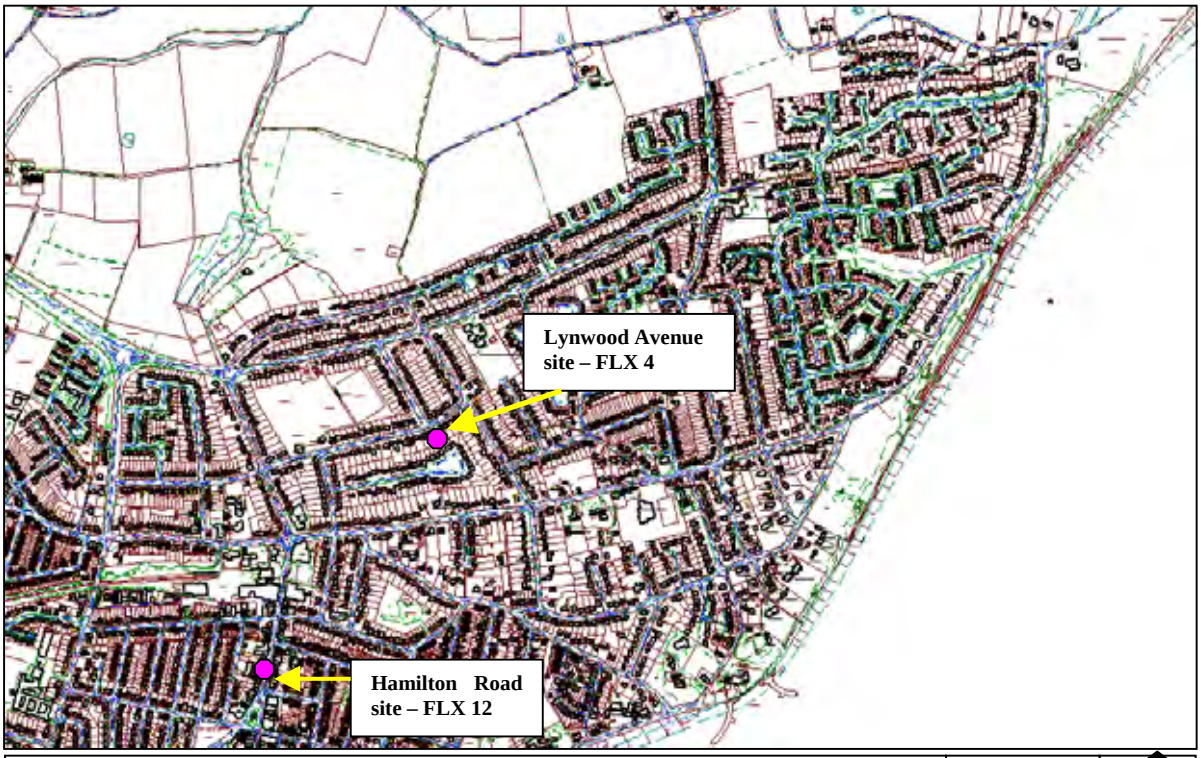
MEL 2	Urban background site	Drainpipe on 106 Hall Farm Road, Melton
MEL 5 a, b, & c	Roadside site	6 The Street, Melton **(triplicate site)**

Diffusion tube annual mean is ratified to improve accuracy. The bias adjustment factor for the diffusion tubes must either be obtained from the analyst laboratory or calculated from a collocation study with a continuous analyser by the authority themselves. In 2005 a collocation study was undertaken by Suffolk Coastal District Council using results from a continuous NO_x analyser located at a site in Woodbridge. The bias correction factor for 2005 was calculated, from this study, as 0.93 and details are available in Figure B-2 in this appendix. Annual mean diffusion tube concentrations were, therefore, multiplied by a factor of 0.93.

Appendix C

Maps detailing the location of nitrogen dioxide diffusion tube monitoring sites within the Suffolk Coastal district, and the automatic NO_x analyser in Woodbridge.

Map C-1 Location of nitrogen dioxide (NO_2) diffusion tubes at Hamilton Road (Roadside site), and Lynwood Avenue (Urban Background site), Felixstowe.

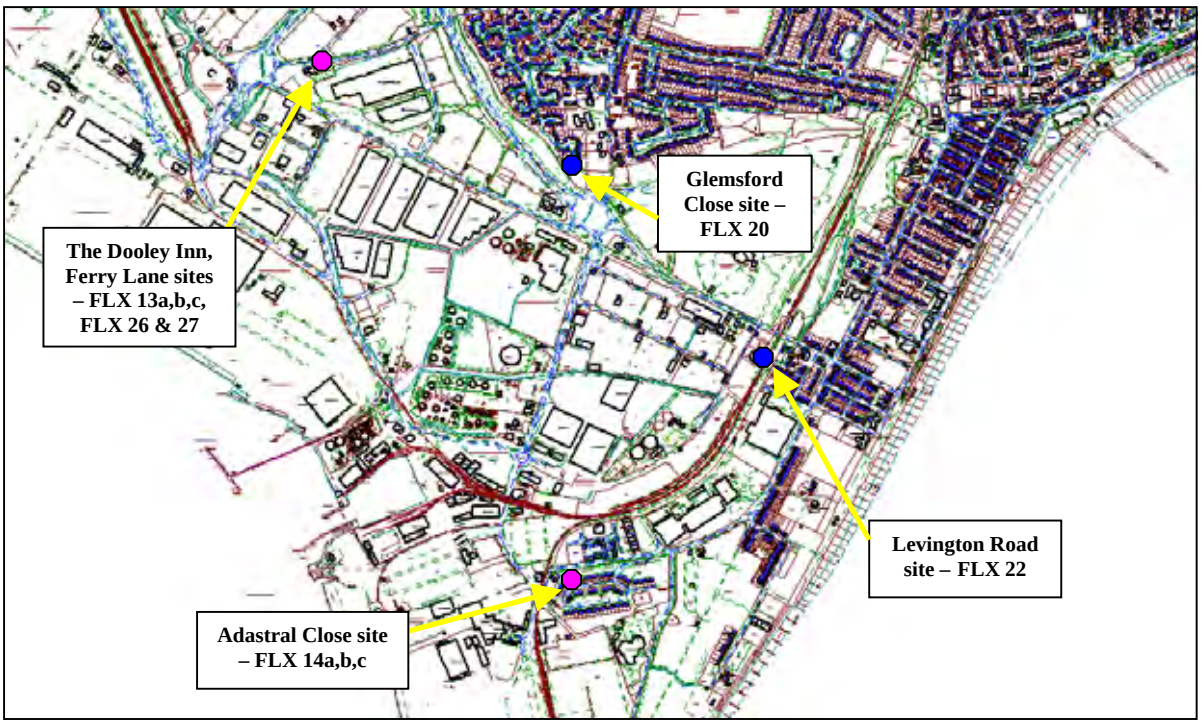


Not to scale

N

● Original sites ● New sites in 2005

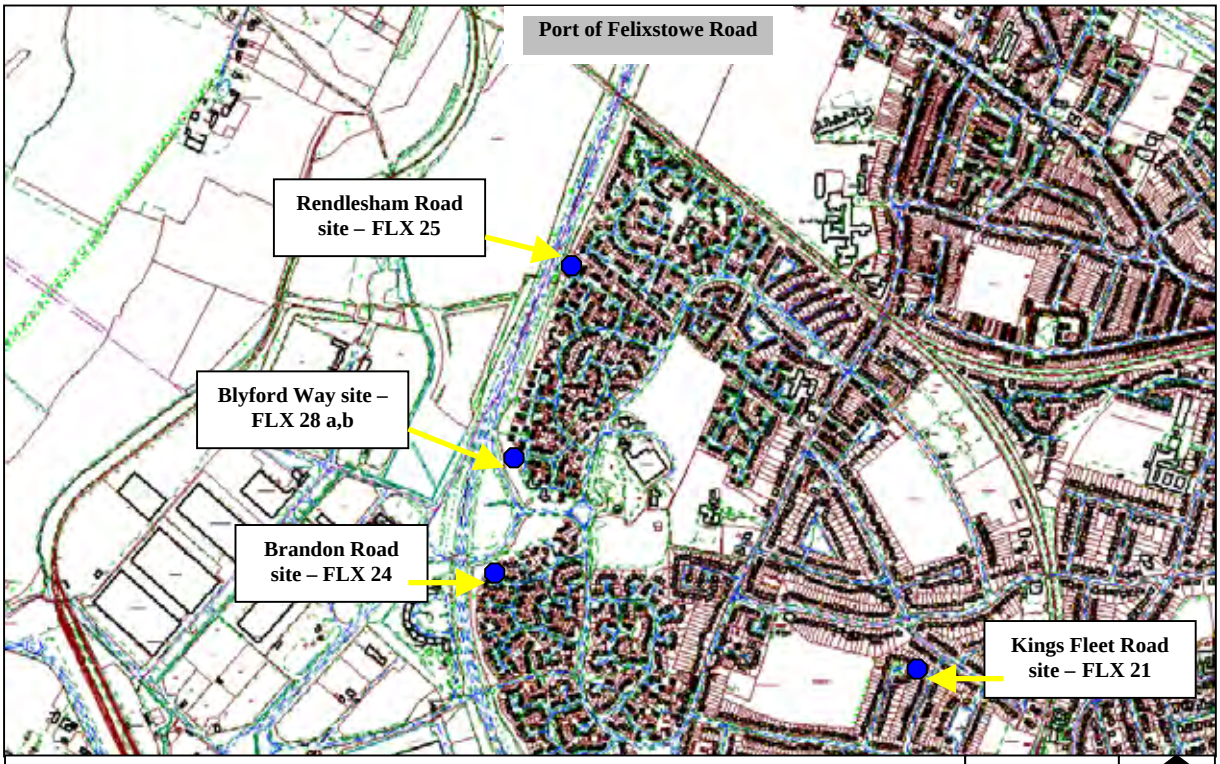
Map C-2 Location of NO_2 diffusion tubes at Ferry Lane (Industrial / Roadside sites), Adastral Close, Levington Road and Glemsford Close (Industrial sites), Felixstowe.



Not to scale

N

Map C-3 Location of NO_2 diffusion tubes at Brandon Road, Rendlesham Road, Blyford Way (Roadside sites) and Kings Fleet Road (Urban Background site), Felixstowe.



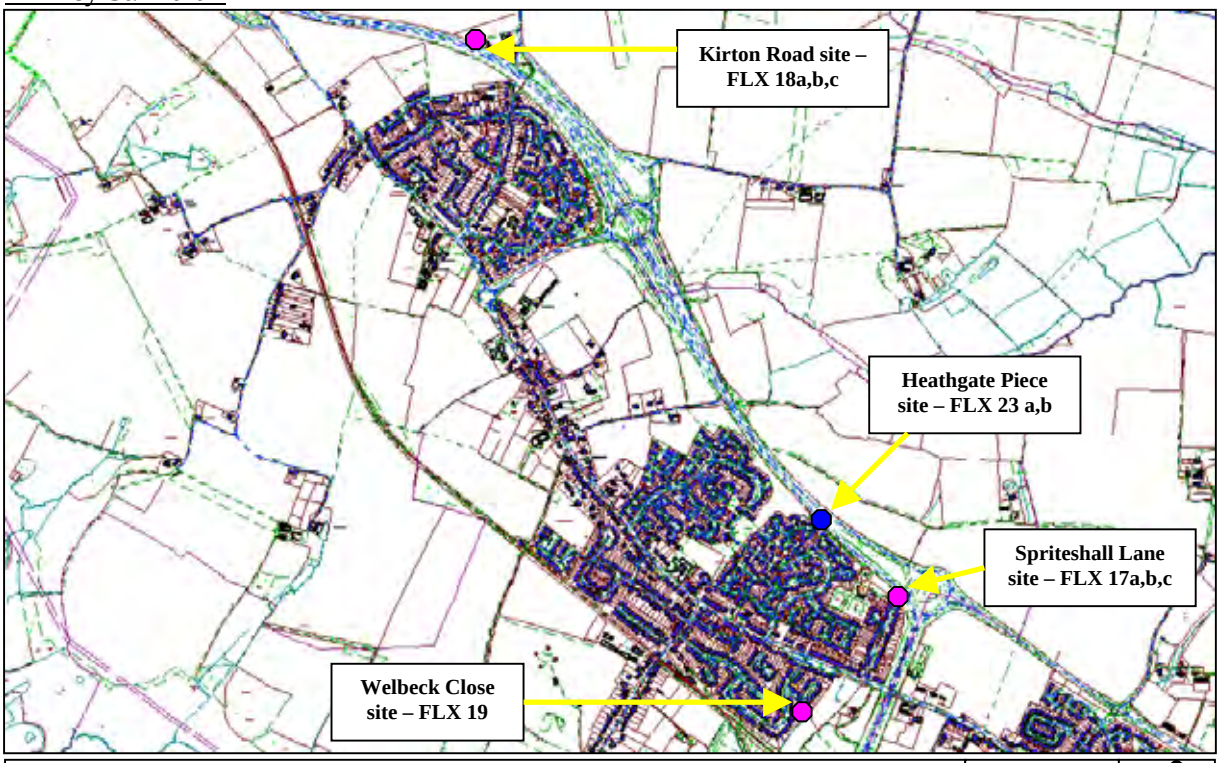
Not to scale

N

Original sites

New sites in 2005

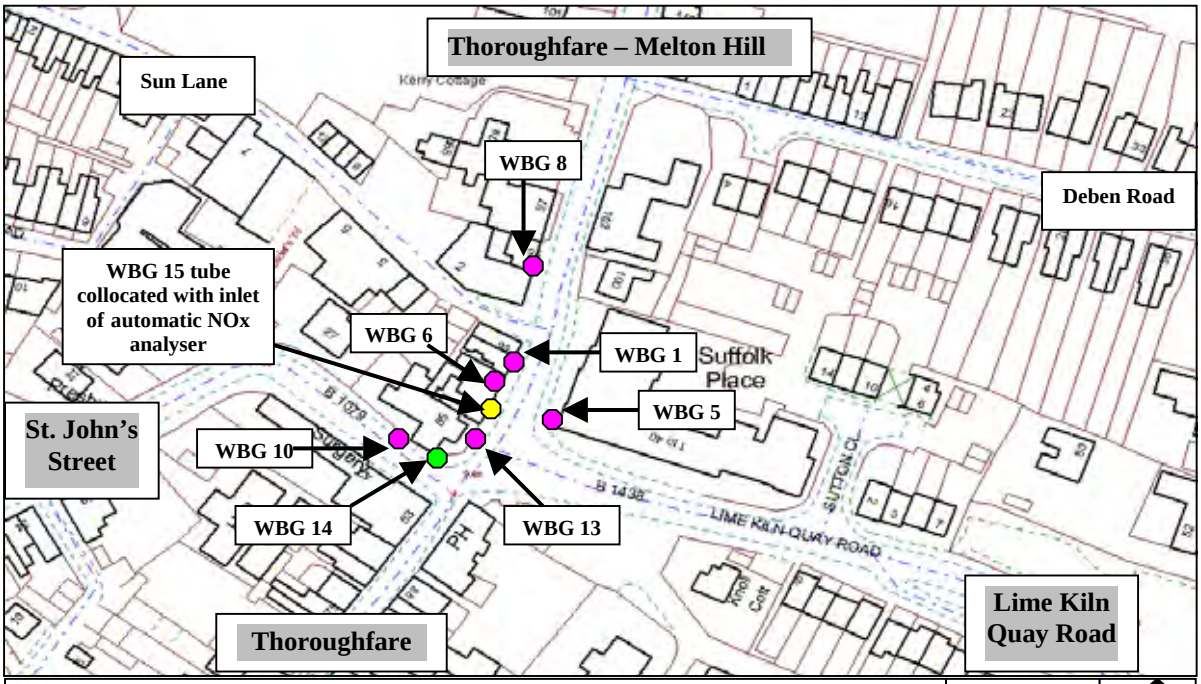
Map C-4 Location of NO_2 diffusion tubes at Spriteshall Lane, Heathgate Piece (Roadside sites) and Welbeck Close (Urban Background site) in Trimley St. Mary, and Kirton Road (Roadside site) in Trimley St. Martin



Not to scale

N

Map C-5 Location of NO_2 diffusion tubes and automatic NO_x analyser sited at the junction of Lime Kiln Quay Road / Thoroughfare / St. John's Street (Kerbside and Roadside sites) in Woodbridge



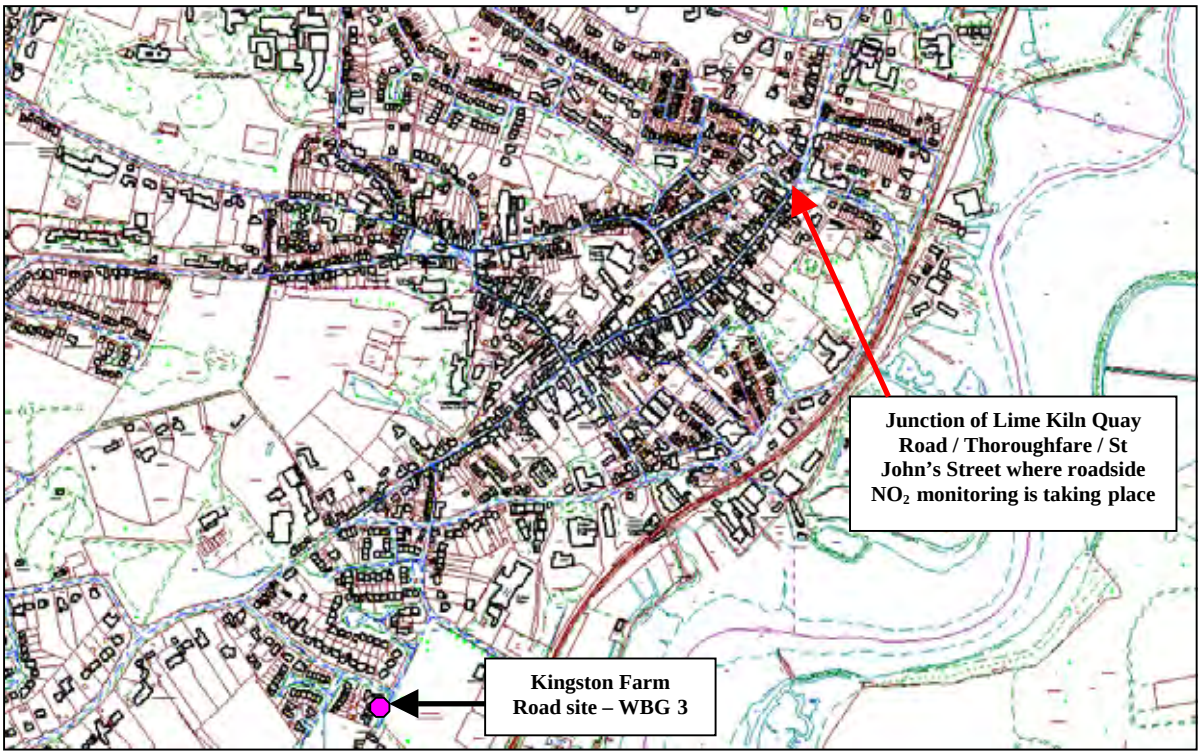
This map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright. Licence No. 100019684. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Not to scale

N

Current sites Site now removed Inlet of automatic NO_x analyser

Map C-6 Location of NO_2 diffusion tube sited at Kingston Farm Road (Urban Background site), Woodbridge.

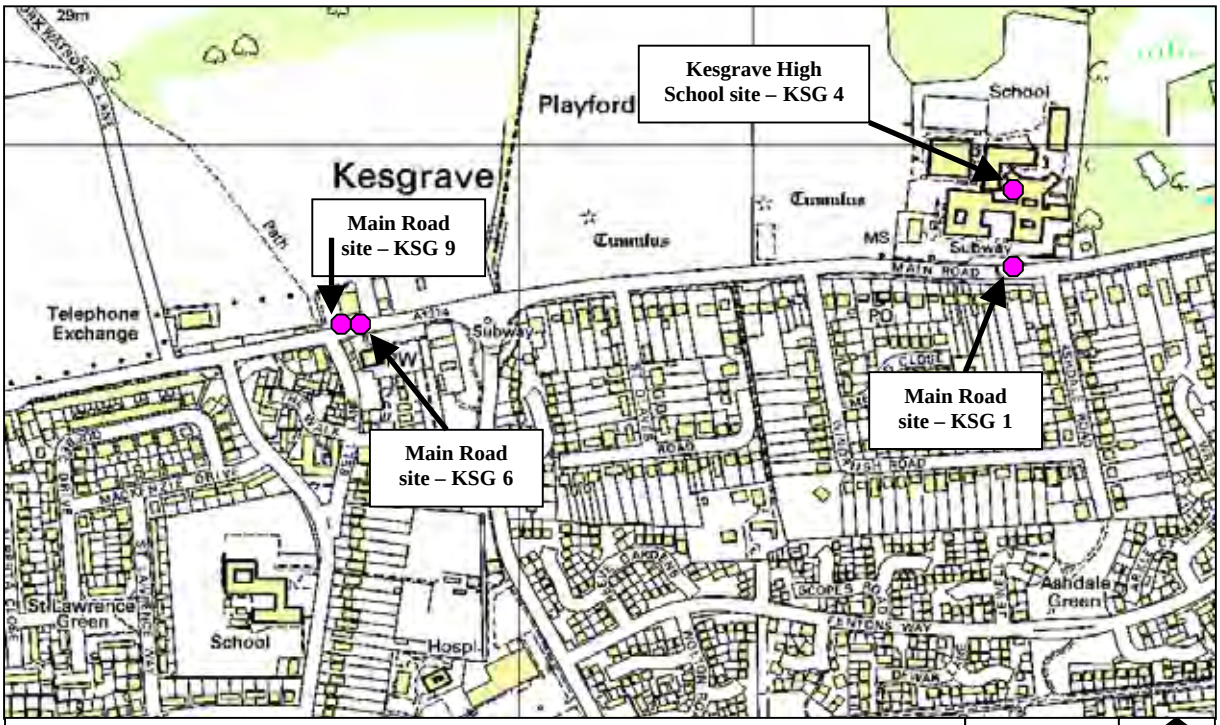


This map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright. Licence No. 100019684. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Not to scale

N

Map C-7 Location of NO_2 diffusion tubes sited at Main Road (Roadside) and Kesgrave High School (Urban Background site), Kesgrave

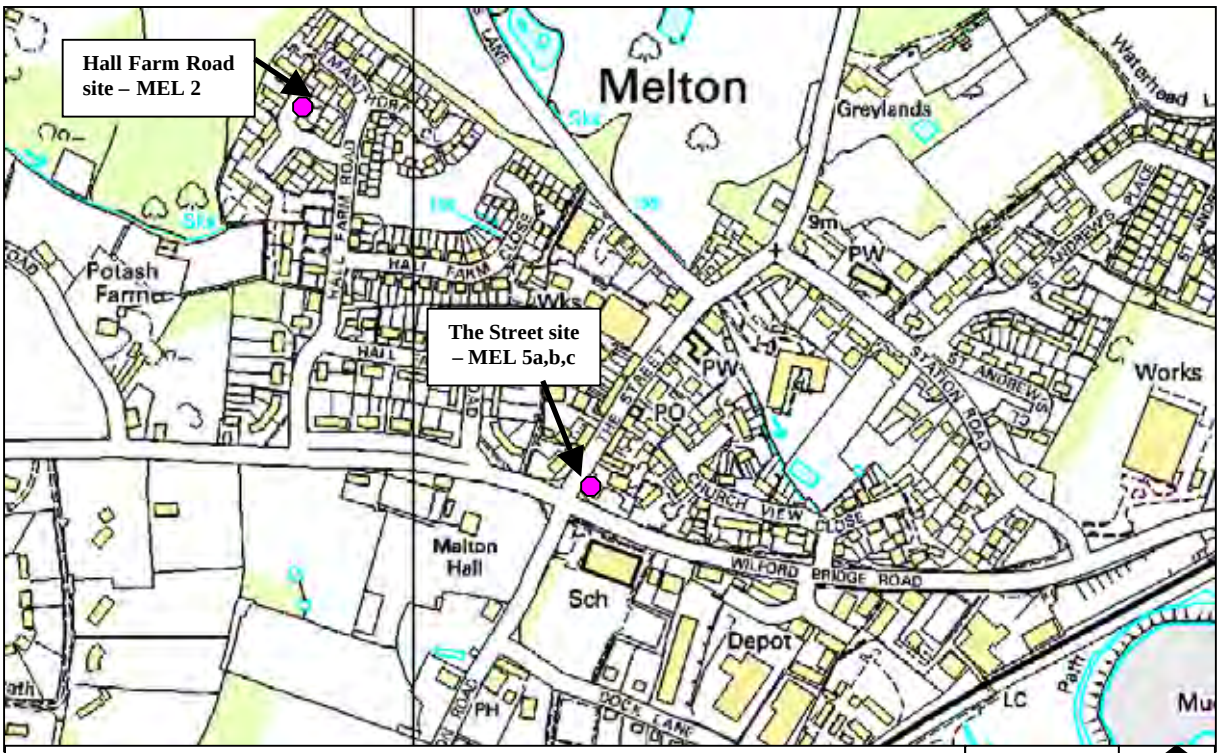


Not to scale

N

● Current sites

Map C-8 Location of NO_2 diffusion tubes sited at the Melton Crossroads (Roadside site) and Hall Farm Road (Urban Background site), Melton



Not to scale

N

Appendix D

Summary and graphical representation of data output from an automatic NO_x analyser, sited at the junction of Lime Kiln Quay Road, The Thoroughfare and St. John's Street in Woodbridge, between 1 January and 31 December 2005.

Produced by netcen on behalf of Suffolk Coastal District Council

SUFFOLK COASTAL WOODBRIDGE
01 January to 31 December 2005

These data have been fully ratified by netcen

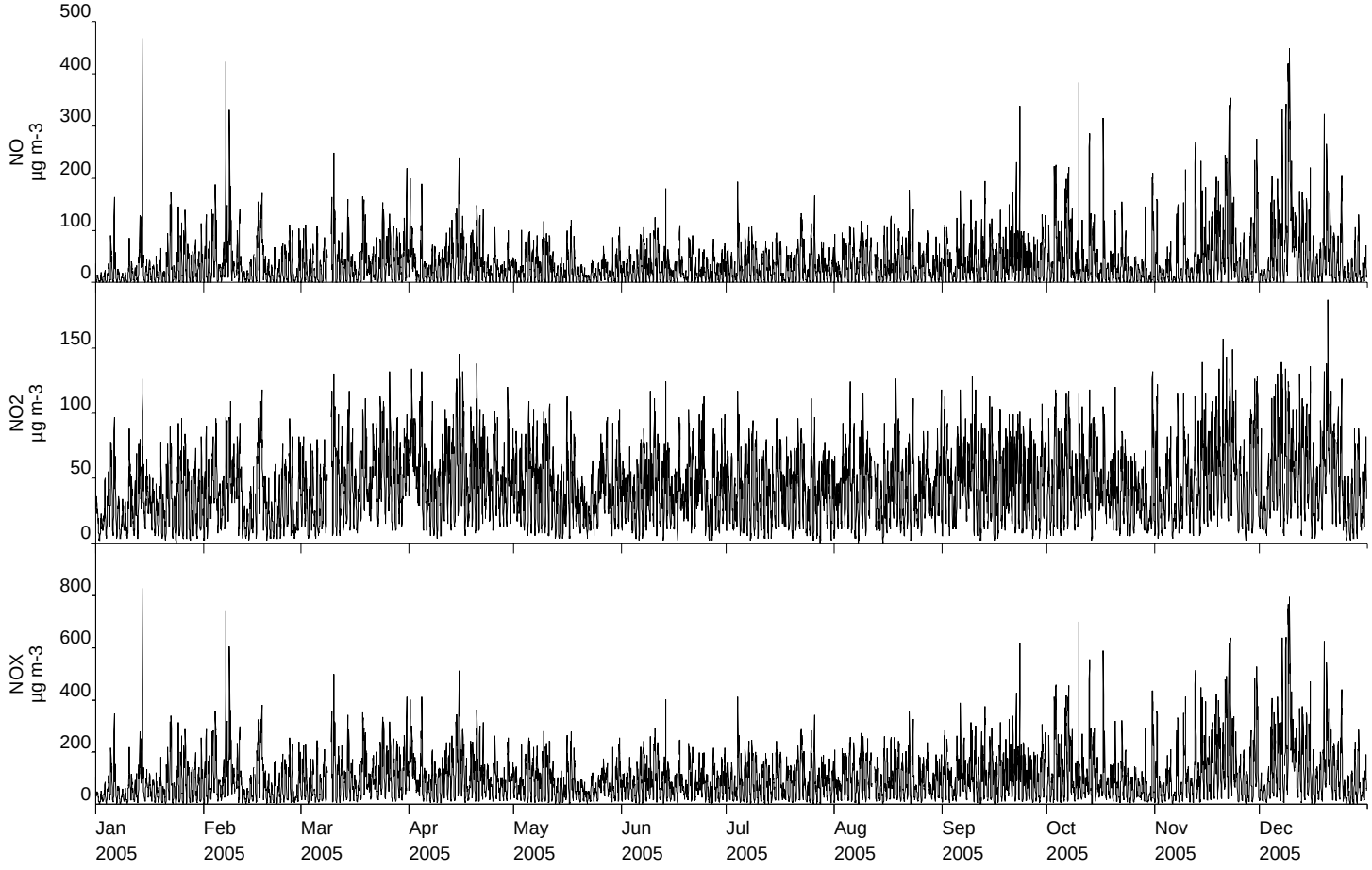
POLLUTANT	NO	NO_2	NO_X
Number Very High	-	0	-
Number High	-	0	-
Number Moderate	-	0	-
Number Low	-	8647	-
Maximum 15-minute mean	559 µg m^{-3}	405 µg m^{-3}	989 µg m^{-3}
Maximum hourly mean	468 µg m^{-3}	187 µg m^{-3}	829 µg m^{-3}
Maximum running 8-hour mean	377 µg m^{-3}	125 µg m^{-3}	671 µg m^{-3}
Maximum running 24-hour mean	286 µg m^{-3}	87 µg m^{-3}	510 µg m^{-3}
Maximum daily mean	252 µg m^{-3}	84 µg m^{-3}	457 µg m^{-3}
Average	36 µg m^{-3}	42 µg m^{-3}	97 µg m^{-3}
Data capture	98.7 %	98.7 %	98.7 %

All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2

Pollutant	Air Quality (England) Regulations 2000 and (Amendment) Regulations 2002	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	1	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0

Produced by netcen on behalf of Suffolk Coastal District Council

Suffolk Coastal Woodbridge Air Monitoring
Hourly Mean Data for 01 January to 31 December 2005



Sean Christiansen
Environmental Quality
AEA Technology
Building 551
Harwell
Didcot
Oxfordshire
OX11 0QJ

Direct line 0870 190 6431
Direct facsimile 0870 190 6377
e-mail sean.christiansen@aeat.co.uk

Appendix E

Graphical representation to show trends in annual mean nitrogen dioxide concentrations measured at permanent diffusion tube sites in Felixstowe, Kesgrave, Woodbridge and Melton between 1999 and 2004.

Figure E-1 Annual mean nitrogen dioxide concentrations measured at permanent diffusion tube sites in Felixstowe between 1999 and 2005

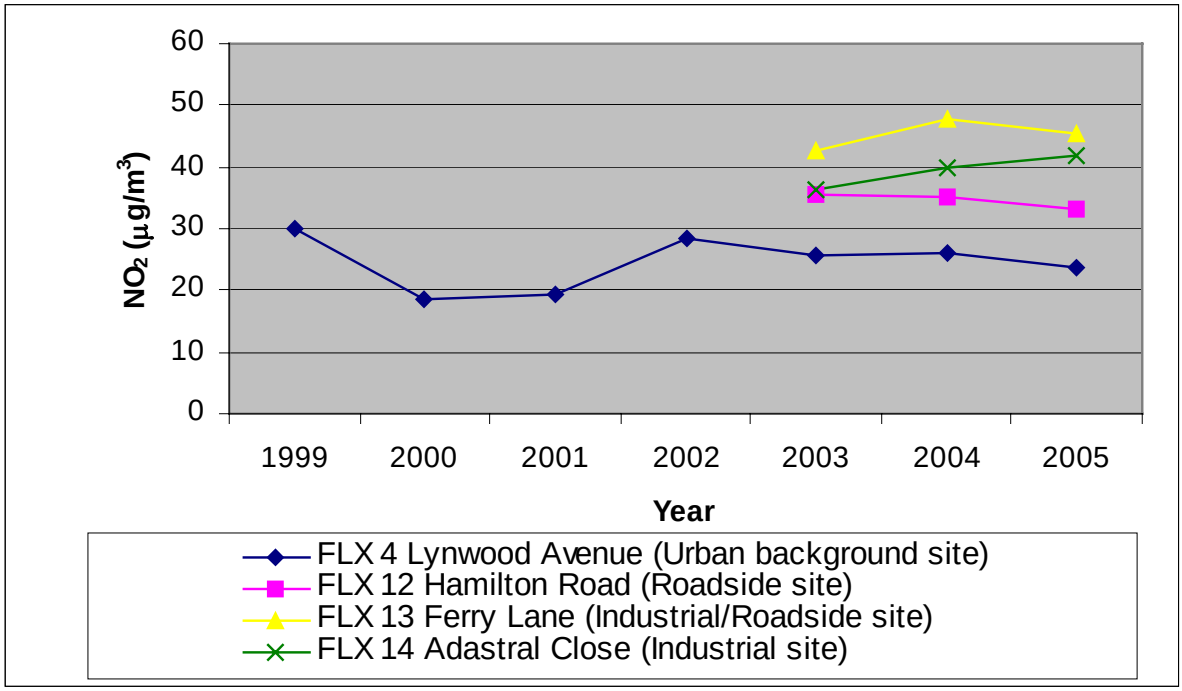


Figure E-2 Annual mean nitrogen dioxide concentrations measured at permanent diffusion tube sites in Kesgrave between 1999 and 2005

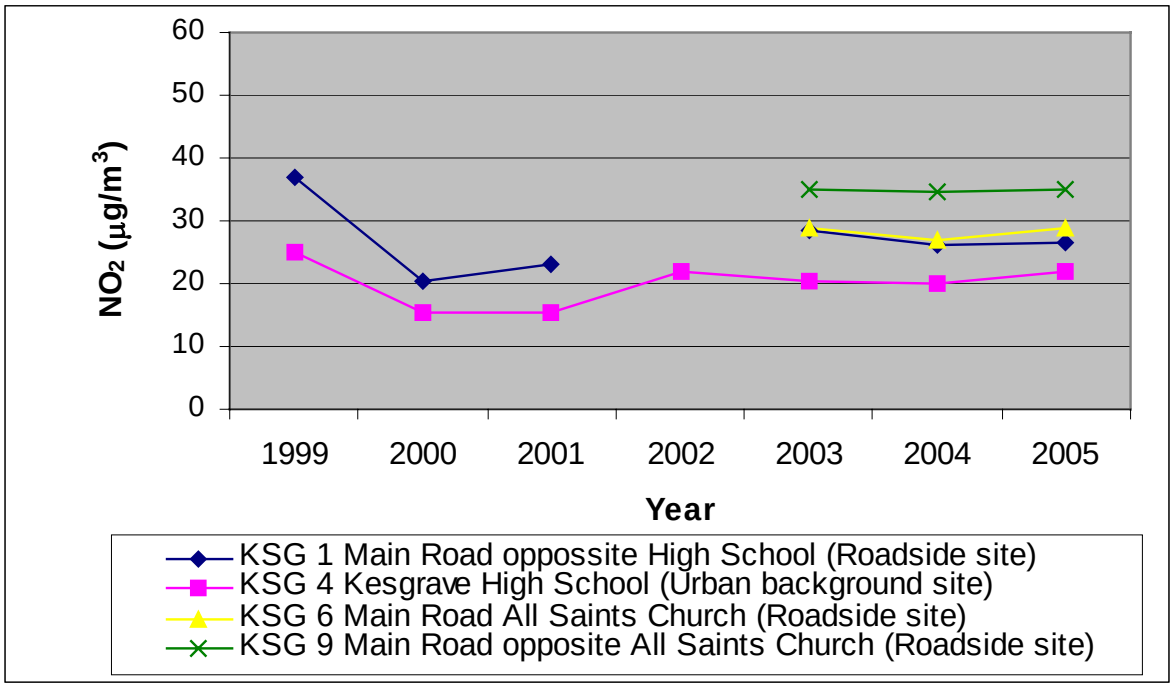


Figure E-3 Annual mean nitrogen dioxide concentrations measured at permanent diffusion tube sites in Woodbridge between 1999 and 2005

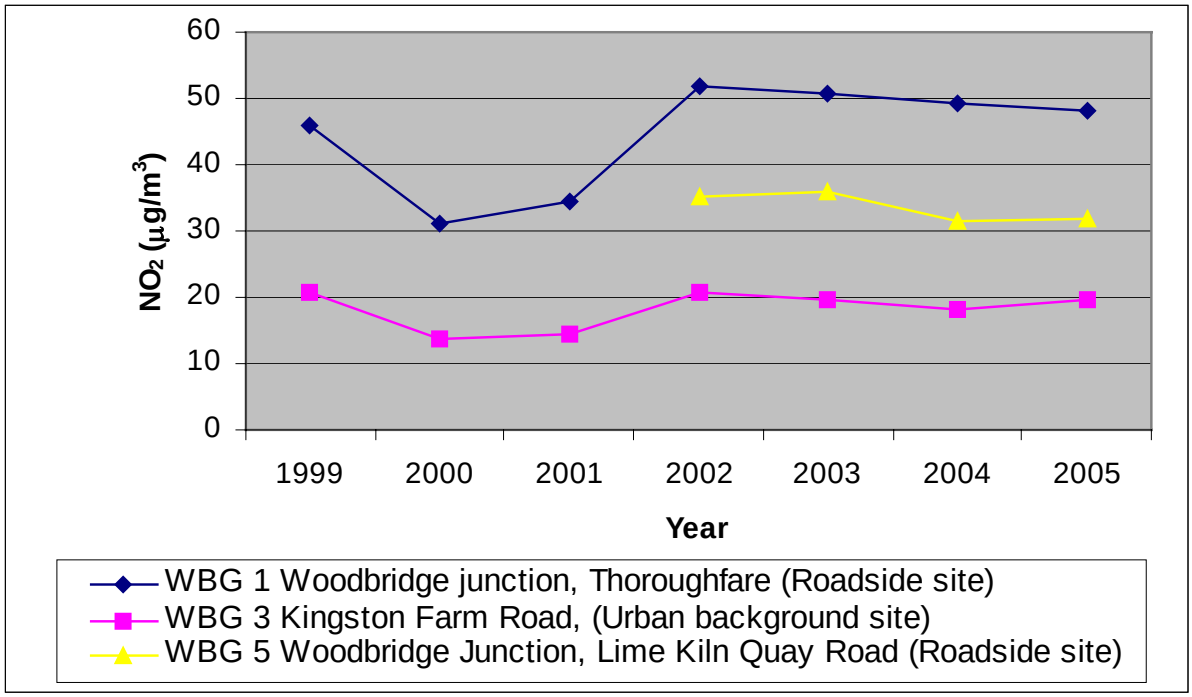
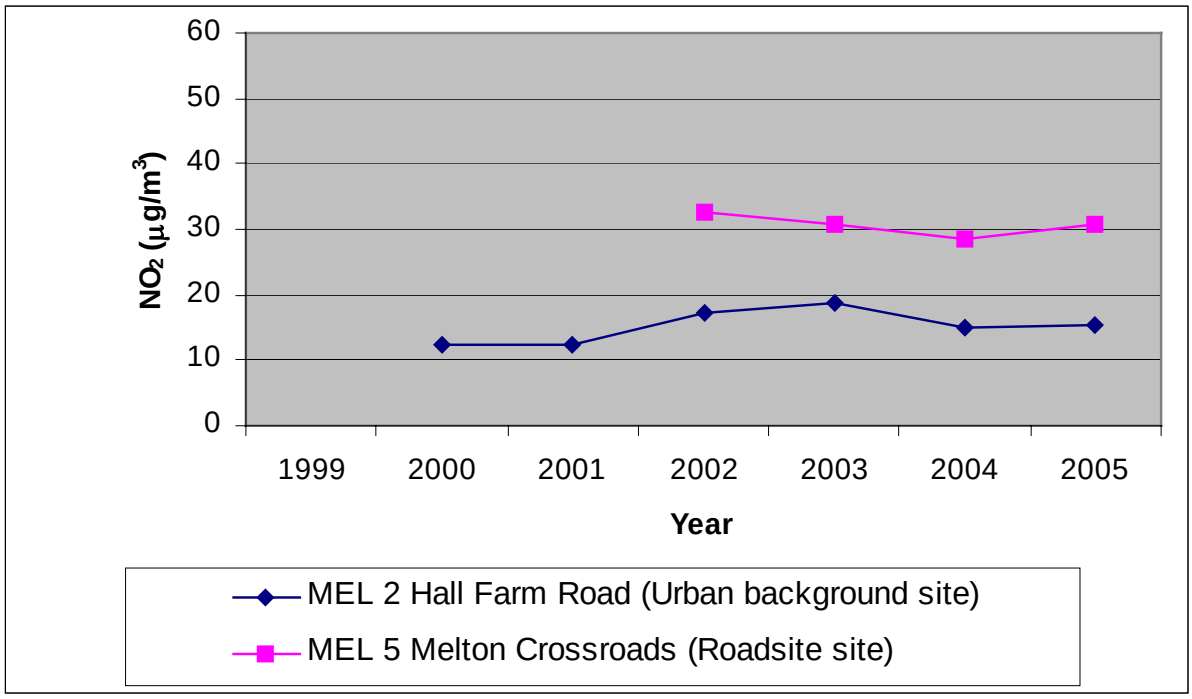


Figure E-4 Annual mean nitrogen dioxide concentrations measured at permanent diffusion tube sites in Melton between 1999 and 2005



Appendix F

Summary of traffic data obtained and information used to run the Design Manual for Roads and Bridges (DMRB) Screening Methodology for roads within the Suffolk Coastal district.

Figure F-1 Information required to run the Design Manual for Roads and Bridges Screening Methodology

Table F-1 Traffic count information for roads within the Suffolk Coastal district provided by Suffolk County Council (SCC) Environment and Transport Department.

Table F-2 Summary of traffic data and other information used to run the DMRB screening model to assess nitrogen dioxide (NO_2) and particulate matter (PM_{10}) concentrations arising from traffic emissions on a section of the **A12 at Benhall**. DMRB predicts annual mean concentrations for NO_2 and PM_{10} together with the number of days PM_{10} concentrations are expected to be greater than 50μg/m^3.

Table F-3 Summary of traffic data and other information used to run the DMRB screening model to reassess particulate matter (PM_{10}) concentrations arising from traffic emissions at **Dock Spur roundabout, Felixstowe** where vehicle speeds are reduced. DMRB predicts the annual mean concentration together with the number of days PM_{10} concentrations are expected to be greater than 50μg/m^3.

Figure F-1

Information required to run the Design Manual for Roads and Bridges Screening Methodology

LAQM.TG(03) advises that the Design Manual for Roads and Bridges Screening Method (DMRB), hereafter referred to as DMRB, should be used to assess traffic emissions for roads and junctions against the objectives where necessary. DMRB includes a simple methodology for estimating the concentrations of air pollutants in the vicinity of roads. This methodology has been used for many years as a screening tool, primarily in support of assessments of new road building projects. The methodology is attractive as it implicitly includes the change in vehicle technologies year by year.

Since the first round of review and assessments the DMRB model has been updated and is expected to provide a slightly conservative assessment of the impact of traffic in most cases. The model will, therefore, tend to over-estimate the predicted pollutant concentrations; this is appropriate for a screening model as the authority can be reasonably confident that it has identified all areas at risk of exceeding the objectives. DMRB should prevent local authorities from unnecessarily proceeding to a Detailed Assessment.

DMRB requires the following input data:

- **Year of assessment** – this is the year for which the specific pollutant requires assessment.
- **Number of road links** being assessed – where the DMRB spreadsheet is used for the assessment of a junction, the number of links for the junction, as defined in the DMRB instruction manual, need to be calculated. The following information will then need to be input for each road link identified.
- **Receptor location** and **distance to the centre of the road** from the receptor. The nearest relevant receptor location was identified for each section of road or each junction. The distance from each receptor location to the centre of the road was measured and input into the DMRB spreadsheet.
- **Annual Average Daily Traffic flows** (AADT) - AADT's were obtained from Suffolk County Council Environment and Transport Department.
- **Annual average speeds** – vehicle emission rates are calculated as a function of average speed and, therefore, annual average speed data needs to be input into the DMRB spreadsheet. Where no information is available on average speeds then the speed limit may be used as a default value. Care should be taken to provide reduced speed data when assessing road junctions; where there is no junction speed information available default values detailed in LAQM.TG(03) for different types of junctions have been used.
- **Road type** – DMRB requires that a road type definition be given for each road in the assessment. The DMRB Screening Method has three road type categories built into it which include default values for traffic compositions for that type of road (A, B and C). A is all motorways or A-roads. B is urban roads which are neither motorways nor A-roads. C is any other roads. There is also a fourth road type, category D, which allows the user to input their own traffic composition data where they have it.
- **Traffic composition data** – the DMRB spreadsheet requires the fraction of both Light Duty Vehicles (LDVs) and Heavy Duty Vehicles (HDVs). The definition between these two categories is that any vehicle above 3.5 tonnes gross vehicle weight is classified as a HDV and anything under this weight as a LDV. Information was obtained from Suffolk County Council Environment and Transport Department. Most traffic information provided by Suffolk County Council Environment and Transport Department is not classified in terms of gross vehicle weights, but as vehicle length and number of axles. Advice was given by Suffolk County Council Environment and Transport Department to determine HDV and LDV percentages.
- **Local background concentrations** – for local impact assessments of road traffic, it is necessary to specify background concentrations upon which the traffic derived pollution is superimposed.

Background concentrations were obtained from a series of default concentration maps produced by netcen on behalf of Defra. The maps provide data with a resolution of 1km x 1km for every local authority district for the pollutant assessment year of concern, and can be obtained from the website at www.airquality.co.uk. The maps have been plotted using information from Defra-run background and urban monitoring networks and National Atmospheric Emissions Inventory estimates. Due to concerns raised that background pollutant concentrations for major roads in rural areas may include emissions from the road in question, LAQM.TG(03) advises that the average background concentration four grid squares away from either side of the road, where there are no other significant sources of pollution, is used.

Table F-1 **Updated traffic count information for roads within the Suffolk Coastal district provided by Suffolk County Council (SCC) Environment and Transport Department.**

Road	Traffic count site description	SCC site identification details	Grid reference Eastings	Grid reference Northings	7-day AADTs – all motorised vehicles. Details for 2005 (unless otherwise stated)	Percentage Heavy Duty Vehicles (calculated from vehicles >6m length) Details for 2005 (unless otherwise stated)
A14	TRIMLEY HEATH (HIGHWAYS AGENCY SITE)	M081	628800	237300	**33,955**	**21.8 %**
A14	IPSWICH ORWELL BRIDGE (HIGHWAYS AGENCY SITE)	M094	618300	241100	**52,765**	**33.3 %**
A12	WOODBRIDGE BYPASS SOUTH OF B1079	M002	626000	249200	**30,281**	**6 %**
A12	BRIGHTWELL	M026	624830	244485	**34,299 (2004)**	**15.9 % (2004)**
A12	SOUTH OF YOXFORD	M042	639300	268120	**11,184**	**13.3 %**
A12	SAXMUNDHAM BYPASS	M095	637850	265320	**9,640**	**12.5 %**
A12	FARNHAM	Y141	636060	260110	**15,851**	**6.4 % (2004)**
A12	BENHALL, SOUTH OF B1121	Y142	637765	261010	**15,144 (2004)**	**1.1 % (2004)**
A12	BLYTHBURGH, SOUTH OF A145	Y111	645200	275700	**12,917 (2004)**	no data available
A144	SOUTH OF BRAMFIELD	Y005	640250	272488	**4,132 (2004)**	**14 % (2004)**
A154	FELIXSTOWE	M020	629577	235915	**16,069**	**4.5 %**
A1094	NORTH WEST OF ALDEBURGH	M027	644116	258307	**4,642 (2003)**	**7 % (2003)**
A1094	SNAPE WEST OF B1069	Y114	639398	259344	**6,724 (2004)**	**11 % (2004)**
A1094	SNAPE EAST OF B1069	Y115	639747	259329	**7,620**	**10 %**
A1120	SAXTEAD SOUTH WEST OF U2119	P005	624650	263930	**3,884**	**8 %**
A1120	WEST OF PEASENHALL	Y013	634920	269130	**2,875 (2004)**	**2 % (2004)**
A1120	SAXTEAD BOTTOM	Y118	626380	265720	**2,108 (2004)**	**11 % (2004)**
A1152	WEST OF MELTON	M003	627350	250430	**12,832**	**8 %**
A1152	MELTON WILFORD BRIDGE	M053	629019	250267	**14,309**	**7 %**
A1152	BROMESWELL EAST OF B1084	Y120	629700	250140	**9,898 (2003)**	no data available
A1152	BROMESWELL NORTH OF B1084	Y121	630644	250306	**5,910 (2004)**	**1 % (2004)**
A1156	WARREN HEATH – IPSWICH	P004	619758	242493	**25,448**	**4 %**
A1214	MARTLESHAM WEST OF A12	M004	623764	246132	**20,259**	**6 %**
B1069	TUNSTALL EAST OF C335	M074	635950	235082	**2,724 (2003)**	no data available
B1069	NORTH EAST OF TUNSTALL	Y017	636630	255590	**2,682 (2003)**	no data available
B1069	KNODISHALL COMMON	Y018	642373	259901	**5,021 (2004)**	**1 % (2004)**
B1069	SOUTH OF TUNSTALL	Y119	635775	254810	**4,150 (2004)**	**2 % (2004)**
B1069	GOLDFAIR GREEN	Y122	643781	261167	**6,616 (2004)**	**1 % (2004)**
B1077	SWILLAND NORTH OF C366	M055	618355	252349	**2,215**	**5 %**
B1078	OTLEY EAST OF C306	M036	619366	254036	**4,612**	**10 %**
B1078	CLOPTON EAST OF B1079	Y022	621880	254430	**2,571 (2004)**	**20 % (2004)**
B1078	WEST OF TUNSTALL	Y125	634608	255578	**957 (2003)**	no data available
B1078	EAST OF TUNSTALL	Y126	636530	255050	**1,257 (2004)**	**3 % (2004)**
B1079	GRUNDISBURGH SOUTH OF B1078	Y024	620448	254746	**2,794 (2004)**	**11 % (2004)**
B1079	SUTTON WALKS SOUTH OF C340	Y025	621500	253480	**2,568 (2004)**	**1 % (2004)**
B1079	WOODBRIDGE EAST OF A12	Y127	626110	249340	**4870 (2004)**	**5 % (2004)**
B1083	BUTLEY, SPRATTE STREET	Y026	629900	248790	**3,411 (2004)**	**1 % (2004)**

Table continued overleaf

Road	Traffic count site description	SCC site identification details	Grid reference Eastings	Grid reference Northings	7-day AADTs – all motorised vehicles. Details for 2005 (unless otherwise stated)	Percentage Heavy Duty Vehicles, where available. Details for 2005 (unless otherwise stated)
B1083	BROMESWELL NORTH OF C340	Y128	629690	249150	**5,411 (2004)**	no data available
B1084	BUTLEY, SPRATT STREET	Y027	633109	250599	**3,576 (2004)**	no data available
B1084	ORFORD SOUTH OF U3829	Y028	641790	250661	**2,659 (2003)**	no data available
B1116	DENNINGTON NORTH OF B1118	Y035	628330	268630	**1,544 (2002)**	no data available
B1116	FRAMLINGHAM COLLEGE ROAD	Y204	627840	264300	**2,610 (2003)**	no data available
B1116	NORTH OF PARHAM	M040	629974	260965	**5,013**	**8 %**
B1117	HEVENINGHAM SOUTH OF C220	Y130	634633	273768	**871 (2003)**	no data available
B1118	DENNINGTON WEST OF B1116	Y036	628020	268320	**638 (2004)**	**16 % (2004)**
B1119	WEST OF SAXMUNDHAM BYPASS	M058	637305	263626	**1,760**	**6 %**
B1119	EAST OF SAXMUNDHAM	Y038	641077	262535	**3,648**	**7 %**
B1119	SAXTEAD GREEN	Y132	626110	264430	**3,674 (2004)**	**13 % (2004)**
B1120	FRAMLINGHAM BADINGHAM ROAD	Y040	629300	264220	**1,237 (2003)**	no data available
B1121	STERNFIELD EAST OF C247	Y041	639415	261438	**1,042 (2003)**	no data available
B1121	NORTH OF SAXMUNDHAM	Y172	638333	265570	**2,059 (2003)**	no data available
B1121	SOUTH OF SAXMUNDHAM	Y173	638233	261642	**3,399 (2003)**	no data available
B1121	THEBERTON	M078	643910	265689	**4,464 (2002)**	no data available
B1122	EAST OF YOXFORD	Y042	640488	268444	**3,204 (2004)**	**1 % (2004)**
B1122	LEISTON SOUTH OF B1353	Y043	644640	260780	**3,379 (2004)**	**14 % (2004)**
B1122	SOUTH OF LEISTON	Y133	644525	261179	**5„207 (2004)**	no data available
B1122	NORTH OF LEISTON SOUTH OF U2822	Y143	644370	263130	**4,363 (2004)**	no data available
B1123	LINSTEAD	Y044	635604	277675	**1,446 (2004)**	**3 % (2004)**
B1123	BLYFORD EAST OF U1326	Y134	642800	276763	**4,134 (2003)**	no data available
B1125	SOUTH OF WESTLETON	Y045	643786	267944	**2,421 (2001)**	no data available
B1353	WEST OF THORPENESS	Y049	645507	260685	**1,961 (2004)**	**1 % (2004)**
B1353	ALDRINGHAM	Y136	644289	261019	**2,309 (2004)**	no data available
B1387	BLYTHBURGH EAST OF A12	Y137	645223	274239	**1,059 (2004)**	**2 % (2004)**
B1438	SOUTH OF WOODBRIDGE	M059	625641	247964	**11,152**	**5 %**
B1438	QUAYSIDE WOODBRIDGE	M070	627673	248955	**9,609**	**5 %**
B1438	SOUTH OF WICKHAM MARKET	M088	629929	254074	**4,002**	**5 %**
B1438	SOUTH OF UFFORD	Y138	629050	252100	**5,261 (2004)**	no data available
C228	LEISTON KING GEORGES AVENUE	Y174	645261	262502	**4,469 (2004)**	no data available
C322	FOXHALL ROAD IPSWICH	M089	621524	244033	**10,356**	**3.3 %**
C340	SUTTON WALKS	Y139	630050	248910	**3,791 (2004)**	**1 % (2004)**
C372	MARTLESHAM FELIXSTOWE ROAD	Y182	624940	246500	**5820 (2004)**	no data available
C376	MARTLESHAM EAST OF BLACKTILES LANE	Y176	624620	246442	**2,760**	**6.5 %**
C624	TUDDENHAM EAST OF U6204	M084			**3,732**	**9.8 %**
U2822	LEISTON LOVERS LANE	Y152	644800	263740	**1,785 (2004)**	no data available
U3215	MARTLESHAM EAGLE WAY NORTH	Y170	624444	245806	**4,572 (2004)**	**4.6 % (2004)**
U3215	MARTLESHAM EAGLE WAY SOUTH	Y171	624660	245218	**3,865 (2004)**	**2.8 % (2004)**

Table F-2 **Summary of traffic data and other information used to run the DMRB screening model to assess nitrogen dioxide (NO_2) and particulate matter (PM_{10}) concentrations arising from traffic emissions on a section of the A12 at Benhall. DMRB predicts annual mean concentrations for NO_2 and PM_{10} together with the number of days PM_{10} concentrations are expected to be greater than 50µg/m^3**

Road or junction identification	Address of receptor	Distance from receptor to centre of road (m)	Combined AADT flow (HDV + LDV) base year	Combined AADT flow (HDV + LDV) for 2005	Annual average speed (km/h) (N.B to convert mph to km/h x by 1.609)	Road type (A,B,C or D) #	% Light Duty Vehicles (LDV)	% Heavy Duty Vehicles (HDV)	Background PM_{10} concentration for 2005 (µg/m^3)	Background NO_x concentration for 2005 (µg/m^3)	Background NO_2 concentration for 2005 (µg/m^3)	Summary of output results from DMRB spreadsheet
Closest receptor location to the A12 between the A1094 junction at Farnham and the B1121 junction at Curlew Green, Kelsale.A12 at Benhall	Closest relevant receptor location to road, Saxmundham	30m	18.148 (2005)	18,148	95 km/h	A	93.6%	6.4%	19.6 µg/m^3	12.0 µg/m^3	9.4 µg/m^3	**NO_2 annual mean =15.1 µg/m^3** **PM_{10} annual mean = 21.8µg/m^3** **PM_{10} number of days concentration exceeds 50µg/m^3 = 6**

The DMRB Screening Method has four road type categories built into it (A,B,C,D). A is all motorways or A-roads. B is urban roads which are neither motorways nor A-roads. C is any other roads. A,B and C include default values for traffic compositions for that type of road. The fourth road type, category D, allows the user to input their own traffic composition data where they have it.

Table F-3 Summary of traffic data and other information used to run the DMRB screening model to reassess particulate matter (PM_{10}) concentrations arising from traffic emissions at Dock Spur roundabout, Felixstowe where vehicle speeds are reduced. DMRB predicts the annual mean concentration together with the number of days PM_{10} concentrations are expected to be greater than 50µg/m^3

Road or junction identification	Address of receptor	Distance from receptor to centre of road (m)	Combined AADT flow (HDV + LDV) base year	Combined AADT flow (HDV + LDV) for 2005 ⁎	Annual average speed (km/h) (N.B to convert mph to kmh x by 1.609)	Road type (A, B, C or D) #	% Light Duty Vehicles (LDV)	% Heavy Duty Vehicles (HDV)	Background PM_{10} concentration for 2005 (µg/m^3)	Summary of output results from DMRB spreadsheet
A14 Section 2 **Reduced speeds and junction assessment at Dock Spur roundabout,** Link 1 (A14 North of roundabout) ♣	Closest relevant receptor location to road, Felixstowe	87.8m	33,955 (2005)	33,955	32 km/h	A	21.8%	78.2%	19.4 µg/m^3	**n/a**
A14 Section 2 **Reduced speeds and junction assessment at Dock Spur roundabout,** Link 2 (A14 + A154, South of roundabout) ♣	Closest relevant receptor location to road, Felixstowe	31.0m	20,548 (2003)	21,206	32 km/h	A	25.6%	74.4%	19.4 µg/m^3	**Annual mean = 27.4µg/m^3** **Number of days concentration exceeds 50µg/m^3 = 19**

⁎ Traffic summary figures calculated by Suffolk Coastal District Council using a Trip End Modelling Programme (TEMPRO), provided by Suffolk County Council Environment and Transport Department, to calculate general future growth.

The DMRB Screening Method has four road type categories built into it (A, B, C, D). A is all motorways or A-roads. B is urban roads which are neither motorways nor A-roads. C is any other roads. A, B and C include default values for traffic compositions for that type of road. The fourth road type, category D, allows the user to input their own traffic composition data where they have it.

♣ Assessment of a junction by DMRB requires that it is split into a number of road links as per the instruction manual, information is put into the model for each link. DMRB calculates the total concentration at a receptor from both links.

Appendix G

The Suffolk Coastal District Council Air Quality Management Area Order no. 1, 2006 (for the junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge).

Environment Protection Act 1995, Part IV section 83(1)

Suffolk Coastal District Council

Air Quality Management Area Order

THE SUFFOLK COASTAL DISTRICT COUNCIL AIR QUALITY MANAGEMENT AREA ORDER NO 1, 2006

Suffolk Coastal District Council, in exercise of the powers conferred upon it by Section 83(1) of the Environment Act 1995, hereby makes the following Order

This Order may be referred to as '**The Suffolk Coastal District Council Air Quality Management Area Order No 1, 2006',** and shall come into effect on the **3rd April 2006**

The area shown on the attached map hatched in red is to be designated as an air quality management area (the designated area). **The designated area incorporates properties on the Western side of the Thoroughfare and Melton Hill arm of the junction with Lime Kiln Quay Road, in Woodbridge, Suffolk.**

The map may be viewed at the Council Offices, at Melton Hill, Woodbridge, between the hours of 08.45am to 5.15pm Mondays to Thursdays, and 08.45am to 4.45pm on Fridays.

This Area is designated in relation to a likely breach of the nitrogen dioxide (annual mean) objective as specified in the Air Quality Regulations (England)(Wales) 2000.

This order shall remain in force until it is varied or revoked by a subsequent order.

Dated; this Third day of March 2006

The Common Seal of Suffolk Coastal District Council was affixed in the presence of;

Ian S de Prez

……..

Authorised Officer

And

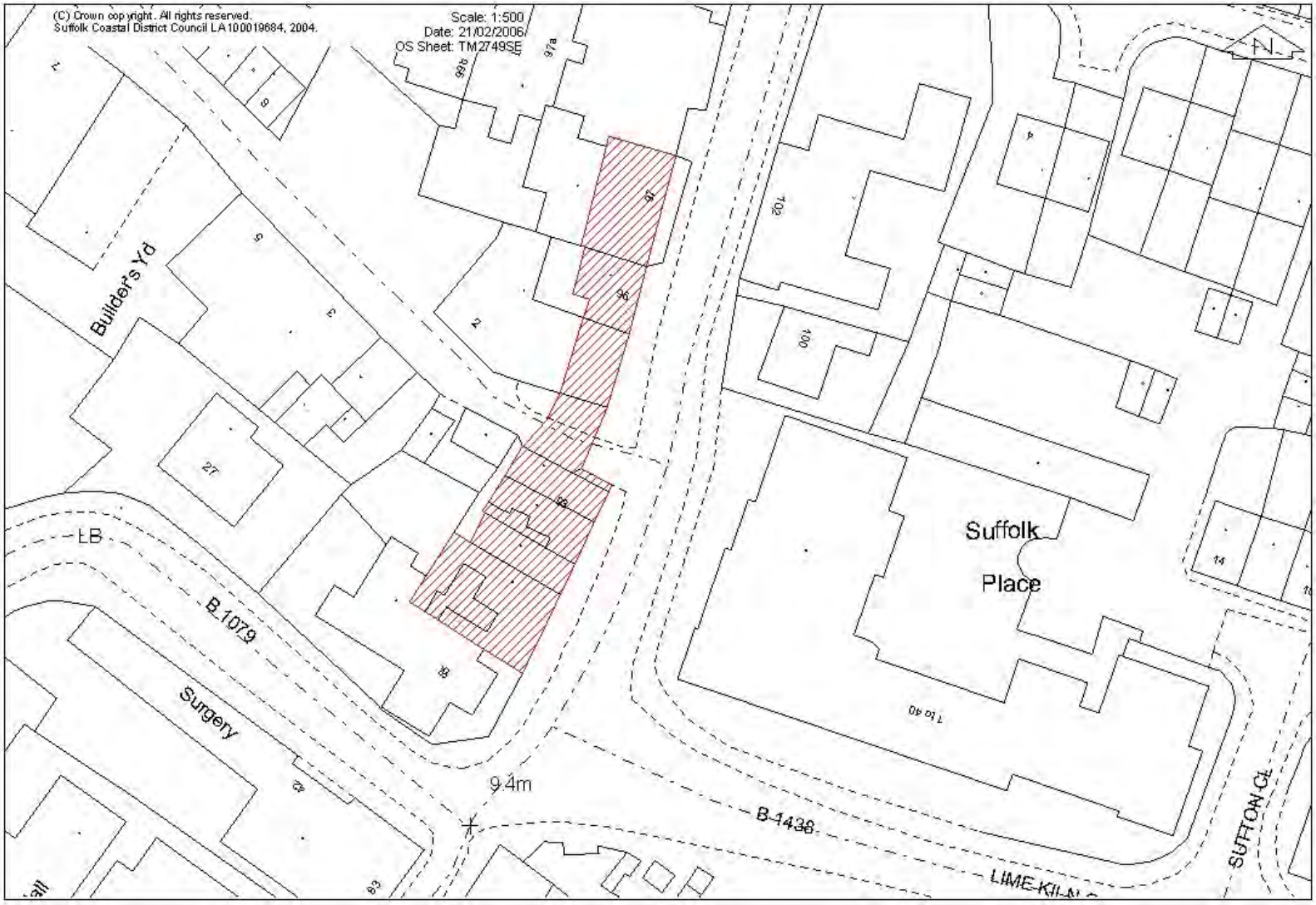
Simon Burridge

…… **CS** 9281

Authorised Officer

Dated 3rd March 2006

THE SUFFOLK COASTAL DISTRICT COUNCIL AIR QUALITY MANAGEMENT AREA ORDER NO 1, 2006



Appendix H

Continued Assessment of Emissions Generated by the Port of Felixstowe – Chapter 11 from the Progress Report on Air Quality in the Suffolk Coastal district (May 2005)

Continued Assessment of Emissions Generated by the Port of Felixstowe

Introduction

The Port of Felixstowe is located within the Suffolk Coastal district, it is the largest container port in the UK, and the fourth largest in Europe. It is owned by Hutchinson Ports (UK) Limited, and incorporates the Trinity and Landguard Container Terminals, an existing Dock Basin, Dooley Ro-Ro Terminal, the Ferry Terminal and the two rail terminals – North and South. A potential for public exposure exists at Felixstowe due to the location of a number of domestic properties and the viewing area at Landguard Point within 500 metres of the docking area.

Trinity III and Trinity III (Phase 2) Terminal extensions

The original Trinity III Terminal extension was completed in 1996 and provided an extra 630 metres of deep-water quay to the Port. In February 2000 planning permission was granted by Suffolk Coastal District Council for the Trinity III (Phase 2) Terminal – a proposed extension of 14 hectares of land reclamation and a change of land use to planning use class B8 (storage and distribution). The land was to be used as a container yard serving existing Port operations and as the northern end of a new rail terminal to be constructed to service the Port.

Following a Public Enquiry in 2002, the Port of Felixstowe was also granted the Harbour Revision Order to proceed with an extension to extend the deep-water quay at the Trinity Terminal by 270 metres. This included enclosure and reclamation of part of the sea and river bed adjacent to the dock, comprising of 7.27 hectares, for a new storage and handling park.

The first phase of the Trinity III (Phase 2) Terminal extension consisted of 6 hectares of back-up land behind the existing Trinity III Terminal and was opened in mid-2003. In November 2004 the 270 metre quay extension was opened, increasing the length of deep-water berths on the Trinity Terminal to 900 metres. The infrastructure for the Trinity III (Phase 2) Terminal extension is now in place and it is working to full capacity.

Planning Application for Felixstowe South Reconfiguration

In 2003 Hutchison Ports (UK) Ltd submitted an application for planning permission and other consents to reconfigure the existing quay-side and land at the Southern end of the Port of Felixstowe, with reclamation and dredging to enable the engineering of a new container quay.

The proposal involves the conversion of the area previously used by P&O North Sea Ferries and the now largely redundant Dock Basin to container use. At the same time the existing container facilities in the Southern part of the Port which were developed in the 1960s and 1970s would be upgraded. The scheme would provide 910 metres of additional quay face bringing the total length of quay at the Port to 3,828 metres. The container handling capacity of the Port would increase by 1.56 million Twenty-foot Equivalent Units (TEU), to total 5.56 million TEU. TEU is the industry measure of container capacity and on average the ratio is 1.5 TEUs per container. The Port of Felixstowe website advises that, if approved, it is expected that the first phase of the new terminal would commence operation at the end of 2007.

Posford Haskoning (Environment) was commissioned by Hutchison Ports (UK) Ltd and submitted an Environmental Statement to accompany the Planning Application. This included a specific report relating to air quality and the potential impacts within the area of the Port, in the nearby Felixstowe town centre, and along the A14 trunk road towards Ipswich. It also included a report detailing the 'In-combination' effects on air quality should both the Felixstowe South Reconfiguration and Bathside Bay Container Terminal (detailed below) Planning Applications gain approval.

In October 2004 the Felixstowe South Reconfiguration Planning Application was taken to Public Inquiry, the Inquiry closed in December 2004. A decision has not yet been made and is expected later in 2005. Further information on the Public Inquiry is available at http://www.planning-inspectorate.gov.uk/felixstowe/index.htm, including all documents submitted as part of the Inquiry.

Planning Application for Bathside Bay Container Terminal, Harwich

Harwich International Port is currently a multipurpose facility that handles passengers and freight. There has been a recent increase in Ro-Ro freight following the move of P&O from Felixstowe to Harwich and the port also offers ferry, container and bulk operations. The current container managing service is at two berths and has a stacking capacity of 1,536 TEUs.

Hutchison Ports (UK) Ltd has submitted an application for planning consent to develop a new container port facility at Bathside Bay in Harwich. The planning scheme proposes reclamation of approximately 60 hectares of Bathside Bay to create container storage and cranage facilities, and additional areas for potential mixed-use development (commercial, employment and retail uses). A new quay wall would be constructed to form approximately 1,400 metres of quayside. The container yard storage capacity would be 40,000 TEUs with a predicted throughput of 1.68 million TEUs per year. A new 775 metre long rail terminal is also proposed, to link to existing rail facilities. Posford Haskoning (Environment) was commissioned by Hutchison Ports (UK) Ltd and has submitted an Environmental Statement to accompany the Planning Application.

In April 2004 the Bathside Bay Container Terminal Planning Application was taken to Public Inquiry, the Inquiry closed in October 2004. A decision has not yet been made and is expected later in 2005. Further information, including all documents submitted, on the Public Inquiry is available at http://www.planning-inspectorate.gov.uk/bathsidebay/

Review and assessment history for the Port of Felixstowe

Nitrogen dioxide (NO_2)

In the Updating and Screening Assessment concentrations of NO_2 at receptor locations along the A14 were estimated using the Design Manual for Roads and Bridges screening method (DMRB) to determine whether any exceedance of the objectives was likely. This included receptor locations at the Haven Exchange roundabout, Dock Spur roundabout and the intersection with the A12 at Nacton. The results from DMRB confirmed that NO_2 concentrations at all receptor locations modelled were within the objective levels for 2005, and the Updating and Screening Assessment Report (June 2003) concluded that no further action was necessary.

The report did, however, acknowledge that there was the potential for emissions of NO_2 from activities on and associated with the Port of Felixstowe to combine at nearby receptor locations. It was concluded that NO_2 concentrations would be monitored, using diffusion tubes, at the closest receptor location to the Port boundary, Adastral Close, and at a public receptor located approximately 70 metres from Dock Gate 2 roundabout in Ferry Lane.

Diffusion tube monitoring began at both locations in April 2003, with two additional sites located to determine whether a gradient existed between the kerbside at Dock Gate 2 roundabout and the receptor location in Ferry Lane. These sites were Felixstowe 13, 14, 15, and 16 and the location of each is shown in the maps in Appendix D. The results of monitoring for 2003 were presented in the Detailed Assessment and Continued Updating and Screening Assessment Report produced in March 2004. The results showed that the predicted NO_2 concentration in 2005 at the Adastral Close receptor (Felixstowe 14) was within the annual mean objective of 40 $\mu g/m^3$. The results for the receptor located in Ferry Lane (Felixstowe 13) confirmed that a gradient did occur between the kerbside of

Dock Gate 2 roundabout and the receptor (Felixstowe 15 and 16). The NO_2 concentration at the Ferry Lane receptor (Felixstowe 13) was marginally above the objective level when predicted to 2005, at 40.9 $\mu g/m^3$. The NO_2 concentrations at Felixstowe 15 and 16 respectively were 53.0 $\mu g/m^3$ and 65.7 $\mu g/m^3$ respectively, well above the objective level.

It was concluded that the single diffusion tube site at the receptor would be triplicated to increase the accuracy of the monitoring results obtained, and the results of a further 12 months of sampling in 2004 would be presented in the next air quality report produced. The diffusion tube site at Adastral Close (Felixstowe 14) was already a triplicate site and this was left in place. The diffusion tube sites Felixstowe 15 and 16 had determined that a NO_2 gradient existed between Dock Gate 2 roundabout and the Ferry Lane receptor, and as these sites were not representative of public exposure they were removed.

Sulphur dioxide (SO_2)

An Updating and Screening Assessment was undertaken to investigate SO_2 emissions arising from boiler plant burning fuel oil at site buildings on the Port of Felixstowe. In combination the boiler plant could have a thermal capacity greater than 5 MW and therefore be classified as a significant emitter of SO_2. Information was obtained from the Port of Felixstowe advising that the combined thermal capacity of boilers and warm air heaters was 4.16 MW. As the combined thermal capacity did not exceed 5 MW no further assessment was necessary.

The Updating and Screening Assessment also reported on SO_2 concentrations arising from diesel and coal-fired locomotives. The presence of any locations where diesel locomotives were stationary for two or more periods per day, of at least 15-minutes, with their engines running and where there are receptor locations within 15 metres of the stationary locomotives was investigated. Only one area was identified, a signalled junction at Grange Road, Walton that stops freight trains travelling from the Landguard Terminal (South Terminal) at the Port of Felixstowe onto the main line if the main line is in use. Investigations were undertaken and advice sought from Defra's Review and Assessment Helpdesk who confirmed that exceedance of the SO_2 objectives at receptor locations is unlikely, and further assessment was not necessary.

The Updating and Screening Assessment report included a Detailed Assessment for SO_2 concentrations arising from shipping activities at the Port of Felixstowe. External contractors, Entec UK Limited, were employed to undertake the assessment. Monitoring for concentrations of SO_2 from shipping emissions was undertaken for a six-month period at a site relevant to the nearest receptor location. The findings were that ambient concentrations of SO_2 were well within the relevant air quality criteria. The report concluded that the Port and surrounding residential areas would not require declaration of an Air Quality Management Area due to emissions of SO_2 associated with shipping activities and no further assessment was necessary.

Particles (PM_{10})

In the Updating and Screening Assessment concentrations of PM_{10} at receptor locations along the A14 were estimated using the Design Manual for Roads and Bridges screening method (DMRB) to determine whether any exceedance of the objectives was likely. This included receptor locations at the Haven Exchange roundabout, Dock Spur roundabout and the intersection with the A12 at Nacton. The results from DMRB confirmed that PM_{10} concentrations at all receptor locations modelled were within the objective levels for 2005, and the Updating and Screening Assessment Report (June 2003) concluded that no further action was necessary.

LAQM.TG(03) states that there are emissions of PM_{10} from the burning of oil in ship's engines, but there is no evidence to suggest that there is any risk of the 24-hour objective for 2004 being exceeded. No further assessment was, therefore, required under LAQM.TG(03). Following the technical guidance in LAQM.TG4(00) for the first round of review and assessments a Third Stage investigation

was undertaken to assess PM_{10} emissions from shipping activities at the Port of Felixstowe. The Defra monitoring helpdesk advised that it would be possible to assess PM_{10} levels using the results from monitored levels of SO_2 in the 6-month programme to be undertaken at the Port of Felixstowe, and proportional calculations taken from previous studies, in particular the Southampton Dibden Terminal Study. This method of assessment for PM_{10} was carried out by Entec UK Limited. The findings were that the potential for the air quality objectives for PM_{10} to be exceeded was negligible, and further assessment for this pollutant at the relevant receptors was not necessary.

During the consultation on the Updating and Screening Assessment and Detailed Assessment Reports, a response was received from someone in a position of knowledge questioning the shipping vessel figures used in the Entec UK Limited report to predict PM_{10} concentrations arising from shipping. The consultation response stated that the vessel figures used in the modelling appeared to be too low. The consultation response was forwarded to Entec UK Limited who were asked to liase directly with the consultee and report back on their conclusions, these would then be included in the next air quality report by Suffolk Coastal District Council.

Although investigations of emissions from traffic and shipping in isolation confirmed that further assessment was not necessary, the potential exists for emissions of PM_{10} from combined activities at the Port of Felixstowe to cause elevated concentrations at nearby receptor locations. The Detailed Assessment and Continued Updating and Screening Assessment Report (March 2004) advised that an Environmental Statement had been submitted as part of the Felixstowe South Reconfiguration planning application. This included detailed information regarding current emissions of PM_{10} from the different activities associated with the Port of Felixstowe, and future emissions should the planning approval be given. The report advised that Suffolk Coastal District Council commissioned a consultant to comment on the complex air quality information provided in the planning application. When his findings were received an assessment of the potential for emissions of PM_{10} from combined activities at the Port of Felixstowe to cause an exceedance of the objectives at nearby receptor locations would be reported.

Expansion at the Port of Felixstowe

The Detailed Assessment and Continued Updating and Screening Assessment Report (March 2004) advised that future traffic increases, associated with the Port of Felixstowe, were predicted for the A14. These increases were associated with the Trinity III Terminal extension at the Port, opened in mid-2003, and on-going works to the Trinity III (Phase 2) Terminal extension, both of which would increase the capacity of the Port.

In addition, planning applications for the Felixstowe South Reconfiguration at the Port of Felixstowe, and the Bathside Bay Container Terminal Development at Harwich had been submitted to the relevant local authorities.

The report concluded that if the Felixstowe South Reconfiguration and/or Bathside Bay Container Terminal planning applications were granted permission they would potentially increase pollutant concentrations of NO_2, SO_2 and PM_{10} at receptor locations close to the Port of Felixstowe and along the A14. The report advised that a consultant had been commissioned by Suffolk Coastal District Council to comment on the complex air quality information provided in the planning application for Felixstowe South Reconfiguration, and that the impacts with respect to air quality would be reported if the planning applications were granted permission.

Update on review and assessment

Environmental Statement for Felixstowe South Reconfiguration (FSR) Planning Application

The Environmental Statement that accompanied the planning application for FSR included an Air Quality Assessment report to determine the potential impacts of the development within the area of the Port, in the nearby town centre of Felixstowe and along the A14 towards Ipswich. It also included a report on the In-Combination effects of FSR and Bathside Bay Container Terminal developments if the applications are both approved, in which air quality was addressed.

A firm of consultants, the National Environmental Technology Centre (netcen), were employed on behalf of Suffolk Coastal District Council to comment on the complex information provided in the air quality reports, to determine the accuracy of the findings. Netcen provided a review report and were also required to submit a Proof of Evidence to the FSR Public Inquiry in October 2004 detailing their findings. A copy of the Proof of Evidence is attached as Appendix F.

The FSR Environmental Statement identifies the significant sources of emissions of NO_2, SO_2 and PM_{10} on and associated with the Port of Felixstowe and specifically the FSR, to include construction activities, shipping, the Container Terminal and car parking, road and rail transport. The Environmental Statement reports the findings of detailed computer modelling undertaken to assess air quality from activities on and associated with the Port of Felixstowe. The computer model used was ADMS-Roads 2.0, a new generation atmospheric dispersion modelling system produced by Cambridge Environmental Research Consultants Ltd. This model has been widely used in other similar assessments and is appropriate for this use. The model allows emissions to be defined as point, line and area sources. The point sources defined include the shipping berths for the existing South Port and the FSR. Area sources defined include the existing Landguard Container Terminal, the proposed FSR, the existing maintenance dredge area, areas of construction activity, capital and additional maintenance dredging activity, the Trinity III extension and the Bathside Bay Terminal. Line sources have been defined to represent emissions from incoming and outgoing shipping vessels, railway lines and the A14.

The detailed modelling was run for a number of scenarios including predictions for the year 2008 with a Business As Usual (BAU) scenario and also with FSR in place. The BAU scenario included all committed development at the Port of Felixstowe, such as the Trinity III and Trinity III (Phase 2) Terminal, and included traffic figures using the A14. The traffic figures provided were much higher than anticipated but did include traffic from the P&O Ro-Ro operation, this ceased operation in 2002 but it was assumed that it would be reinstated if FSR does not go ahead. The BAU scenario therefore represents the worse case in terms of the current concentrations of pollutant and whether levels will exceed the objectives. In addition, during the Public Inquiry for FSR the traffic figures were revised and vehicle estimates lowered so the modelled figures are worse case. The modelling included predicted concentrations of pollutants at 16 specific receptor locations near to the Port of Felixstowe boundary and along the A14, of which 13 are located within the Suffolk Coastal district.

Netcen had a number of minor criticisms with the methodology used to carry out the dispersion modelling study but concluded that they were not likely to affect the following findings:

- NO_2 concentrations at relevant receptor locations close to the Port of Felixstowe Road and its junction with Candlet Road (Dock Spur roundabout) may exceed the annual average objective for 2005. The predicted exceedances occur in both the BAU and with FSR scenarios.
- PM_{10} concentrations at all receptor locations considered will not exceed the objectives for 2004.
- The additional contribution to NO_2 and PM_{10} concentrations from the proposed FSR development is small.

Netcen do not agree with the findings of the modelling for SO_2 due to discrepancies with model outputs when compared with continuous monitoring undertaken by Suffolk Coastal District Council. They are concerned that there is a risk that the discharge plumes from ships at berth in the Port, with FSR in place, might combine when the wind is from the north-west or south-east.

The Public Inquiry for FSR has not reached a decision as yet, but it is expected later in 2005. Predictions of pollutant concentrations at receptor locations with FSR in place will therefore not be undertaken at this time, but will be considered once the Public Inquiry decision has been made if FSR obtains planning approval. The BAU detailed modelling findings will be used in this report to undertake a current assessment of pollutant concentrations due to committed development at the Port of Felixstowe.

Nitrogen dioxide (NO_2)

The air quality assessment provided as part of the Environmental Statement for the FSR planning application included detailed modelling of NO_2 emissions from activities on the Port of Felixstowe and traffic on the A14 associated with the Port of Felixstowe. The modelling undertaken for the BAU scenario in 2008 represents the worse case, due to inclusion of emissions from committed development at the Port not yet in place, and predicts concentrations of NO_2 at 13 specific receptor locations within the Suffolk Coastal district. The worse case scenario model predictions for 2008 have been used to assess current PM_{10} concentrations at receptor locations close to the Port of Felixstowe and the A14.

The model for 2008 shows two receptor locations with an annual mean NO_2 concentration greater than the 2005 objective of 40 $\mu g/m^3$. The receptor locations are at The Downs (close to the Port of Felixstowe Road) and Spriteshall Lane (close to Dock Spur roundabout) and the predicted annual mean NO_2 concentrations are 43.5 $\mu g/m^3$ and 41.5 $\mu g/m^3$ respectively. The model predictions for 2008 of hourly mean NO_2 concentrations at all receptor locations are shown to be within the 2005 objective of 200 $\mu g/m^3$.

As detailed earlier in this section of the report, concentrations of NO_2 were monitored at a number of locations within Felixstowe during 2003. In 2004 three of theses sites were removed, Felixstowe 5 (High Road West), Felixstowe 6 (Nayland Way) and Felixstowe 9 (Brinkley Way). They were removed as the annual mean concentration of NO2 recorded at each site was shown to be within the objective level of 40 $\mu g/m^3$ when predicted forward to 2005.

Three additional NO_2 sites were added in April 2004 to monitor concentrations at receptors close to the A14. Felixstowe 17 was located at the closest receptor location to the Dock Spur roundabout in Spriteshall Lane, Trimley St. Mary. Felixstowe 18 was located at the closest receptor location to the A14 between the Dock Spur roundabout and the Trimley junction in Kirton Road, Trimley St. Martin. Felixstowe 19 was located in Welbeck close to provide an urban background concentration in this area for comparison purposes.

The locations of all sites removed and all new sites are shown in the maps in Appendix D and the results of diffusion tube sampling undertaken in 2003 and 2004 is summarised in table 11.1. Full details of the analytical technique and laboratory used, monitoring locations, diffusion tube bias adjustment information and breakdown of results on a monthly basis for the monitoring periods can be seen in Appendix C. The results for all sites were predicted forward to the end of 2005, for comparison with the air quality objectives, using factors provided in the technical guidance LAQM.TG(03). The predicted levels at all sites in 2005 can also be seen in table 11.1, sites where the predicted annual mean NO_2 concentration in 2005 is above the objective level of 40 $\mu g/m^3$ are highlighted in grey.

Table 11.1 shows three monitoring locations (Felixstowe 13, 15 and 16) in 2003 with a predicted annual mean NO_2 concentration above the objective level in 2005. Felixstowe 15 and 16 were removed from the survey in 2004, they were sited to determine the existence of a NO_2 concentration gradient from the kerbside of Dock gate 2 roundabout (Felixstowe 16) to the receptor in Ferry Lane (Felixstowe 13), and were not representative of receptor locations. In 2004 Felixstowe 13 is the only site with a predicted NO_2 concentration above the objective level in 2005. The measured NO_2 concentrations in 2003 and 2004 have increased at Felixstowe 13 and 14. Both sites are located near to the Port of Felixstowe boundary, the Ferry Lane sites (Felixstowe 13) is to the north of the Port of Felixstowe and the Adastral Close site (Felixstowe 14) is to the south-east. The measured concentration at Adastral Close (Felixstowe 14) in 2004 is now close to the objective level.

Felixstowe 4 and 12 are located in the centre of Felixstowe and confirm that predicted levels are within the 2005 objective. Concentrations of NO_2 at the three new sites (Felixstowe 17, 18 and 19) located to measure concentrations close to the A14 are also within the objective level.

Felixstowe 4 and 19 are both urban background locations and show very similar levels, indicating that the predicted background NO_2 concentration in Felixstowe and the Trimleys for 2005 is 25.4 – 25.9μg/m^3.

Table 11.1 Bias corrected annual mean NO_2 diffusion tube concentrations recorded in 2003 and 2004 for sites in Felixstowe and the Trimleys. Figures in micrograms per cubic metre (μg/m^3). Annual mean concentration at each site predicted forward to 2005.

Site and location	2003		2004	
	Annual mean	**Predicted annual mean in 2005** (Kerbside and Roadside sites = x 0.95 Others = x 0.96)	**Annual mean**	**Predicted annual mean in 2005** (Kerbside and Roadside sites = x 0.97 Others = x 0.98)
Felixstowe 4 (Lynwood Avenue) **(UB)**	25.7	**24.7**	25.9	**25.4**
Felixstowe 5 (High Road West)	34.0	**32.3**	~	**~**
Felixstowe 6 (Nayland Road)	36.4	**34.6**	~	**~**
Felixstowe 9 (Brinkley Way)	25.2	**24.2**	~	**~**
Felixstowe 12 (Hamilton Road)	35.6	**33.8**	35.1	**34.0**
Felixstowe 13 (Ferry Lane)	42.6	**40.9**	47.4	**46.5**
Felixstowe 14 (Adastral Close)	36.4	**34.9**	39.9	**39.1**
Felixstowe 15 (Ferry Lane)	55.2	**53.0**	~	**~**
Felixstowe 16 (Ferry lane)	69.2	**65.7**	~	**~**
Felixstowe 17 (Spriteshall lane)	~	**~**	29.1	**28.2**
Felixstowe 18 (Kirton Road)	~	**~**	33.6	**32.6**
Felixstowe 19 (Welbeck Close) **(UB)**	~	**~**	26.4	**25.9**

The diffusion tube sites Felixstowe 13, 14 and 17 compare in their locations with receptors modelled in the FSR Environmental Statement. The annual mean predicted NO_2 concentrations for these sites are as follows:

- Ferry Lane receptor location (Felixstowe 13) has a predicted annual mean NO_2 concentration as measured by diffusion tube of 46.5 $\mu g/m^3$ in 2005 and a modelled concentration of 27.0 $\mu g/m^3$ under the 2008 BAU scenario.
- Adastral Close receptor location (Felixstowe 14) has a predicted annual mean NO_2 concentration as measured by diffusion tube of 39.1 $\mu g/m^3$ in 2005 and a modelled concentration of 27.1 $\mu g/m^3$ under the 2008 BAU scenario.
- Spriteshall Lane receptor location (Felixstowe 17) has a predicted annual mean NO_2 concentration as measured by diffusion tube of 28.2 $\mu g/m^3$ in 2005 and a modelled concentration of 41.5 $\mu g/m^3$ under the 2008 BAU scenario.

The receptors close to the Port of Felixstowe boundary have a higher predicted concentration of NO_2 from the diffusion tube monitoring. The receptor close to the A14 but away from the Port of Felixstowe boundary has a higher predicted concentration of NO_2 from the detailed computer modelling. It would be expected that the modelled concentrations should be consistently higher than measured concentrations, as the modelling included additional emissions from committed development not currently present at the Port of Felixstowe. The number of comparable sites is too few at the current time to confirm any trends. Seven new diffusion tube sites have been located at receptors near the Port of Felixstowe boundary and along the A14 in order to provide more detailed information. These sites are shown on the maps in Appendix D of this report and are as follows:

- Felixstowe 20 – located in Glemsford Close, near to the Port of Felixstowe Road at the Haven Exchange roundabout and closest to the north / north-east boundary of the Port of Felixstowe.
- Felixstowe 21 – located in Kings Fleet Road to provide an urban background concentration to the north / north-east of the Port of Felixstowe.
- Felixstowe 22 - located in Levington Road, closest to the East / north-east boundary of the Port of Felixstowe.
- Felixstowe 23 – located in Heathgate Piece, Trimley St. Mary, near to the A14 at the Dock Spur roundabout.
- Felixstowe 24 – located in Brandon Road, close to the Port of Felixstowe Road and its slip road off to Dock Gate 2 roundabout.
- Felixstowe 25 – located in Rendlesham Road, at the closest receptor to the Port of Felixstowe Road.
- Felixstowe 28 – located in Blyford Way, close to the Port of Felixstowe Road and its slip road off to Dock Gate 2 roundabout.

The site of greatest concern is the receptor location in Ferry Lane, the Dooley Inn Public House. This single receptor is situated approximately 70 metres from Dock Gate 2 roundabout and the Port of Felixstowe boundary, to the north-west. The map in figure 11.1 shows the site detail. The diffusion tube monitoring site at this location (Felixstowe 13) is triplicated and has been corrected for bias thereby increasing the accuracy of its measurements. Monitoring undertaken in 2004 at this site shows a predicted NO_2 concentration in 2005 of 46.5 $\mu g/m^3$, which is above the objective level.

During the monthly site visits made in 2004 to change the diffusion tubes it was noted that the car park at the front of the building was used more often and by more vehicles than was at first suggested. Vehicles have also been seen on a number of occasions, when the pub is busy, parked in close proximity (1-2 metres) to the diffusion tubes. Information provided confirms that both the rear and sometimes front car parks are often used to park Heavy Goods Vehicle cabs overnight. The pub Landlord has also confirmed that only the top floor of the building is used for residential purposes.

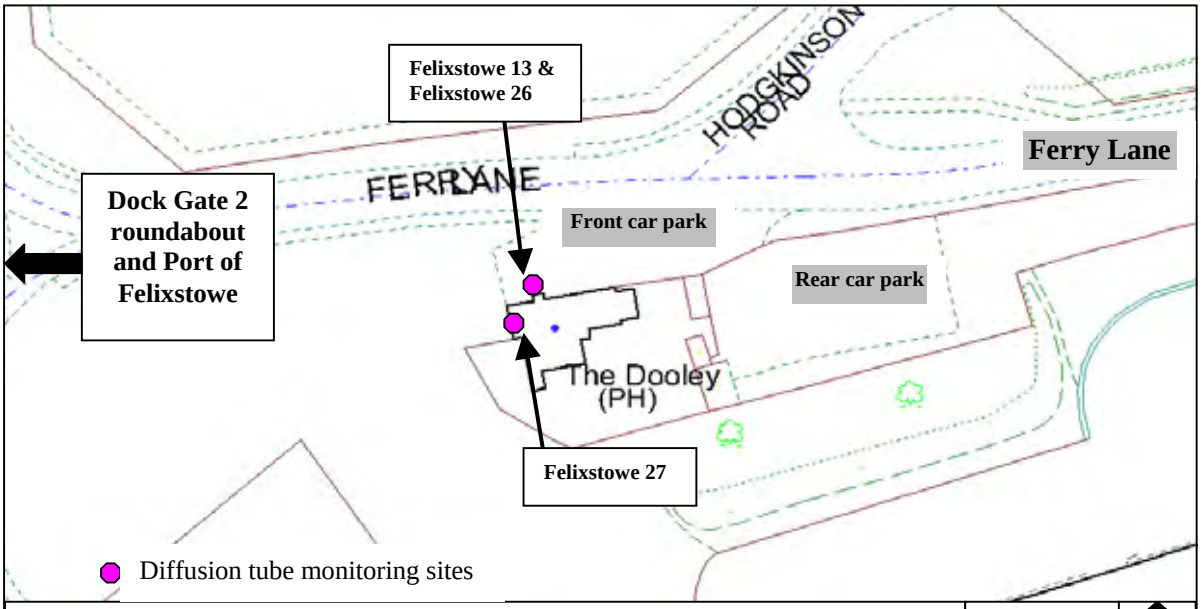
This information suggests that NO_2 concentrations recorded at Felixstowe 13 may be influenced by emissions from vehicle exhausts in close proximity. This may be leading to an increase in the concentrations being recorded by the diffusion tubes which is not necessarily representative of ambient levels at this site. The confirmation that only the top floor of the building is used for

residential purposes, and is therefore the relevant receptor location for annual mean NO_2 concentrations also suggests that the diffusion tubes may not be situated at the best location.

Two new single diffusion tube monitoring locations were added on this site in January 2005 to determine whether the above situations have any influence on the NO_2 concentrations being recorded. Felixstowe 26 is located on the same drainpipe as Felixstowe 13 but at the height of the first floor windows of the building. Felixstowe 27 is located on the south-west side of the building facing towards the Port of Felixstowe and Dock Gate 2 roundabout, and at the height of the first floor windows of the building.

At the end of 2005 12-months of monitoring information will be obtained for all of the new diffusion tube sites in Felixstowe and the Trimleys. This will enable Suffolk Coastal District Council to consider whether declaration of an Air Quality Management Area for NO_2 is necessary at receptor locations near to the Port of Felixstowe and/or along the A14.

Site map and location of nitrogen dioxide diffusion tubes at The Dooley Inn Public House, Ferry Lane, Felixstowe



Sulphur dioxide (SO_2)

The Updating and Screening Assessment and Detailed Assessment concluded, for all sources of SO_2 investigated, that it was unlikely the objectives would be exceeded and no further assessment was necessary. A Detailed Assessment of SO_2 emissions arising from shipping and other activities on and associated with the Port of Felixstowe was undertaken by Entec UK Limited, on behalf of Suffolk Coastal District Council. Detailed monitoring was undertaken at a site relevant to the nearest receptor location to the Port, which determined that ambient concentrations of SO_2 were within the relevant air quality criteria.

The detailed monitoring was undertaken in 2002, at which time the Trinity III (Phase 2) Terminal extension was not completed. The Trinity III (Phase 2) Terminal extension was opened in November

2004, this added 270 metres of quay for deep-water berths and land for new storage and handling facilities at the Port of Felixstowe. The extension of deep-water quay at the Port increases the number of larger ships that can be berthed simultaneously. The infrastructure is now all in place and the terminal is working to full capacity. The current situation at the Port of Felixstowe is therefore much different to that in 2002 when the detailed monitoring was undertaken.

Information was obtained regarding the number of ship calls and the volume of cargo handled in 2002 and 2004 at the Port of Felixstowe, in order to provide an indication of any changes that have occurred. The number of ship calls has reduced significantly from 6,132 in 2002 to 4,415 in 2004, but the volume of cargo handled shows no significant difference. This may be as a result of the capacity for larger ships to berth at the Port due to the extension of deep-water quay.

It could be concluded that a reduction in the number of ship calls to the Port between 2002 and 2004 would reduce SO_2 emissions from shipping, and therefore reduce the concentration of SO_2 at nearby receptor locations. Emissions from ships engines are, however, complex and determined by a number of parameters including stack height, stack diameter and fuel type. It cannot therefore be concluded that concentrations of SO_2 at receptor locations have decreased or are even similar to those measured in 2002, and the results of the detailed monitoring undertaken will not be used to determine the current situation.

The air quality assessment provided as part of the Environmental Statement for the FSR planning application included detailed modelling of SO_2 emissions from activities on and associated with the Port of Felixstowe. The modelling undertaken for the BAU scenario in 2008 predicts concentrations of SO_2 at 13 specific receptor locations within the Suffolk Coastal district. The Environmental Statement includes model predictions of the 99.7th percentile hourly mean concentration and the 99.1th percentile 24-hour mean concentration of SO_2. Predicted concentrations at all 13 receptor locations are well within the levels set for these two objectives. The Environmental Statement does not include any predictions of the 99.9th percentile 15-minute mean concentration which is usually the most stringent of the three objectives.

Netcen had a number of comments with regard to the air quality assessment of SO_2 within the Environmental Statement. One of the receptor locations modelled was Avocet House, the location of detailed monitoring undertaken in 2002 by Suffolk Coastal District Council. The model predicted concentrations for a base year in 2001, which were all markedly less (by a factor of approximately two) than the measured concentrations recorded in 2002. Netcen concluded that it was unlikely that the short-term 15-minute mean objective would be breached at Avocet House with the FSR in place. They were concerned, however, that a risk exists for the discharge plumes from ships at berth to combine when the wind is from the north-west or south-east and cause objective exceedances at receptor locations.

Data required for a screening modelling study to predict the concentration of SO_2 at receptor locations near to the Port of Felixstowe is being investigated with the assistance of netcen. Once the data is obtained it will be determined whether detailed monitoring and modelling of SO_2 emissions is necessary. The findings will be reported in the Updating and Screening Assessment report, which is due to be published in April 2006.

Particles (PM_{10})

The Updating and Screening Assessment and Detailed Assessment concluded that emissions from traffic and shipping in isolation were unlikely to cause exceedances of the objectives and further assessment was not necessary. The conclusions drawn for emissions from shipping from the report provided by Entec UK Limited were questioned in a consultation response and it was determined that Entec UK Limited would liase directly with the consultee and report back on their findings.

The Updating and Screening Assessment and Detailed Assessment also concluded that the potential exists for emissions of PM_{10} from combined activities at the Port of Felixstowe to cause elevated concentrations at nearby receptor locations, and that further assessment was needed. An assessment of PM_{10} from combined activities on and associated with the Port of Felixstowe was included in the Environmental Statement that had been submitted as part of the Felixstowe South Reconfiguration planning application. This included detailed information regarding current emissions of PM_{10} from the different activities associated with the Port of Felixstowe, and future emissions should the planning approval be given. It was determined that an assessment would be made by Suffolk Coastal District Council of the current potential for the PM_{10} objectives to be exceeded following receipt of comments from netcen, employed by Suffolk Coastal District Council to comment on the air quality assessment included in the Environmental Statement.

Following liaison directly with the consultee, Entec UK Limited submitted a new report to Suffolk Coastal District Council in 2004. The new report quoted an increased number of shipping vessels leaving and entering the Port, and predicted a higher concentration of PM_{10} at the receptor location than originally estimated. This report was based on the detailed monitoring undertaken for SO_2 in 2002, at which time the Trinity III (Phase 2) Terminal extension was not completed. The Trinity III (Phase 2) Terminal extension was opened in November 2004, this added 270 metres of quay for deep-water berths and land for new storage and handling facilities at the Port of Felixstowe. The infrastructure is now all in place and it is working to full capacity. The report is therefore not representative of the current situation at the Port of Felixstowe, and the revised version will not be submitted or used in the review and assessment process.

The air quality assessment provided as part of the Environmental Statement for the Felixstowe South Reconfiguration (FSR) planning application included detailed modelling of PM_{10} emissions from activities on the Port of Felixstowe and traffic on the A14 associated with the Port of Felixstowe. The modelling undertaken for the Business As Usual (BAU) scenario in 2008 represents the worse case, due to inclusion of emissions from committed development at the Port not yet in place, and predicts concentrations of PM_{10} at 13 specific receptor locations within the Suffolk Coastal district. The worse case scenario model predictions for 2008 have been used to assess current PM_{10} concentrations at receptor locations close to the Port of Felixstowe and the A14.

The model for 2008 shows predicted annual mean and 24-hour mean PM_{10} concentrations at all receptor locations to be within the 2004 objective levels of 40 $\mu g/m^3$ and 50 $\mu g/m^3$ respectively. The highest predicted annual mean concentration in 2008 is 25.2 $\mu g/m^3$ at receptor locations in both The Downs (close to the Port of Felixstowe Road) and Spriteshall Lane (close to Dock Spur roundabout). The highest predicted 24-hour means are also seen at these locations with a concentration of 25.6$\mu g/m^3$ predicted at The Downs and 25.7 $\mu g/m^3$ predicted at Spriteshall Lane. The Proof of Evidence submitted by netcen at the Public Inquiry agrees that PM_{10} concentrations at all receptor locations considered will not exceed the objectives for 2004.

As the modelling represents a worse case scenario, with all committed development included in the predictions for BAU in 2008, it is concluded that both the annual mean and 24-hour mean PM_{10} objectives will be met at receptor locations near to the Port of Felixstowe and along the A14. No further review and assessment of PM_{10} is therefore necessary.

Conclusion

Detailed computer modelling of NO_2 emissions from activities on and associated with the Port of Felixstowe has been undertaken as part of the FSR planning application. The modelling presents a worse case scenario, with all committed development included in the predictions for BAU in 2008. It concludes that the annual mean NO_2 objective in 2005 will be exceeded at receptor locations situated in The Downs (close to the Port of Felixstowe Road) and Spriteshall Lane (close to Dock Spur

roundabout). Results of diffusion tube monitoring undertaken in 2004 do not correspond with the modelling results and 7 new diffusion tube monitoring sites have been established at the start of 2005 to obtain further information for receptor locations close to the Port of Felixstowe and along the A14. The monitoring site in Ferry Lane at The Dooley Inn Public House shows concentrations of NO_2 above the objective levels when predicted forward to the end of 2005. Doubts have been cast on the reliability of results from the monitoring location due to vehicles parking in close proximity to the diffusion tubes and the relevant receptor location being confirmed as the top floor of the building only. Two new diffusion tube sites have been established on the building at the height of the receptor and away from the direct emissions of vehicles using the car park at the front of the building. At the end of 2005 12-months of monitoring information will be obtained for all of the new diffusion tube sites in Felixstowe and the Trimleys. This will enable Suffolk Coastal District Council to consider whether declaration of an Air Quality Management Area for NO_2 is necessary at receptor locations near to the Port of Felixstowe and/or along the A14.

The results of detailed SO_2 monitoring undertaken in 2002 cannot be used to determine the current situation at receptors close to the Port of Felixstowe due to changes that have occurred at the Port following the Trinity III (Phase 2) terminal extension. Detailed computer modelling of SO_2 emissions from activities on and associated with the Port of Felixstowe has been undertaken as part of the FSR planning application. The report produced was assessed by independent consultants, netcen, who expressed concern that a risk exists for the discharge plumes from ships at berth to combine when the wind is from the north-west or south-east and cause objective exccedances at receptor locations. Data required for a screening modelling study to predict the concentration of SO_2 at receptor locations near to the Port of Felixstowe is being investigated with the assistance of netcen. Once the data is obtained it will be determined whether detailed monitoring and modelling of SO_2 emissions is necessary. The findings will be reported in the Updating and Screening Assessment report, which is due to be published in April 2006.

Detailed computer modelling of PM_{10} emissions from activities on and associated with the Port of Felixstowe has been undertaken as part of the FSR planning application. The modelling presents a worse case scenario, with all committed development included in the predictions for BAU in 2008 and concludes that both the annual mean and 24-hour mean PM_{10} objectives will be met at receptor locations near to the Port of Felixstowe and along the A14. No further review and assessment of PM_{10} is therefore necessary.

The Public Inquiries for the FSR and Bathside Bay Container Terminal planning applications have not reached decisions on either development as yet, but decisions on both are expected later in 2005. Predictions of pollutant concentrations at receptor locations with the FSR and/ or Bathside Bay Container Terminal developments in place will be considered once the Public Inquiry decisions have been made, if planning approval is given.