

ELLESMERE PORT & NESTON
Borough Council

AIR QUALITY REVIEW

EXECUTIVE SUMMARY

The U.K. Government published its strategic policy framework for air quality management in 1995 establishing national strategies and policies on air quality which culminated in the Environment Act, 1995. As a requirement of the Act, the Secretary of State has since prepared a National Air Quality Strategy. The National Air Quality Strategy provides a framework for air quality control through air quality management and air quality standards. New national air quality standards have been proposed by the Expert Panel on Air Quality Standards (EPAQS) for the U.K. Government. These new air quality standards and their objectives have been enacted through the Air Quality Regulations in December 1997. The Environment Act requires Local Authorities to undertake an air quality review for the following pollutants namely: Benzene, 1,3-Butadiene, Carbon Monoxide, Lead, Nitrogen Dioxide, PM₁₀ and Sulphur Dioxide.

The first step in this process is to undertake a review of current and potential future air quality. The Review and Assessment process is split into three distinct stages namely: Stage 1 which is an information gathering exercise to determine whether or not levels of any of the specific pollutants are likely to exceed the predicted objectives. Stage 2 is carried out if any of the levels in Stage 1 are likely to be exceeded and may involve computer modelling. This Stage is intended to provide further screening. Stage 3 is progressed if pollutant levels are still expected to exceed the objective for the year 2005. Stage 3 is the most detailed stage in which emission inventories and expensive and sophisticated computer modelling and automatic monitoring equipment is used.

A minimum of two air quality reviews are recommended in order to assess compliance with air quality objectives, one to assess air quality at the outset of the National Air Quality Strategy and a second to be carried out towards the end of the policy timescale (2005). The number of reviews necessary depends on the likelihood of achieving the objectives. In areas where air quality objectives are not anticipated to be met by the year 2005, Local Authorities are required to establish Air Quality Management Areas.

This report is equivalent to a stage one review as outlined in the Government's published guidance. The air quality review investigates current air quality through an examination of the locality and size of principle emission sources, and by reference to monitored air quality data previously and currently being established by Ellesmere Port and Neston Borough Council.

The Council recognised at an early stage the potential air quality issues due to the large amounts of Industry in close proximity and the general public's perception of poor air quality in the Borough. At this point a partnership approach was set up to install sophisticated monitoring equipment to monitor for a wide range of pollutants. The results of previous monitoring have given this Council an advantage over other Local Authorities, as we currently know levels of many pollutants within our area.

The outcome of the Stage 1 Review and assessment indicates that a **Stage 2 Review and Assessment is required to be carried out for all of the above pollutants specified above.**

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1.0 INTRODUCTION

1.0 INTRODUCTION

In accordance with the Environment Act 1995, Part 4: all Local Authorities have a statutory duty to carry out a review and assessment of air quality within their area. The purpose of the review and assessment is to assess both the current and predicted (up to 2005) levels of the pollutants listed in table 1 below together with the objectives to be achieved by 2005.

The review and assessment process is split into three stages:

Stage 1 - Involves gathering information relating to traffic flows, Part A and B Authorised Processes, large boiler plant (>5MW), proposed developments and any other significant source. This information is then collated to determine whether levels of any of the specific pollutants are likely to exceed the predicted levels listed in table 1.

Stage 2 - Is undertaken if any of the levels in Stage 1 are likely to exceed the standards and objectives listed in table 1. This stage is intended to provide further screening of the pollutant concentrations within the Local Authority's boundary. Two alternative approaches to the second Stage review and assessment are advised, one based on a projection of current monitoring data, and one based on screening models to determine potential 'hot spot' areas.

Stage 3 - In this stage the Authority is expected to undertake a detailed review and assessment of the current and future air quality. This stage includes modelling of potential 'hot spot' areas using ADMS computer modelling, automatic monitoring to validate the model and accurately determine measurement of pollutants and the use of emission inventories.

Should the results of the Stage 3 Review and Assessment demonstrate that exceedences of the objectives will not be met, Air Quality Management Areas must be set up.

1.1 AIMS AND OBJECTIVES

The aims of this report were:

1. To investigate both the present and potential future air quality within the Borough of Ellesmere Port and Neston.
2. To make an assessment of air quality in relation to the requirements of the National Air Quality Strategy.
3. To make recommendations regarding the subsequent management of air quality within the Borough of Ellesmere Port and Neston.

The objectives of this report were to:

1. Identify the principle sources of pollutant emissions affecting air quality within the borough of Ellesmere Port and Neston.
2. Identify areas within the Borough of Ellesmere Port and Neston, which are likely to experience the highest concentrations of pollutants
3. Indicate whether present and predicted air quality in the district is likely to comply with the requirements of the National Air Quality Strategy.
4. Identify any future actions that are to be required by Ellesmere Port and Neston Borough Council under Part IV of the Environment Act 1995.
5. Identify areas of work for further investigation.

2.0 NATIONAL AIR QUALITY STRATEGY

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2.1 INTRODUCTION

During the early 1990s, the Department of Environment, Transport and the Regions' (DETR) has been investigating the need for a new framework for air quality control. This has been fuelled by recent episodes of poor air quality in many of the UK's major urban areas and by increasing concerns expressed by both the public and the scientific community. The need to reconcile rising demands in living standards with the maintenance of environmental quality has already been recognised in Agenda 21 and is now taken further with the development of the National Air Quality Strategy (NAQS).

2.2 THE NEED FOR A NATIONAL AIR QUALITY STRATEGY

Major elements of the Environment Act 1995 include:

- Section 80** Obliges the Secretary of State (SoS) to publish a National Air Quality Strategy as soon as possible.
- Section 81** Obliges the Environment Agency to take account of the strategy.
- Section 82** Requires Local Authorities, any unitary or district, to review air quality and to assess whether the air quality standards and objectives are being achieved. Areas where standards fall short must be identified.
- Section 83** Requires a Local Authority, for any area where air quality standards are not being met, to issue an order designating it an Air Quality Management Area (AQMA).
- Section 84** Imposes duties on a Local Authority with respect to AQMAs. The Local Authority must carry out further assessments and draw up an action plan specifying the measures to be carried out and the time-scale to bring air quality in the area back within limits.
- Section 85** Gives reserve powers to cause assessments to be made in any area and to give instructions to a Local Authority to take specified actions. Authorities have a duty to comply with these instructions.
- Section 86** Provides for the role of County Councils to make recommendations to a district on the carrying out of an air quality assessment and the preparation of an action plan.
- Section 87** Provides SoS with wide ranging powers to make regulations concerning air quality. These include standards and objectives, the conferring of powers and duties, the prohibition and restriction of certain activities or vehicles, the obtaining of information, the levying of fines and penalties, the hearing of appeals and other criteria. The regulations must be approved by affirmative resolution of both Houses of Parliament.
- Section 88** Provides powers to make guidance that Local Authorities must have regard to.

2.3 OVERVIEW OF THE PRINCIPLES AND MAIN ELEMENTS OF THE NATIONAL AIR QUALITY STRATEGY

For each of the pollutants listed in Table 1, a **standard** and an **objective** has been prescribed to provide parameters for reviewing and assessing each pollutant.

The air quality **standards** in the strategy are set from research into the effects on health and **represent minimum or no significant risk levels**. They are not based on an assessment of costs and benefits or issues of technical feasibility.

The air quality **objectives** in the strategy represent the **Government's present judgement of achievable air quality by the year 2005 on the evidence of costs and benefits and technical feasibility**. These therefore provide the framework for determining the extent to which policies should aim to improve air quality, and also **provide a measure for each of the pollutants of concern by which progress towards achieving improved air quality can be measured**.

2.4 AIR QUALITY REVIEWS PREVIOUSLY CARRIED OUT

Government has previously carried out air quality management activities under Phase 1 Guidance. The following includes work previously undertaken:

Group	Air Quality Management Action
The 32 London Boroughs	London wide review and assessment. Co-ordination of District activities.
Cambridge County & City Councils with S Cambridgeshire	Kerbside monitoring and modelling. Modelling of congested centre. Investigation of relationships between hydrocarbons and other pollutants.
Hampshire C.C. and District Councils (includes Southampton and Portsmouth)	Survey of Benzene and 1,3-Butadiene in the vicinity of Fawley oil refinery. V.O.C. emissions inventory.
Cornwall County and District Councils as Cornwall Air Quality Forum	Investigations of PM ₁₀ in the vicinity of quarrying activities.
The new Unitary Authorities of the former County of Avon	Investigation of Sulphur Dioxide and Hydrocarbon concentrations in Avonmouth.
West Midlands Metropolitan Authorities	Regional and small scale modelling. Characterisation and modelling of lead around industrial sources. Validation of emissions inventory methodology.
District Councils of N.E. Derbyshire, Bolsover,	Characterisation and assessment of PM ₁₀ in the vicinity of quarrying activities.

**Chesterfield, Derbyshire
Dales and High Peak
Borough**

Ribble Valley B.C.

Modelling and measurement studies in the vicinity of a cement works.

**Merseyside Metropolitan
Authorities**

Validation of emission inventory for Part A and B processes. Production of V.O.C. inventory from EPA 90 sources.

**Barnsley, Rotherham and
Doncaster MBC's**

Quantification of cost of EPA 90 inventory approach.
Monitoring of Sulphur Dioxide and PM₁₀ from domestic coal burning.

**Metropolitan Authorities of
Tyne and Wear as the Tyne
and Wear Air Quality
Management Group**

V.O.C. emission inventory.
PM₁₀ monitoring around open cast coal mining.
Lead monitoring and modelling around industrial sites.

City of Glasgow

Industrial emissions inventory with particular emphasis on Part B Processes.

City of Aberdeen

Modelling within congested streets of city centre requiring mini emissions inventory, automatic traffic counters and extra monitoring.

**The new Unitary
Authorities of Neath and
Port Talbot and Swansea**

Monitoring and modelling studies of PM₁₀, NO_x and 1,3-Butadiene in the vicinity of steel works.

2.5 FIRST STAGE REVIEW AND ASSESSMENT PROCEDURE

The first stage review and assessment procedure is designed to collate all the information available relating to air quality, especially in relation to the following areas:

- Part A and B Authorised processes both within the Borough and bordering areas.
- Information relating to traffic flows and mean speeds for all the major roads within the Borough.
- Information relating to future developments that may have an impact air quality.
- The use of national data relating to background concentrations located on the Internet.
- Data from current air quality monitoring carried out within the Borough.
- Any other information available relating to the air quality within the Borough.

Once all this information has been collated it will be examined to determine any areas within the Borough that are either currently or by the year 2005 likely to exceed the standards and objectives set out in table 1 above.

2.6 KEY POINTS

Key Points

- ∪ The Environment Act 1995 has required the development of a National Air Quality Strategy
- ∪ A central element in the Strategy is the use of air quality standards and associated objectives based on human health effects
- ∪ The Strategy uses a local air quality management approach in addition to existing national and international legislation. It promotes an integrated approach to air quality control by the various actors and agencies involved.
- ∪ Air quality objectives, with the exception of ozone and possibly PM₁₀s are required to be achieved by 2005. Ozone and PM₁₀s are classified as transboundary national and international pollutants.
- ∪ A number of air quality reviews are required in order to assess compliance with air quality objectives. The number of reviews necessary depends on the likelihood of achieving the objectives.

3.0 ELLESMERE PORT AND NESTON- AIR QUALITY REVIEW

3.0 ELLESMERE PORT AND NESTON AIR QUALITY REVIEW.

The Borough of Ellesmere Port and Neston extends across the southern part of the Wirral peninsula from the Mersey to the Dee, covering 33 square miles and having a population of approximately 81,200. The town of Ellesmere Port is the largest urban area in the Borough and starts where the Manchester Ship Canal and the Mersey are joined by the Shropshire Union Canal. The Borough itself is largely smoke controlled, with 19 Smoke Control Areas being set up between 1952 and 1982, highlighted in figures 1 and 2, leaving Neston and other small areas capable of using fossil fuels.

The M53 motorway runs around the north and east of the town, close to residential and shopping areas. The M56 motorway skims the boundary to the Southeast and runs Northeasterly. The major routes are indicated in figure 1. To the north and east of the towns are a number of industrial sites including an oil refinery and associated petro-chemical complex, a car assembly plant, and a chemical waste incinerator.

In the Borough there are approximately 57 Authorised industrial processes which, under the provisions of the Environmental Protection Act 1990, are authorised for integrated pollution control requirements by the Environment Agency or for pollution control purposes by the Borough Council. All of the prescribed processes are highlighted on Figure 3 and Tables 2 and 3.

Ellesmere Port and Neston Borough Council recognised at an early stage that atmospheric pollution was a major concern of residents within the Borough and that steps were required to be taken to forward the issue.

Ellesmere Port and Neston Borough Council were responsible for and the co-ordination and formulation of the EPICENTRE partnership.

The Council with help from other public, private and voluntary sector organisations developed a 'strategy' to 'regenerate' a substantial area of Ellesmere Port - the EPICENTRE. Funding for this regeneration came via a single Regeneration Budget Grant from central government, which was matched by the EPICENTRE partnership and Local Industries. One of the objectives of the regeneration strategy was to address the concerns of the local community in relation to environmental issues. Such concerns included a perception that air quality in the area was poor. It was therefore felt there was a need to investigate air quality within the area, relate this to national and international health related parameters and to inform local residents of the intention to install sophisticated monitoring equipment. This would allow continuous monitoring of a number of known pollutants across a significant part of the EPICENTRE area.

The setting up of the equipment has given the Council a 'head start' in dealing with Stage 1 Review and Assessment. The council is in a good position to assess any potential exceedences of the objectives and has furthered the partnership by adding to the monitoring strategy and including additional pollutants i.e. 1,3-Butadiene and other Hydrocarbons.

3.1 POLLUTANT MONITORING CARRIED OUT IN THE BOROUGH OF ELLESMERE PORT AND NESTON.

OPSIS air quality monitoring system was installed in October 1995 and has been running continually ever since that date.

Two OPSIS beams are used to determine the average concentrations of a pollutant over a long path length, therefore, the results reflect a level of pollution across a particular area and not at a single point (unlike typical 'Real Time' automatic monitoring where pollution levels are determined at a single point location).

It must be noted that the contrast in technique provides results with subtle differences, which can be misleading if not understood and interpreted correctly.

The dissimilarity is most important when considering the effects of relatively narrow plumes of pollution released close to the monitoring site. In the case of point sampling such a plume will give very high readings when directly over the point sampler. When considered over a period of time, there may be many occasions when the plume passes close to, but not over the point sampler and high levels are not recorded. In the case of OPSIS such a plume passing through the beam will be recorded as an average over the paths full length. This means that the maximum-recorded level will be lower than that recorded by the point monitor.

However, it is inevitable that there will be many more occasions when a plume impinges on the beam than on the single point, so OPSIS will record many more occasions of the presence of the plume. These difference may be notable when comparing data measured using the two different systems, particularly when considering the number of times a given level, such as the National Air Quality Objectives, is exceeded.

OPSIS, in this instant should be used complimentary to 'Real Time' automatic monitoring to highlight potential exceedences of the objectives.

Apart from OPSIS the Local Authority operates other highly sophisticated equipment for monitoring various pollutants throughout the Borough. The equipment itself ranges from 1 TEOM PM₁₀ sampler, 4 Sulphur Dioxide and Smoke Bubblers, 11 NO_x Diffusion tube sites, 2 Minivols particulate samplers and a meteorological station continuously collects wind speed, wind direction and ambient temperature data. The locations are shown in figure 4 and listed in Table 4.

The Local Authority has recently purchased 2 mobile air quality monitoring stations incorporating a NO_x Real Time Analyser, TEOM PM₁₀ monitor, and Sulphur Dioxide

Real Time Analyser in each. These mobile stations are to be up and running by spring of 1999, along with a further, separate, 'Real Time' NOx Analyser being located at an additional site. A gas chromatograph will be purchased by the spring of 1999. This piece of equipment is able to monitor 27 hydrocarbons of which Benzene and 1,3-Butadiene are included. A thorough Quality Assurance/ Quality Control programme has been formulated and implemented and the Meteorological Office have expressed satisfaction that the meteorological data gathered was valid and of good quality.

The Local Authority will therefore be able to monitor pollutants ranging from Benzene, 1,3-Butadiene, Lead, Nitrogen Dioxide, PM₁₀'s, Sulphur Dioxide, Formaldehyde, Ozone, Toluene and P-Xylene, of which, the first 5 are of relevance to this first stage review and assessment. Data from the above mentioned equipment and locations have been utilised in the review. The results of monitoring are discussed later in this report under the individual pollutant section

Furthermore the gas chromatograph has the capacity to monitor a number of pollutants which may be included in the DETR guidance for monitoring in the future.

4.0 REVIEW AND ASSESSMENT OF BENZENE

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4.1 INTRODUCTION

In the U.K. the main sources of atmospheric Benzene are via the distribution and combustion of petrol and from some specific authorised processes which use a large quantity of Benzene.

The risk to health from air borne Benzene is due to it being absorbed into the body through the lungs and distributed to the bone marrow. Once into the bone marrow it has the potential to cause non-lymphocytic leukaemia.

4.2 STANDARD AND OBJECTIVE FOR BENZENE

The Government has set a running annual average of 5 ppb as an air quality Standard for Benzene, with an objective for the standard to be achieved by the end of 2005. (Proposals by the DETR have brought forward compliance of the objective to 2003, with a new indicative level of 1ppb by 2005.)

4.3 THE NATIONAL PERSPECTIVE

The results of previous monitoring show that existing national policies are expected to deliver the prescribed air quality objective for Benzene by the end of 2005. Roadside levels of Benzene, next to even the most busy or congested roads are expected to be well below the objective by the year 2005. Only those Local Authorities with major industrial processes which either handle, store or emit Benzene which have the potential, in conjunction with other sources, to result in elevated levels of Benzene in relevant locations, are expected to need to undertake a second or third stage review and assessment.

4.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW AND ASSESSMENT OF BENZENE

The following information should be collated:

- Details of Part A Authorised Processes present within the Authority's area.
- Details of Part B Authorised Processes present in the Authority's area .
- Planned developments of the above mentioned types in the locality.
- Details of any significant sources of Benzene in neighbouring areas, which could impact significantly within the Authority's area.
- Details of any surveys or investigations undertaken to obtain information to compile the report.

For all existing and proposed activities identified by the Local Authority above, the Authority should then identify those existing or proposed processes or activities which have the potential, singly or together, to emit significant quantities of Benzene and;

- are expected to be in existence and/or operational by the end of 2005;
- and for which there is potential for exposure of individuals in relevant locations.

For the purposes of a first stage review and assessment for Benzene these can be assumed to consist of:

- One or more Part A or Part B Processes of the type indicated to be a potential significant source of Benzene highlighted in Tables 5 - 10 inclusive.
- Planned developments of the above mentioned types in the locality.

4.5 INDICATIONS FOR THE STAGE 2 REVIEW AND ASSESSMENT OF BENZENE

- There are no Part A Authorised Processes present within the Borough which emit significant quantities of Benzene. Fugitive emissions of Benzene have not been quantified by the Environment Agency but are believed to be present.
- There is 1 Part B Authorised Process within the Borough, namely the Shell UK Limited Petrol Terminal for the unloading of petrol onto tankers, which is liable to emit significant quantities of Benzene, along with 12 petrol stations which emit minor quantities of Benzene.
- There are no planned developments of the above mentioned types in the locality.
- There are no significant emitters of Benzene from sources in neighbouring areas, which could impact significantly on the Borough.
- The Shell UK Limited Petrol Terminal and all 12 petrol Stations are expected to be in existence and, or operational in 2005.

4.6 BENZENE MONITORING CARRIED OUT IN ELLESMERE PORT AND NESTON BOROUGH.

The Council has monitored Benzene since October 1995 using OPSIS. Graphs 1,2 and 3 demonstrate hourly averages for 1995-1998 using both OPSIS beams 001 and 002.

The summarised results are as follows:

1995-1996. Beam 001:	mean 3.20ppb (10.4µg/m ³)
1995-1996. Beam 002:	mean 3.92ppb (12.7µg/m ³)
1996-1997. Beam 001:	mean 2.80ppb (9.20µg/m ³)
1996-1997. Beam 002:	mean 2.53ppb (8.20µg/m ³)
1997-1998. Beam 001:	mean 3.00ppb (9.70µg/m ³)
1997-1998. Beam 002:	mean 3.02ppb (9.80µg/m ³)

The recorded annual means of 3.00ppb and 3.02ppb on beams 001 and 002 respectively for year ending 1997-1998 are below the current standard of 5ppb for year 2005. However recent proposals by the DETR are likely to bring forward this limit to December 2003 and insert a new indicative level of 1ppb by December 2005.

The results demonstrated a decrease in 1996-1997 but an upturn in 1997-1998. Comparisons of Benzene concentration against wind direction strongly indicate that there is a source of Benzene to the east of the beams. This may in part be attributed to traffic travelling on the M53 motorway. However, the fact that beam 001 is influenced to a greater extent by air reaching it from the east than is beam 002, suggests that industrial sources may play a significant role.

4.7 EXCEEDANCES OF THE AIR QUALITY STANDARD AND SPECIFIC OBJECTIVES

Within the Borough of Ellesmere Port and Neston the main source of atmospheric Benzene is through the storage and unloading of petrol at the Shell UK Limited Terminal located at Stanlow and via the unloading of petrol at approximately 12 petrol stations. Traffic also contributes to atmospheric Benzene, however, existing national policies ensure that even the busiest or congested roads will be below the objective.

The Petrol Terminal and petrol stations are currently dealt with under the Environmental Protection (Prescribed Processes and Substances Etc.) (Amendment) (Petrol Vapour Recovery) Regulations 1996. The majority of which will be dealt with under phase 1B of the above legislation, which means that vapour recovery equipment should be installed by the end of 1998 for petrol stations with a throughput of in excess of 1000m³ of petrol per annum. A vapour recovery plant is currently installed at the petrol terminal, however, one loading gantry requires upgrading by 2004.

Therefore, it is anticipated that via the implementation of this legislation that the standard and objective will be achieved for the initial target of 5ppb for 2003, but may not be met for the new target of 1ppb for 2005.

4.8 FURTHER INFORMATION OR ACTION REQUIRED TO FURTHER REVIEW BENZENE

The above information demonstrates that there is a slight risk of the standards and objectives being exceeded by the year 2003 but there are grave doubts that the target of 1ppb will be met by 2005, and hence there is a need for further information and action to be taken in the review of Benzene.

In order to establish the extent to which Benzene levels are effected by Industry which is situated immediately to the east of Ellesmere Port, requires further study and possibly an increase in the extent of monitoring being undertaken.

5.0 REVIEW AND ASSESSMENT OF 1,3-BUTADIENE

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5.1 INTRODUCTION

In the U.K. the main sources of atmospheric 1,3-butadiene is through the combustion of petrol and other fossil fuels and from some specific authorised processes, such as the production of synthetic rubber for tyres, which use large quantities of 1,3-butadiene. However, 1,3-butadiene is efficiently removed by catalytic converters on motor vehicles, which is likely to have a marked effect on the reduction of the levels in the atmosphere.

Currently there is a relative small amount of data available about the precise effects on human health. However, the data that is available does show 1,3-Butadiene to be a potential carcinogen and to act, through another chemical to which it is converted in the body, on the genetic material of cells as a genotoxic carcinogen.

5.2 STANDARD AND OBJECTIVE FOR 1,3-BUTADIENE

The Government has set a running annual average of 1 ppb as an air quality standard for 1,3-butadiene, with an objective for the standard to be achieved by the end of 2005. (Proposals by the DETR are to bring forward compliance of the objective to 2003.)

5.3 THE NATIONAL PERSPECTIVE

The results of previous monitoring show that existing national policies are expected to deliver the prescribed air quality objective for 1,3-butadiene by the end of 2005. Roadside levels of 1,3-Butadiene, next to even the most busy or congested roads are expected to be well below the objective by the year 2005. However, the Borough of Ellesmere Port and Neston does have a significant emitter of this pollutant in the area.

5.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW AND ASSESSMENT OF 1,3-BUTADIENE

The following information should be collated:

- Details of Part A Authorised Processes present within the Authority's area.
- Details of Part B Authorised Processes present in the Authority's area.
- Planned developments of the above mentioned types in the locality.
- Details of any significant sources of 1,3-butadiene in neighbouring areas, which could impact significantly within the Authority's area.
- Details of any surveys or investigations undertaken to obtain information to compile the report.

For all existing and proposed activities identified by the Local Authority above, the authority should then identify those existing or proposed processes or activities which have the potential, singly or together, to emit significant quantities of 1,3-butadiene and

- are expected to be in existence and/or operational by the end of 2005;
- and for which there is potential for exposure of individuals in relevant locations.

For the purposes of a first stage review and assessment for 1,3-butadiene these can be assumed to consist of:

- One or more Part A or Part B Processes of the type indicated to be a potential significant source of 1,3-butadiene highlighted in Tables 5-10 inclusive.
- Planned developments of the above mentioned types in the locality.

5.5 INDICATIONS FOR THE STAGE 2 REVIEW AND ASSESSMENT OF 1,3-BUTADIENE

- There is one Part A Authorised Process, namely Shell UK Limited, Ellesmere Port, Reference AK 3927, which emits significant quantities of 1,3-butadiene.
- There are no Part B Authorised Processes, which emit 1,3-butadiene.
- There are no planned developments of the above-mentioned type in the locality.
- There are no significant sources of 1,3-butadiene in neighbouring areas, which could impact significantly in the Authority's area.
- The London Research Centre Emission Inventory carried out in 1996 highlighted the area as a potential 'hot spot'.
- The Shell UK Limited Part A Authorised Premises is likely to be in existence by the year 2005.

5.6 1,3-BUTADIENE MONITORING CARRIED OUT IN ELLESMERE PORT AND NESTON BOROUGH.

Monitoring has not been carried out in the past by Ellesmere Port and Neston Borough Council.

5.7 EXCEEDENCES OF THE AIR QUALITY STANDARD AND SPECIFIC OBJECTIVES

The levels produced by the combustion of petrol are effectively removed by catalytic converters on motor cars and current national policies are expected to meet the objective, however, Ellesmere Port and Neston Borough Council has a major emitter of 1,3-butadiene within its area and as such a question mark is raised on whether the standard and objective will be achieved by 2005. (New proposals by the DETR may bring the limit of 1ppb brought forward to December 2003.)

5.8 FURTHER INFORMATION OR ACTION REQUIRED TO FURTHER

REVIEW 1,3-BUTADIENE

At present The Council has not carried out any monitoring for this pollutant. It is considered that modelling should be carried out in relation to the Part A Authorised Process highlighted above, alongside physical monitoring in the modelled footprint for validation purposes.

Supplementary Credit Approval from Government has allowed this Council to purchase a Gas Chromatograph. As discussed previously this piece of equipment is able to monitor 26 Hydrocarbons, of which 1,3-Butadiene is one. It is considered that once installed in a relevant 'hot spot' area, the council will be able to demonstrate whether a third stage review of this pollutant is required.

6.0 REVIEW AND ASSESSMENT OF CARBON MONOXIDE

6.0 REVIEW AND ASSESSMENT OF CARBON MONOXIDE

6.1 INTRODUCTION

Carbon Monoxide is a product of the incomplete combustion of organic substances or those that are essentially carbon. The major source of Carbon Monoxide in the atmosphere is through the combustion systems in vehicles. These systems are designed at optimum conditions to produce very little Carbon Monoxide, however, higher levels will be produced when the engine is either cold, poorly tuned, idling or moving slowly.

The Carbon Monoxide that is produced by vehicles is usually rapidly dispersed away from the roads and then broken down by photochemical reactions. However, during periods of cold still air, such as those that occur during winter, the rapid dispersion of the gas will be prevented. This will allow the levels to build up close to roads and other sources.

There is currently a great deal of information relating to the effects of Carbon Monoxide on the body. These have shown carbon monoxide affects the body by replacing the oxygen in the blood so hence preventing the body from getting sufficient amounts of oxygen to the various organs and issues etc.

6.2 STANDARD AND OBJECTIVE FOR CARBON MONOXIDE

The Government has set an 8-hour running average of 10 ppb as an air quality standard for Carbon Monoxide, with an objective for the standard to be achieved by the end of 2005. (Proposals from the DETR bring this limit forward December 2003).

6.3 THE NATIONAL PERSPECTIVE

The main source of Carbon Monoxide in the U.K. is road transport, which accounted for 75% of the total emission in 1995. Current monitoring throughout the U.K. has indicated that there is large variability in the maximum running 8-hour average exceedences especially in the major cities.

The existing national policies are expected to deliver the national air quality objective by the end of the year 2005 with the possible exception, in some years, of the vicinity of heavily congested roads or in the vicinity of certain stationary sources.

6.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW AND ASSESSMENT OF CARBON MONOXIDE

The following information should be collated:

- Information on current and 2005 forecast annual average daily traffic flows and peak hour mean traffic speeds for the major road network in the Authority's area.
- Information on current urban background concentrations due to dispersed road transport sources.
- Details of Part A Authorised Processes present within the Authority's area.
- Details of Part B Authorised Processes present in the Authority's area.
- Planned developments of the above mentioned types in the locality, including those which will increase traffic flow.
- Details of any significant sources of Carbon Monoxide in neighbouring areas that could impact significantly within the Authority's area.
- Details of any surveys or investigations undertaken to obtain information to compile the report.

For all existing and proposed activities identified by the Local Authority above, the Authority should then identify those existing or proposed processes or activities which have the potential, singly or together, to emit significant quantities of Carbon Monoxide and

- are expected to be in existence and/or operational by the end of 2005;
- and for which there is potential for exposure of individuals in relevant locations.

For the purposes of a first stage review and assessment for carbon monoxide these can be assumed to consist of:

- Road links with current or projected average daily traffic flow greater than 50,000 highlighted in Figure 1.
- One or more Part A Process of the type indicated to be a potential significant source of Carbon Monoxide highlighted in Tables 5 -8 inclusive.
- Planned developments of the above mentioned types in the locality including those which will increase traffic flow.

6.5 INDICATIONS FOR STAGE 2 REVIEW AND ASSESSMENT OF CARBON MONOXIDE

- There are currently no roads with current or projected average daily traffic flows greater than 50,000.
- There are 2 Authorised Part A Processes within the Borough, namely Shell UK and Bridgewater Paper Company which emit significant amounts of Carbon Monoxide.
- There are 2 proposed developments that will increase traffic flow, namely The Cheshire Oaks Designer Outlet Village and Leisure Complex.

All of the above are expected to be in existence or operational by 2005.

6.6 CARBON MONOXIDE MONITORING CARRIED OUT IN ELLESMERE PORT AND NESTON BOROUGH.

Carbon Monoxide monitoring has not been carried out by Ellesmere Port and Neston Borough Council.

6.7 EXCEEDENCES OF THE AIR QUALITY STANDARD AND SPECIFIC OBJECTIVES.

As monitoring has not been carried out to determine whether or not breaches of the objective have been made, indications for Stage 2 review and Assessment indicate that as there are 2 significant emitters of Carbon Monoxide the possibility exists.

6.8 FURTHER INFORMATION OR ACTION REQUIRED TO FURTHER REVIEW CARBON MONOXIDE

The above sources have the potential to exceed the standard and objective for carbon monoxide and hence in these areas a second stage review and assessment should take place. This will enable the Authority to gather more accurate data and to determine whether the standard and objective is likely to be exceeded by 2005.

7.0 REVIEW AND ASSESSMENT OF LEAD

7.0 REVIEW AND ASSESSMENT OF LEAD

7.1 INTRODUCTION

The main source of air borne Lead is through the manufacture of batteries, pigments, alloys, plastics and ammunition. In the past it was widely mixed with organic compounds within petrol, however, this has now largely ceased with the increase in the use of unleaded petrol.

Air borne Lead is absorbed into the body through the lungs and accumulates particularly in bone, teeth, skin and muscle. The effects of low levels of exposure to lead on health relate to effects on the central nervous system and, in particular, on the development of the brain.

7.2 STANDARD AND OBJECTIVE FOR LEAD

The Government has set an annual average of $0.5 \mu\text{g}/\text{m}^3$ as an air quality standard for Lead, with an objective for the standard to be achieved by the end of 2005. (Proposals from the DETR are set to bring this limit forward to December 2004 and introduce a new limit of $0.25 \mu\text{g}/\text{m}^3$ by December 2008).

7.3 THE NATIONAL PERSPECTIVE

Following earlier reductions in the amount of Lead in petrol, urban levels have reduced to the extent that the maximum values are now of the order of $150 \mu\text{g}/\text{m}^3$ even at the kerbside at Cromwell Road, West London. Rural values, as expected, are rather smaller and currently range from about $5\text{--}50 \mu\text{g}/\text{m}^3$. In industrial areas in the vicinity of processes, which emit Lead such as secondary non-ferrous metal smelters, levels can be higher than in urban areas where motor vehicle emissions are the main source of lead. Levels at such sites currently range from about $117\text{--}882 \mu\text{g}/\text{m}^3$.

7.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW AND ASSESSMENT OF LEAD

The following information should be collated:

- Details of Part A Authorised Processes present within the Authority's area.
- Details of Part B Authorised Processes present in the Authority's area .
- Planned developments of the above mentioned types in the locality, including those which will crease traffic flow.
- Details of large Part A Authorised Processes in neighbouring areas which could impact significantly within the Authority's area.
- Details of any surveys or investigations undertaken to obtain information to compile the report.

For all existing and proposed activities identified by the Local Authority above, the Authority should then identify those existing or proposed processes or activities which have the potential, singly or together, to emit significant quantities of Lead and;

- are expected to be in existence and/or operational by the end of 2005;
- and for which there is potential for exposure of individuals in relevant locations.

For the purposes of a first stage review and assessment for Lead these can be assumed to consist of:

- Part A Authorised Processes with the potential to emit significant quantities of Lead highlighted in Table 5 - 8 inclusive.
- Part B Authorised Processes, or a number of such processes in close proximity, which collectively have the potential to emit significant quantities of Lead highlighted in Tables 9 and 10.
- Industrial or other sites with non-prescribed processes with the potential to emit significant quantities of Lead.
- Planned developments of the above mentioned types in the locality, including those which will increase traffic flow

7.5 INDICATIONS FOR STAGE 2 REVIEW AND ASSESSMENT OF LEAD

- There are two Part A Authorised Processes within the Borough which emit significant quantities of Lead. Associated Octel Ltd have two processes namely a Process for the Manufacture of Lead Derivatives and a Sodium Process.
- There are no Part B Authorised Processes within the Borough of Ellesmere Port and Neston, which collectively have the potential to emit significant quantities of Lead.

- There are no Industrial non-prescribed processes within the Borough which have the potential to emit significant quantities of Lead, however The Cheshire Oaks Designer Outlet Village and Leisure Complex situated at Kinsey Road, Ellesmere Port does have the potential to emit significant quantities of Lead via car exhausts. The Outlet Village itself has approximately 7 million visitors per annum and it is envisaged that the new Leisure Complex could have up to ¼ million visitors per annum.
- There are various proposed developments for both residential and commercial purposes, which will result in increased traffic flows. These include a proposed Supermarket on land adjacent to Sutton Way and Whitby Road, an housing development of approximately 900 houses on a site at Ledsham Way, Ellesmere Port and other smaller residential development spread throughout the Borough.
- All of the above sources and activities are expected to be in existence and/or operational by 2005.

7.6 LEAD MONITORING CARRIED OUT IN ELLESMERE PORT AND NESTON BOROUGH.

Historical monitoring programs for Lead in the atmosphere within the Borough of Ellesmere Port and Neston were previously undertaken between the periods of 1979-1991. Concentrations of Lead were measured at four sites in the vicinity of Associated Octel Ltd. Appendix. The results from this period indicated Lead levels at $0.16\mu\text{g}/\text{m}^3$, which comply, with the current and proposed limits. However as the readings were both infrequent and inconsistent the results may be considered unreliable for future reference.

Subsequent monitoring was carried out using the filter cartridges from the TEOM PM₁₀ Monitor between 1995-1996, 1996-1997 and 1997-1998. The results indicate levels of Lead to be $0.03\mu\text{g}/\text{m}^3$ for period 1995-1997 and $0.015\mu\text{g}/\text{m}^3$ for period 1997-1998.

7.7 EXCEEDENCES OF THE AIR QUALITY STANDARD AND SPECIFIC OBJECTIVES.

There are two Authorised Part A Processes within the Borough of Ellesmere Port and Neston which have the ability to emit significant quantities of Lead, however the above results indicate that the levels of Lead in the atmosphere currently meet the existing and proposed limits. Levels of lead are expected to fall between now and 2005 within the Borough due to the implementation of the European Fuel Quality Directive which states that all member States will remove all Lead from Petroleum by the year 2000.

**7.8 FURTHER INFORMATION OR ACTION REQUIRED TO FURTHER
REVIEW LEAD**

In conclusion, present monitoring results indicates full compliance with the objective, however recent monitoring has not been carried out on a frequent basis. It is recommended that a Second Stage Review should be progressed as DETR Guidance does suggest that a Second Stage Review should be carried out if a major emitter of Lead from an Authorised Part A Process is located within the Borough.

It is recommended that further monitoring is carried out in the future to demonstrate continued compliance, possibly extending the sampling of the TEOM filter cartridges from not only OPSIS but also the mobile monitoring stations which will be in situ by spring of 1999.

7.0 REVIEW AND ASSESSMENT OF NITROGEN DIOXIDE

8.0 REVIEW AND ASSESSMENT OF NITROGEN DIOXIDE

8.1 INTRODUCTION

Nitrogen Oxides are formed during high temperature combustion processes from the oxidation of nitrogen in the air or fuel. The principal source of nitrogen oxides - Nitric Oxide (NO) and Nitrogen Dioxide (NO₂), collectively known as NO_x is road traffic, which is responsible for approximately half the emissions in Europe. NO and NO₂ concentrations are therefore greater in urban areas where traffic is heaviest. Other important sources are power stations, heating plants and industrial processes.

Nitrogen Oxides are released into the atmosphere mainly in the form of NO, which is then readily oxidised to NO₂ by reaction with ozone. Elevated levels of NO_x occur in urban environments under stable meteorological conditions, when the airmass is unable to disperse.

Nitrogen Dioxide has a variety of environmental and health impacts. It is a respiratory irritant, may exacerbate asthma and possibly increase susceptibility to infections. In the presence of sunlight, it reacts with hydrocarbons to produce photochemical pollutants such as ozone (see below). In addition, nitrogen oxides have a lifetime of approximately 1 day with respect to conversion to nitric acid. This nitric acid is in turn removed from the atmosphere by direct deposition to the ground, or transfer to aqueous droplets (e.g. cloud or rainwater), thereby contributing to acid deposition.

8.2 STANDARD AND OBJECTIVE FOR NITROGEN DIOXIDE

The Government has adopted a 1-hour average of 150 ppb as an air quality standard for Nitrogen Dioxide (NO₂), with a specific objective for the standard to be achieved as the hourly maximum by the year 2005. The Government has adopted an annual average of 21 ppb as an air quality standard with a specific objective to achieve this by the year 2005. (Proposals by the DETR are to amend the 1 hour mean to 104.6ppb with a maximum of 18 exceedences. The annual mean will remain the same, however a new annual national objective for the protection of vegetation of 15.7ppb is to be introduced for December 2000.)

8.3 THE NATIONAL PERSPECTIVE

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

NO₂ is produced by the oxidation of nitric oxide in the atmosphere and there is a complex relationship between emissions of NO_x and the resulting concentrations of NO₂, dependent on the proportion of NO₂ in the primary emission and the availability of atmospheric oxidant, especially ozone, to oxidise NO to NO₂. Exceedences of the 1-hour air quality objective for NO₂, if they occur, are most likely to be associated with either winter episodes of poor dispersion, such as that in London in December 1991, or during summer oxidant episodes. *[Local authorities do not have control over summer oxidant concentrations since these have a significant trans-boundary component. However, local authorities can influence sources of NO_x and thus prevent winter episodes and reduce the severity of summer episodes].*

8.4 INFORMATION REQUIRED FOR A STAGE 1 & 2 REVIEW OF NITROGEN DIOXIDE

The Authority should collate the following information:

- information on current and 2005 forecast annual average daily traffic flows and peak hour mean traffic speeds for the major road network in the Authority's area;
- information on current urban background concentrations due to dispersed road transport sources to be taken from local diffusion tube measurements at background sites or from maps;
- details of Part A Authorised Processes present within the Authority's area;
- details of Part B Authorised Processes present within the Authority's area;
- planned developments of the above mentioned types in the locality, including those which will increase traffic flow;
- details of large Part A Authorised Processes in neighbouring areas which can impact within the Authority's area;
- details of any surveys or investigations undertaken to obtain information to compile the report.

For all existing and proposed activities identified by the Local Authority, the Authority has to identify those existing or proposed processes or activities which have the potential, singly or together, to emit significant quantities of the pollutant(s) of concern. For the purposes of a First Stage review these can be assumed to consist of:

- an annual mean urban background concentration in 1994 of greater than 30 ppb
- one or more existing or planned roads with a projected annual average daily traffic flow of greater than 25,000 in 2005 highlighted in figure 1.

- one or more Part A Processes of the type indicated to be a potential significant source of NO_x highlighted in Tables 5 - 8 inclusive.
- an indication of existing sources acting in combination to exceed an annual mean concentration of 30 ppb as measured by diffusion tubes or equivalent measurement method highlighted in Graphs 4 - 6 inclusive.

8.5 INDICATIONS FOR STAGE 2 REVIEW AND ASSESSMENT OF NITROGEN DIOXIDE

- There were no sites within the Borough of Ellesmere Port and Neston which had an annual mean background concentration of greater than 30ppb.
- There are two roads, namely the M56 and M53 with a projected annual average daily traffic flow of greater than 25,000 in 2005.
- There are 14 Part A Authorised Processes within the Borough indicated to be potential significant sources of NO_x.
- All of the Authorised Part A Processes are expected to be in existence by 2005.

8.6 NITROGEN DIOXIDE MONITORING CARRIED OUT IN ELLESMERE PORT AND NESTON BOROUGH.

Nitrogen Dioxide monitoring has taken place in the Borough of Ellesmere Port since 1990. Initially 5 sites were set up, 4 of which complied with the criteria set down by United Kingdom National Survey. Subsequently 5 additional sites were added in 1997 in order to carry out a survey in the Neston area due to complaints of 'fallout' from Industrial sources situated across the Dee Estuary in Flintshire District. The list and locations of Diffusion Tubes are highlighted in Table 4 and Figure 4.

In 1995 OPSIS was installed to monitor Nitrogen Dioxide on a 'Real Time' basis. Results of monitoring are highlighted in Graphs 7 - 9 inclusive and summarised below for 1998:

DIFFUSION TUBES. Measured in ppb.

Site 1. 15.6	Site 2. 18.0	Site 3. 24.5	Site 4. 20.0
Site 5. 17.6	Site 6. 15.8	Site 7. 11.3	Site 8. 9.7
Site 9. 8.9	Site 10. 11.9	Site 11. 11.1	

As can be seen from the data, Site 3 does not meet the objective. However this site is located in the middle of the Stanlow Industrial complex. Site 4 is approaching the objective.

After comparing the data with the previous year, the results demonstrate that overall NO_x levels have decreased significantly for Sites 1 and 2, Site 3 remained constant and Sites 4, 5 and 6 decreased marginally. Comparisons can not be made for the other Sites due there only being one years data available.

OPSIS.

	<u>1998.</u>	<u>1997.</u>	<u>1996.</u>
Beam 001	16ppb.	15.8ppb.	18.3ppb.
Beam 002	14.5ppb.	17.5ppb	20.2ppb.

Beam 001 has increased by a negligible amount in 1998 compared to the previous year, however beam 002 has shown a marked decrease over all 3 years. The results for 1998 demonstrate that the objective is being complied with.

8.7 EXCEEDANCES OF THE AIR QUALITY STANDARD AND SPECIFIC OBJECTIVES

The above results indicate that the levels of NO_x in the atmosphere currently do not meet the existing and proposed limits for all sites. One site currently fails the existing objective with 3 other sites approaching the objective. Currently hourly monitoring is not carried out at these locations. Indications are that hourly monitoring may demonstrate non-compliance of the objective on these sites.

Indications for a Stage 2 Review and Assessment highlight that the further review should also be carried out due to the M53/56 motorways being present in close vicinity to the Borough and also the number of Part A Authorised Processes which emit significant amounts of NO_x.

8.8 FURTHER INFORMATION OR ACTION REQUIRED TO FURTHER REVIEW NITROGEN DIOXIDE

A Second Stage Review and Assessment is required to further review Nitrogen Dioxide within the Borough of Ellesmere Port and Neston.

Subsequently 5 Diffusion Tubes are to be located within the town centres of Ellesmere Port and Neston. The Council has recently purchased three 'Real Time' NO_x Analysers, of which consideration should be given to locating these in Ellesmere Port and Neston town centres and Cheshire Oaks designer Outlet Village adjacent to the M56 motorway.

9.0 REVIEW AND ASSESSMENT OF PM10

9.0 REVIEW AND ASSESSMENT OF PM₁₀

9.1 INTRODUCTION

PM₁₀ consists of particulate matter that is 10 µm in diameter. These particles arise in the air from a wide variety of sources, either natural or man-made. Of the former, forest fires and volcanic eruptions provide dramatic examples, while sea spray and the erosion of soil and rocks by wind are important sources in many localities. Biological sources are ubiquitous, and particularly in rural areas considerable numbers of pollen grains, fungal spores and their fragments contribute to the total mass of airborne particles. Man-made airborne particles result mostly from combustion processes, the working of soil and rock, many other industrial processes and the attrition of road surfaces by motor vehicles.

The largest single source in urban areas is road traffic, and within this category the largest component is that derived from diesel exhaust, followed by lead rich particles derived from running cars on leaded fuel.

The main effect on health is due to the particles being inhaled. These particles then reach the furthest parts of the lung, the air spaces or alveoli, where the delicate tissues involved in the exchange of oxygen and carbon dioxide and interfere with the essential process of respiration. This means that those individuals who suffer from respiratory problems are most likely to suffer adverse effects due to high levels of PM₁₀.

9.2 STANDARD AND OBJECTIVE FOR PM₁₀

The Government has set a running 24-hour average of 50 µgm⁻³ as an air quality standard for PM₁₀ with an objective for the standard to be achieved as the annual 99th percentile daily maximum running 24-hour averages (that is no more than four days exceeding the standard in a year), by the end of 2005. Proposals By the DETR are to set a new annual objective of 40µgm⁻³ and 24 hour objective of 50µgm⁻³ (maximum of 35 exceedences) for 2004.

9.3 THE NATIONAL PERSPECTIVE

PM₁₀ data from current national monitoring networks show that the current standard is being exceeded at all sites and it is likely that this will be the most difficult of the air quality objectives to be achieved by most local authorities. The majority of national monitoring network sites are in cities where road transport and domestic combustion are the main sources in the immediate vicinity. Results from the so-called "First Phase" studies undertaken by Local Authorities also clearly show the potential for significant impacts from industrial activity especially quarries.

A significant proportion of the current annual average PM₁₀ is due to the secondary formation of particulate sulphates and nitrates, resulting from the oxidation of sulphur

and nitrogen oxides. These are regional pollutants and the annual concentrations do not vary greatly over a scale of tens of kilometres. There are also natural or semi-natural sources such as wind blown dust and sea salt particles. The impact of local urban sources is superimposed on this regional background. Such local sources are generally responsible for winter episodes of hourly mean concentrations of PM₁₀ above 100µm⁻³ associated with poor dispersion.

It is clear that many of the sources of PM₁₀ are outside the control of individual local authorities. However, there is a significant local contribution to PM₁₀ concentrations, and authorities should focus their attention on the quantification of these local sources.

9.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW AND ASSESSMENT OF PM₁₀

The following information should be collated:

- Information on current and 2005 forecast annual average daily traffic flows and peak hour mean traffic speeds for the major road network in the Authority's area.
- Information on approximate emissions densities from road transport and other low-level dispersed sources (e.g. domestic coal burning) of PM₁₀.
- Information on current urban and rural background concentrations from locally sited measurements or from national maps.
- Details of Part A Authorised Processes present within the Authority's area.
- Details of Part B Authorised Processes present in the Authority's area.
- Planned developments of the above mentioned types in the locality, including those which will increase traffic flow.
- Details of any significant sources of PM₁₀ in neighbouring areas which could impact significantly within the Authority's area.
- Details of any surveys or investigations undertaken to obtain information to compile the report.

For all existing and proposed activities identified by the Local Authority above, the Authority should then identify those existing or proposed processes or activities which have the potential, singly or together, to emit significant quantities of PM₁₀ and

- are expected to be in existence and/or operational by the end of 2005;
- and for which there is potential for exposure of individuals in relevant locations.

For the purposes of a First Stage review and assessment for PM₁₀ these can be assumed to consist of:

- Urban areas for which the annual average regional background due to secondary particles is currently greater than 8µgm⁻³.
- Emissions from low-level dispersed sources greater than 10 tonnes in any single 1 km x 1 km grid square.
- One or more Part A or Part B Processes of the type indicated to be a potential significant source of PM₁₀ highlighted in Tables 5 - 10 inclusive.
- Any industrial process that emits significant quantities of dust in the form of PM₁₀ from uncontrolled or fugitive sources within a plant.

9.5 INDICATIONS FOR A STAGE 2 REVIEW AND ASSESSMENT OF PM₁₀

- It is unknown whether there are urban areas with an annual average regional background due to secondary particles greater than 8µgm⁻³, however results from the TEOM demonstrate the annual mean for 1998 to be 16.4µgm⁻³. A significant amount of this would be caused by secondary particles.
- There are 10 Part A Authorised Processes within the Borough which have the potential to emit significant sources of PM₁₀.
- There are 3 Part B Authorised Processes within the Borough which have the potential to emit significant sources of PM₁₀. (However D Morgan is a mobile crushing plant, therefore sources may be outside the Borough.)
- There are 8 Part A/B Authorised processes outside the Borough which have the potential to emit significant sources of PM₁₀.

9.6 PM₁₀ MONITORING CARRIED OUT IN ELLEMERE PORT AND NESTON BOROUGH.

Monitoring of PM₁₀ has been carried out by the Council since 1995 using the TEOM method highlighted in Graphs 10 - 12 inclusive.

Results broadly correlate with peak levels found at other AUN sites throughout the country which demonstrate that the objective existing and proposed is not being achieved. Recent research has demonstrated that particulates found in Britain have international sources and therefore have cross boundary effects from continental air streams.

9.7 EXCEEDANCES OF THE AIR QUALITY STANDARD AND SPECIFIC OBJECTIVES

Due to the large numbers of Authorised processes, within and outside the Borough that emit significant quantities of PM₁₀ and its correlation with exceedances of the objective in relation to OPSIS results it is recommended that the Council progress to a second Stage Review and Assessment of PM₁₀.

9.8 FURTHER INFORMATION OR ACTION REQUIRED TO FURTHER REVIEW PM₁₀

Further monitoring is required to determine the extent of the levels of PM₁₀ within the Borough.

Subsequently, the Council has purchased two further TEOMs to determine levels of particulate at locations within the Borough to be determined at Stage 2 Review and Assessment.

10.0 REVIEW AND ASSESSMENT OF SULPHUR DIOXIDE

10.0 REVIEW AND ASSESSMENT OF SULPHUR DIOXIDE

10.1 INTRODUCTION

Sulphur dioxide was one of the components of the dense fogs that occurred in industrial cities in the nineteenth century and earlier decades of the present century. The combination of this gas and sooty particles was derived from the widespread burning of coal in homes and factories, and it gave rise to the term smoke fog or 'smog' coined by Des Voeux in 1905. Public awareness of the effects on health was increased in the 1950s following the major smog episodes in London in 1952. Such episodes were shown to be associated with increased numbers of episodes of chest illness and large numbers of excess deaths, mainly among elderly people with heart and lung disease.

Sulphur dioxide acts as an irritant when it is inhaled, because of its acidic nature, and high concentrations may cause breathing difficulties in people exposed. Recent studies have shown that people suffering from asthma may be especially susceptible to the adverse effects of sulphur dioxide and that, within the range of concentrations that occur in pollution episodes, it may provoke attacks of asthma.

10.2 STANDARD AND OBJECTIVE FOR SULPHUR DIOXIDE

The Government has set a 15-minute average of 100 ppb as an air quality standard for sulphur dioxide, with an objective for the standard to be achieved as the 99.9th percentile (that is on all but 35 periods of 15 minutes per year), by the end of 2005. (Proposals by the DETR are to adopt a second 1 hour objective of 131 ppb ($350\mu\text{gm}^{-3}$), not to be exceeded more than 24 times per year, and 24 hour objective of 46.8ppb ($125\mu\text{gm}^{-3}$, not to be exceeded more than 3 times per year, for 2004)

10.3 THE NATIONAL PERSPECTIVE

Measurements from current national monitoring network sites show that exceedences of the air quality standard currently occur in the vicinity of industrial processes for which the stack heights were designed to meet previous air quality standards and in areas where significant quantities of coal are used for space heating. Sulphur dioxide concentrations are elevated at the kerbside but not sufficiently to exceed the air quality standard in the absence of other sources.

10.4 INFORMATION REQUIRED FOR STAGE 1 REVIEW AND ASSESSMENT OF SULPHUR DIOXIDE

The following information should be collated:

- Details of Part A authorised processes present within the Authority's area.

- Information on approximate emissions densities from domestic combustion and other low-level dispersed sources of sulphur dioxide.
- Information on current urban background concentrations from locally sited measurements or from national maps.
- Information on current and 2005 forecast annual average daily traffic flows and peak hour mean traffic speeds for the major road network in the authority's area.
- Details of Part B processes present in the authority's area.
- Information on the existence of combustion systems with thermal power rating greater than 5 MW using fuels containing significant quantities of Sulphur (i.e. solid fuels or fuel oil).
- Planned developments of the above mentioned types in the locality, including those which will increase traffic flow.
- Details of significant sources of Sulphur Dioxide in neighbouring areas, which could impact significantly within the Authority's area.
- Details of any surveys or investigations undertaken to obtain information to compile the report.

For all existing and proposed activities identified by the local authority above, the authority should then identify those existing or proposed processes or activities which have the potential, singly or together, to emit significant quantities of sulphur dioxide and

- are expected to be in existence and/or operational by the end of 2005;
- and for which there is potential for exposure of individuals in relevant locations.

For the purposes of a First Stage review and assessment for sulphur dioxide these can be assumed to consist of:

- Part A industrial processes of the type highlighted in Tables 5 - 8 inclusive.
- Part B industrial process of the type highlighted in Tables 9 and 10.
- A solid-fuel or fuel oil combustion system with thermal power greater than 5 MW.
- A 1 km x 1 km grid square in the Authority's area for which low-level (i.e. domestic combustion and other short stack) emissions are greater than 25Kg per hour or 40 tonnes per year. Where domestic emissions are the main

source of concern, this can be assumed to approximate to 300 houses burning coal in a 1 km x 1 km grid square.

10.5 INDICATIONS FOR STAGE 2 REVIEW AND ASSESSMENT OF SULPHUR DIOXIDE

- There are 14 Authorised Part A Processes which emit significant quantities of Sulphur Dioxide.
- There are no Authorised Part B Processes, which emit significant quantities of Sulphur Dioxide.
- There are no solid-fuel or fuel oil combustion system with thermal power greater than 5MWs.
- There are no 1 km x 1 km grid square in the Authority's area for which low-level (i.e. domestic combustion and other short stack) emissions are greater than 25Kg per hour or 40 tonnes per year. Where domestic emissions are the main source of concern, this has been assumed to approximate to 300 houses burning coal in a 1 km x 1 km grid square.

10.6 SULPHUR DIOXIDE MONITORING CARRIED OUT IN ELLESMERE PORT AND NESTON BOROUGH.

Sulphur Dioxide has been monitored in Ellesmere Port since 1961 using Sulphur Dioxide Bubblers at 4 locations, highlighted in Table 4 and Figure 4, and by the use of OPSIS since 1995. The results are highlighted in Graphs 13 - 15 inclusive.

The results from OPSIS over the last 2 years have shown a marked decrease in the number of exceedences of the objective highlighted in Graphs 16 - 18 inclusive. 5 exceedences were noted on Beam 001 compared to 19 exceedences in 1997. 6 exceedences were noted on Beam 002 in 1998 as compared to 21 exceedences in 1997. These results correlate well with the closure of Ince B Power station in 1997, which was shown to be a significant emitter of Sulphur Dioxide.

The objective of 100ppb measured as a 15-minute mean cannot be correlated to provide the equivalent daily data. It is therefore not possible to compare the results of the Bubblers with the objective. However the Bubblers are useful in identifying areas of high SO₂ concentrations which can then be targeted for automatic monitoring.

All of the 4 sites met the EC Directive lower guide value of 100µgm⁻³ and as such it is reasoned that these sites would not breach the objective.

10.7 EXCEEDANCES OF THE AIR QUALITY STANDARD AND SPECIFIC OBJECTIVES

The above results indicate that the levels of Sulphur Dioxide in the atmosphere currently do meet the existing and proposed limits for all sites. Currently 15 minute mean concentrations are not measured and consideration must be given to incorporating this at a later stage. OPSIS clearly demonstrates that there are significant emitters of Sulphur Dioxide which is being shown by the exceedences on the two Beams and as such exceedences of the objective may be demonstrated with further real time monitoring at locations to determined at the Stage 2 Review.

Indications for a Stage 2 Review and Assessment highlight that the further review should also be carried out due to the large proportion of Authorised part A Processes emitting significant amounts of Sulphur Dioxide.

10.8 FURTHER INFORMATION OR ACTION REQUIRED TO FURTHER REVIEW SULPHUR DIOXIDE

A Second Stage Review and Assessment is required to further review Sulphur Dioxide within the Borough of Ellesmere Port and Neston.

The Council has recently purchased two 'Real Time' SO₂ Analysers, of which consideration should be given to locating these in potential hot spot areas.

11.0 RECOMMENDATIONS FOR FURTHER REVIEWS

11.0 RECOMMENDATIONS FOR FURTHER REVIEWS

The report highlights several areas and pollutants that may not meet the various standards and objectives adopted by the Government. This indicates that within these areas a second stage review and assessment will be necessary to further screen the pollutants with a view to checking whether the above standards and objectives will be achieved.

In order to carry out the above more detailed information is required for the various pollutants in those areas highlighted in this report. This information can be obtained by acquiring more accurate data with respect to traffic flows and speeds and by carrying out more monitoring for the various pollutants highlighted.

Within the borough of Ellesmere Port and Neston the only information available relating to traffic flows was compiled in 1990/1992, the results of which were difficult to obtain in an easy format. Speed and breakdown of traffic using the roads was not available at the time of processing this report. As a result of this Cheshire County Council are planning to carry out a road traffic survey starting in 1999 which it is hoped will provide more accurate information on current and predicted levels. This will enable the necessary action to be taken with respect to the impact on the various pollutants.

The current air quality monitoring carried out within the Borough will remain in place and in those areas where further monitoring is required the current programme may be extended to cover other areas and in some instances other pollutants. The precise nature of the monitoring will be decided within the scope of the second stage review and assessment.

12.0 APPENDIX 1

TABLES

Table 1: National air quality standards and objectives as outlined in the National Air Quality Strategy which each Local Authority should review and asses.

Pollutant	Concentration Limit	Averaging Period	Objective by 2005
Benzene	5 ppb	running annual mean	5 ppb (16.2µg/m ³)
1, 3-Butadiene	1 ppb	running annual mean	1 ppb
CO	10 ppm	running 8-hour mean	10 ppm
Pb	0.5 µgm ⁻³	annual mean	0.5 µg/m ⁻³
NO ₂	150 ppb	1 hour mean	150 ppb hourly mean*
	21 ppb	annual mean	21 ppb annual mean
PM ₁₀	50 µgm ⁻³	running 24-hour mean	50 µgm ⁻³ as 99 th percentile*
SO ₂	100 ppb	15 minutes mean	100 ppb as 99.9 th percentile (provisional)

Table 2: List of Part A Authorised Processes within the Borough.

<u>ADDRESS OF PART A PROCESS</u>	<u>NATURE OF PROCESS</u>
The Associated Octel Co Ltd Oil Sites Road Ellesmere Port L65 4HF	Combustion Process
The Associated Octel Co Ltd Oil Sites Road Ellesmere Port L65 4HF	Petrochemical Process
The Associated Octel Co Ltd Oil Sites Road Ellesmere Port L65 4HF	Petrochemical Process
The Associated Octel Co Ltd Oil Sites Road Ellesmere Port L65 4HF	Halogen Process
The Associated Octel Co Ltd Oil Sites Road Ellesmere Port L65 4HF	Halogen Process
The Associated Octel Co Ltd Oil Sites Road Ellesmere Port L65 4HF	Chemical Processing
The Associated Octel Co Ltd Oil Sites Road Ellesmere Port L65 4HF	Non Ferrous Metal
The Associated Octel Co Ltd Oil Sites Road Ellesmere Port L65 4HF	Non Ferrous Metal
Bridgewater Paper Co North Road Ellesmere Port L65 4HF	Combustion Process
Bridgewater Paper Co North Road Ellesmere Port L65 4HF	Papermaking and related Processes

Table 2 continued.

<u>ADDRESS OF PART A PROCESS</u>	<u>NATURE OF PROCESS</u>
Cabot Carbon Ltd Stanlow Ellesmere Port L65 4HT	Carbonisation Process
Cleanaway Ltd Bridges Road Ellesmere Port L65 4EQ	Incineration Process
DSM Resins UK Ltd Cromwell Road Ellesmere Port L65 0HB	Polymerisation of Organic Monomers
Kemira Ince Ltd Ince Chester CH2 4LB	Manufacture of Chemical Fertilisers
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Sulphur Recovery Process
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Petroleum Process
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Incineration Process
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Petrochemical Process
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Petrochemical Process
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Manufacture and use of Organic Chemicals

Table 2 continued.

<u>ADDRESS OF PART A PROCESS</u>	<u>NATURE OF PROCESS</u>
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Manufacture and use of Organic Chemicals
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Petrochemical Process
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Petrochemical Process
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Manufacture and use of Organic Chemicals
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Manufacture and use of Organic Chemicals
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Manufacture and use of Organic Chemicals
Shell Chemicals U K Ltd Stanlow Ellesmere Port L65 4HB	Petrochemical Processes

Table 3: List of Part B Authorised Processes within the Borough.

<u>ADDRESS OF PART B PROCESS</u>	<u>NATURE OF PROCESS</u>
Vanleer UK Ltd Oil Sites Road Ellesmere Port	Coating and printing
SHS Handling Systems Overpool Ellesmere Port	Coating and printing
E & P Coatings Ltd Rossmore Industrial Estate Ellesmere Port	Coating and printing
Pioneer Concrete (UK) Ltd Bridges Road Ellesmere Port	Cement and Lime
RMC (NW) Ltd Meadow Lane Ellesmere Port	Cement and Lime
Vauxhall Motors Ltd North Road Ellesmere Port	Coating and printing
Tarmac Topmix Ltd Bridges Road Ellesmere Port	Cement and Lime
ABB Capacitors Ltd Rossmore Road East Ellesmere Port	Coating and Printing
Howard Basford Portside North Ellesmere Port	Coating and Printing
M53 Ford Rossmore Road East Ellesmere Port	Coating and Printing

Table 3 continued.

<u>ADDRESS OF PART B PROCESS</u>	<u>NATURE OF PROCESS</u>
Morganite Thermal Ceramics Ltd Liverpool Road Neston	Ceramic Production
Neston Colour Clayhill Industrial Estate Neston	Coating and Printing
D Morgan Plant Hire Ltd 726 Chester Road Great Sutton	Other minerals
Britannia LPG (Shell Gas) Oil Sites Road Ellesmere Port	Gassification
Sir Alfred McAlpine Ltd Cambridge Road Ellesmere Port	Coating and Printing
Lookers Rossmore Road East Ellesmere Port	Coating and Printing
Premier Mortars Ltd Bridges Road Ellesmere Port	Cement and lime
RMC Roadstone Bridges Road Ellesmere Port	Cement and lime
Safeway Petrol Station 32 Chester Road Ellesmere Port	Petroleum Process
Evason Body Repairs 1-3 Telford Road Ellesmere Port	Coating and Printing
Telegraph Service Station 14-16 Chester Road Neston	Petroleum Process

Table 3 continued.

<u>ADDRESS OF PART B PROCESS</u>	<u>NATURE OF PROCESS</u>
Sainsburys Petrol Station Kinsey Road Ellesmere Port	Petroleum Process
Shell Bitumen UK Ltd Oil Sites Road Ellesmere Port	Tar and Bitumen Process
Heron Services Station Chester High Road Burton	Petroleum Process
Shell Select Petrol Station 120 Whitby Road Ellesmere Port	Petroleum Process
Gulf Service Station 187 Overpool Road Ellesmere Port	Petroleum Process
Petrol Express Rossmore Road West Ellesmere Port	Petroleum Process
Stanlow Terminal Oil Sites Road Ellesmere Port	Petroleum Process
Roften Galvanising Ltd North Road Ellesmere Port	Cement and Lime
Save Service Station Ltd (Holywood) 508 Chester Road Little Sutton	Petroleum Process

*Stage 1 Review and Assessment
Air Quality in Ellesmere Port and Neston*

Table 4: Air Pollutant Monitoring Stations in Ellesmere Port & Neston Borough Council

ADDRESS OF SITE	GRID REFERENCE	POLLUTANT MONITORED	TYPE OF MONITOR	LOCATION TYPE	PARTICIPATION IN SURVEYS
Neston Town Hall, Neston	SJ293778	Sulphur Dioxide & Smoke	Bubbler - Daily Average	Rural	CCC Survey
Overpool Community Centre, Rivacre Road, Ellesmere Port	SJ385774	Sulphur Dioxide & Smoke	Bubbler - Daily Average	Residential	CCC Survey
Stanlow Laboratories, Oil Sites Road, Ellesmere Port	SJ442758	Sulphur Dioxide & Smoke	Bubbler - Daily Average	Industrial	CCC Survey
Council Offices, 4 Civic Way, Ellesmere Port	SJ398759	Sulphur Dioxide & Smoke	Bubbler - Daily Average	Commercial/ Town Centre	AEA National Survey & CCC Survey
Ness Gardens, Burton Road, Ness	SJ306756	Oxides of Nitrogen	Bubbler - Daily Average	Background	
Council Offices, 4 Civic Way, Ellesmere Port	SJ398759	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Kerbside	AEA UK National Survey
Shell UK, Oil Sites Road, Ellesmere Port	SJ448760	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Industrial	
Milton Road, Wolverham, Ellesmere Port	SJ409755	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Background	AEA UK National Survey
School Lane, Childer Thornton, Ellesmere Port.	SJ357779	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Intermediate	AEA UK National Survey
Websters Lane, Great Sutton, Ellesmere Port	SJ338748	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Background	AEA UK National Survey
Neston Cemetery, Park Road, Neston	SJ298780	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Intermediate	
Boat House, North Parade, Parkgate	SJ275788	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Intermediate	
The Harp, Quayside, Little Neston	SJ290761	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Background	
Neston Road, Burton	SJ312744	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Kerbside	
Mudhouse Lane, Burton	SJ325746	Oxides of Nitrogen	Diffusion Tube- Monthly Average	Kerbside	
Library Roof, Civic Way, Ellesmere Port	SJ401759	PM ₁₀	Teom - Real Time	General	
Beam 1, Library Roof → Joseph Groome Towers Roof, Ellesmere Port	SJ401759-SJ403767	SO ₂ , NO ₂ , Toluene, Benzene p-xylene, Ozone	OPSIS Air Monitor- Real Time	General	

Table 5: Emissions From Prescribed Part A Authorised Processes.

The following table gives an indication (x) of those processes most likely to release significant quantities of the specified substances to air.

PROCESS	Benzene	1,3-Butadiene	Lead	Carbon Monoxide	Sulphur Dioxide	Nitrogen Dioxide	PM ₁₀
1.1(a) Reforming NG				X	X	X	
1.1(b) Relining NG					X	X	
1.1(c) & (d) Gasification	X				X	X	X
1.2 Pyrolosis, carbonisation etc.	X	X			X	X	X
1.3(a) Boilers and furnaces						X	X
1.3(b) Gas Turbines					X	X	
1.3(b) CI Engines				X	X	X	X
1.3(c) Waste Oil Burning			X		X	X	X
1.3(c) Other Waste Burning					X	X	X
1.4 Crude Oil handling, refining & conversion	X	X	X		X	X	X

Table 5 continued.

PROCESS	Benzene	1,3-Butadiene	Lead	Carbon Monoxide	Sulphur Dioxide	Nitrogen Dioxide	PM ₁₀
2.1 Iron, Steel & Alloys				X	X	X	X
2.2 Non ferrous			X	X	X	X	X
3/1 Cement & Lime					X	X	X
3.2 Asbestos							
3.3 Other Fibres					X	X	X
3.5 Glass			X		X	X	X
3.6 Ceramics (helton bricks)					X	X	X
4.1 Petrochemicals	X	X		X	X	X	X
4.2 Organic Chemicals	X	X			X	X	X
4.3 Acids					X	X	X
4.4 Halogens					X	X	
4.5 Inorganics			X	X	X	X	X
4.6 Fertilisers					X	X	X

Table 5 continued.

PROCESS	Benzene	1,3-Butadiene	Lead	Carbon Monoxide	Sulphur Dioxide	Nitrogen Dioxide	PM ₁₀
4.7 Pesticides							
4.8 Pharmaceuticals							
5.1 Incineration				x	x	x	x
5.2 Oil and Solvent Recovery	x				x	x	
5.3 Fuel from Waste							x
6.1 Paper					x	x	x
6.2 Di-isocyanates	x				x	x	x
6.3 Tar & Bitumen	x				x	x	x
6.5 Coating & Printing							
6.6 Dyestuffs, Inks etc.							
6.7 Timber							

Table 6: Potential Significant Part A Industrial Source Within The Borough Of Ellesmere Port And Neston

NAME AND ADDRESS	PROCESSES	CO	BENZENE	1,3-BUTADIENE	SO ₂	NO ₂	LEAD	PM10
SHELL U.K. LTD.	manufacture of organic chemicals			x	x			
SHELL U.K. LTD.	petrochemical process	x			x	x		
SHELL U.K. LTD.	petrochemical process				x	x		
SHELL U.K. LTD.	petrochemical process				x	x		
SHELL U.K. LTD.	incineration process				x	x		x
SHELL U.K. LTD.	petrochemical process				x	x		
BRIDGEWATER PAPER CO.LTD.	combustion process	x			x	x		x
ASSOCIATED OCTEL CO.LTD.	production of lead derivatives						x	
ASSOCIATED OCTEL CO.LTD.	combustion process				x	x		x
ASSOCIATED OCTEL CO.LTD.	sodium process					x	x	

Table 6 continued.

NAME AND ADDRESS	PROCESSES	CO	BENZENE	1,3-BUTADIENE	SO ₂	NO ₂	LEAD	PM10
ASSOCIATED OCTEL CO.LTD.	sodium process							x
ASSOCIATED OCTEL CO.LTD.	4713							x
ASSOCIATED OCTEL CO.LTD.	3916				x			
KEMIRA INCE LTD.	manufacture of chemical fertiliser				x	x		x
CLEANAWAY LTD.	incineration process				x	x		x
CABOT CARBON LTD.	carbonisation process				x	x		x
ZENECA LTD.	manufacture of indigo					x		
VAUXHALL MOTORS LTD.	combustion process				x	x		x
DSM RESINS UK LTD.	polymerisation process				x	x		x

Table 7: Potential Significant Part A Industrial Sources Outside The Borough Of Ellesmere Port And Neston

NAME AND ADDRESS	PROCESSES	CO	BENZENE	1,3-BUTADIENE	SO ₂	NO ₂	LEAD	PM10
BRITISH STEEL PLC, DEESIDE, FLINTSHIRE						X		
BHP PETROLEUM TALACRE, FLINTSHIRE					X	X		
CASTLE CEMENT LTD. PADESWOOD, FLINTSHIRE					X	X		X
NATIONAL POWER PLC DEESIDE, FLINTSHIRE						X		
J.REID TRADING LTD. SANDYCROFT, FLINTSHIRE						X		
CONNAH'S QUAY POWER STATION, DEESIDE, FLINTSHIRE						X		
SHOTTON PAPER COMPANY PLC DEESIDE, FLINTSHIRE					X	X		
WARWICK INTERNATIONAL LTD. MOSTYN, FLINTSHIRE						X		
OWENS CORNING MANCOT, FLINTSHIRE					X	X		X

Table 7 continued.

NAME AND ADDRESS	PROCESSES	CO	BENZENE	1,3-BUTADIENE	SO ₂	NO ₂	LEAD	PM10
BRITISH NUCLEAR FUELS PLC CHESTER					X			
LUBRIZOL LTD. WIRRAL		X				X		X
LUBRIZOL LTD. WIRRAL					X	X		X
UML LTD. WIRRAL					X	X		X
EASTHAM REFINERY LTD. WIRRAL					X	X		X
CHEMDAL LTD. WIRRAL								X
THERMAL CERAMICS LTD. WIRRAL								X
LEVER BROTHERS LTD. WIRRAL					X			

Table 8: Potential Significant Industrial Sources Outside The Borough Of Ellesmere Port And Neston

NAME AND ADDRESS	PROCESSES	CO	BENZENE	1,3-BUTADIENE	SO ₂	NO ₂	LEAD	PM10
BRITISH STEEL DEESIDE	COIL COATING							x
COED TALON COLLIERY MOLD, FLINTSHIRE	COIL PROCESS							x
HANSON BRICK BUCKLEY, FLINTSHIRE					x			
PANT Y PWLL DWR QUARRY HOLYWELL, FLINTSHIRE	QUARRY PROCESS							x
PANT QUARRY HOLYWELL, FLINTSHIRE	QUARRY PROCESS							x
TRIMM ROCK QUARRY MOLD, FLINTSHIRE	QUARRY PROCESS							x
PINFOLD LANE QUARRY ALLTAMI, FLINTSHIRE	QUARRY PROCESS							x
HENDRE QUARRY MOLD, FLINTSHIRE.	QUARRY PROCESS							x
BRYN MAWR & PEN YR HENBLAS QUARRY HOLYWELL, FLINTSHIRE	QUARRY PROCESS							x
CEFN MAWR QUARRY MOLD, FLINTSHIRE	QUARRY PROCESS							x

Table 9: Emissions From Part B Prescribed Processes

The following table gives an indication (x) of those processes most likely to release significant quantities of the specified substances to air.

PROCESS	PG Note(s)	Carbon Monoxide	Benzene	1,3-Butadiene*	Sulphur Dioxide**	Nitrogen Oxides	Lead	PM ₁₀
Waste Oil Combustion	1/1, 1/2							
Combustion Plant 20-50mwth	1/1, 1/4, 1/6				x			x
WDF Combustion <3MWth	1/10							
Reheat Furnaces 20-50MWth	1/11				x			x
Waste Combustion 0.2-3MWth	1/12							
Processes for the storage, loading & unloading of petrol at terminals	1/13		x					
Unloading of petrol into storage at service stations	1/14							
Furnaces for extraction of non-ferrous metals from scrap	2/1						x	
Galvanising	2/2							
Electrical and Rotary Furnaces	2/3						x	
Foundry Processes	2/1							
Hot and cold blast cupolas	2/5				x		x	
Aluminium & aluminium alloy processes	2/6				x		x	
Zinc and zinc alloy processes	2/7				x		x	
Copper & copper alloy processes	2/8				x		x	
Metal decontamination	2/9							
Blending, packing, loading & use of bulk cement	3/1							
Manufacture of heavy clay goods and refractory goods	3/2				x			
Glass (excluding lead glass) manufacturing process	3/3				x	x		
Lead glass manufacturing processes	3/4				x		x	
Coal, coke, coal product and petroleum coke processes	3/5							x
Exfoliation of vermiculite and expansion of perlite	3/7							
Quarry processes	3/8							x
Plaster processes	3/12							
Lime processes	3/14							
Roadstone coating	3/15				x			x

Table 9 continued.

PROCESS	PG Note(s)	Carbon Monoxide	Benzene	1,3-Butadiene*	Sulphur Dioxide**	Nitrogen Oxides	Lead	PM ₁₀
China & ball clay processes including the spray drying of ceramics	3/17							x
Processes for the surface treatment of metals	4/1							
Incineration processes	5/1, 5/3, 5/4							
Crematoria	5/2							
Processes for the manufacture of particleboard & fibreboard	6/4							
Textile & fabric coating processes (where nitrogen containing solvents are used)	6/8							
Manufacture of coating powder	6/9							x
Coil coating (where nitrogen containing solvents are used)	6/13							x
Heat set web offset printworks	6/16							
Rubber processes	6/28							
Powder coating processes	6/31							
Metal and other thermal spraying process	6/35							

* only if, 1,3 butadiene is used as part of the process.

** only if process burns coal or heavy fuel oil.

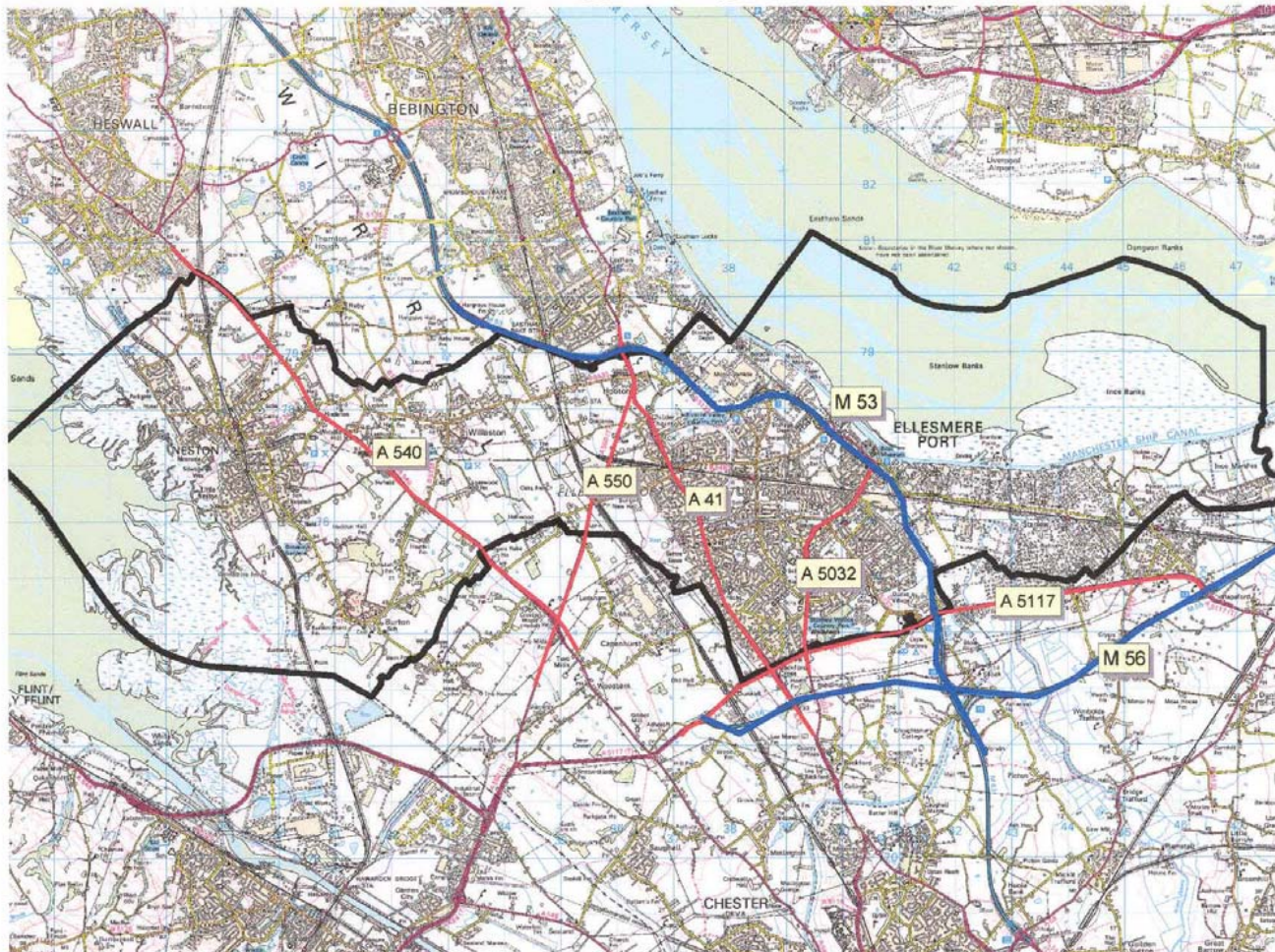
Table 10: Potential Significant Part B Industrial Sources Within The Borough Of Ellesmere Port And Neston

NAME AND ADDRESS	PROCESSES	CO	BENZENE	1,3-BUTADIENE	SO ₂	NO ₂	LEAD	PM10
STANLOW TERMINAL OIL SITES ROAD, ELLESMERE PORT	PETROLEUM PROCESS		x					
TARMAC TOPMIX LTD. BRIDGES ROAD, ELLESMERE PORT								x
D.MORGAN PLANT HIRE LTD. 726 CHESTER ROAD, GREAT SUTTON								x
RMC ROADSTONE BRIDGES ROAD, ELLESMERE PORT								x

13.0 APPENDIX 2

FIGURES

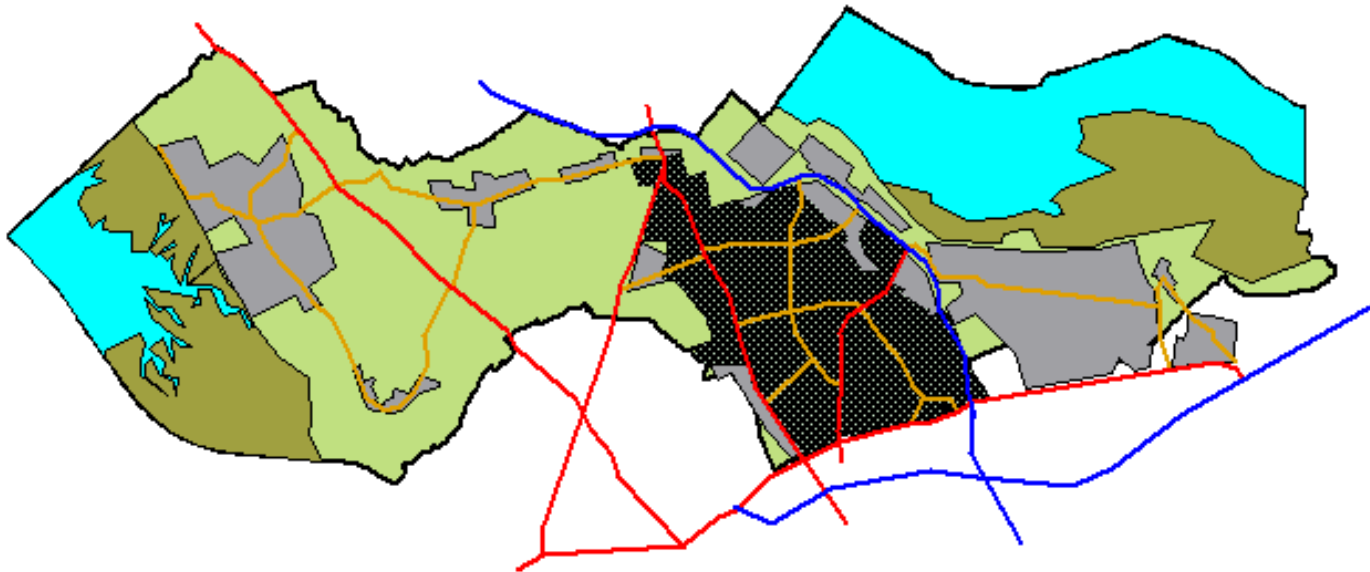
Map of Ellesmere Port and Neston Borough showing major roads



Ellesmere Port and Neston Borough Council – Ordnance Survey Licence N°. LA77917. Reproduction from the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office. Crown Copyright reserved.

FIGURE 1

SMOKE CONTROL AREAS IN ELLESMERE PORT



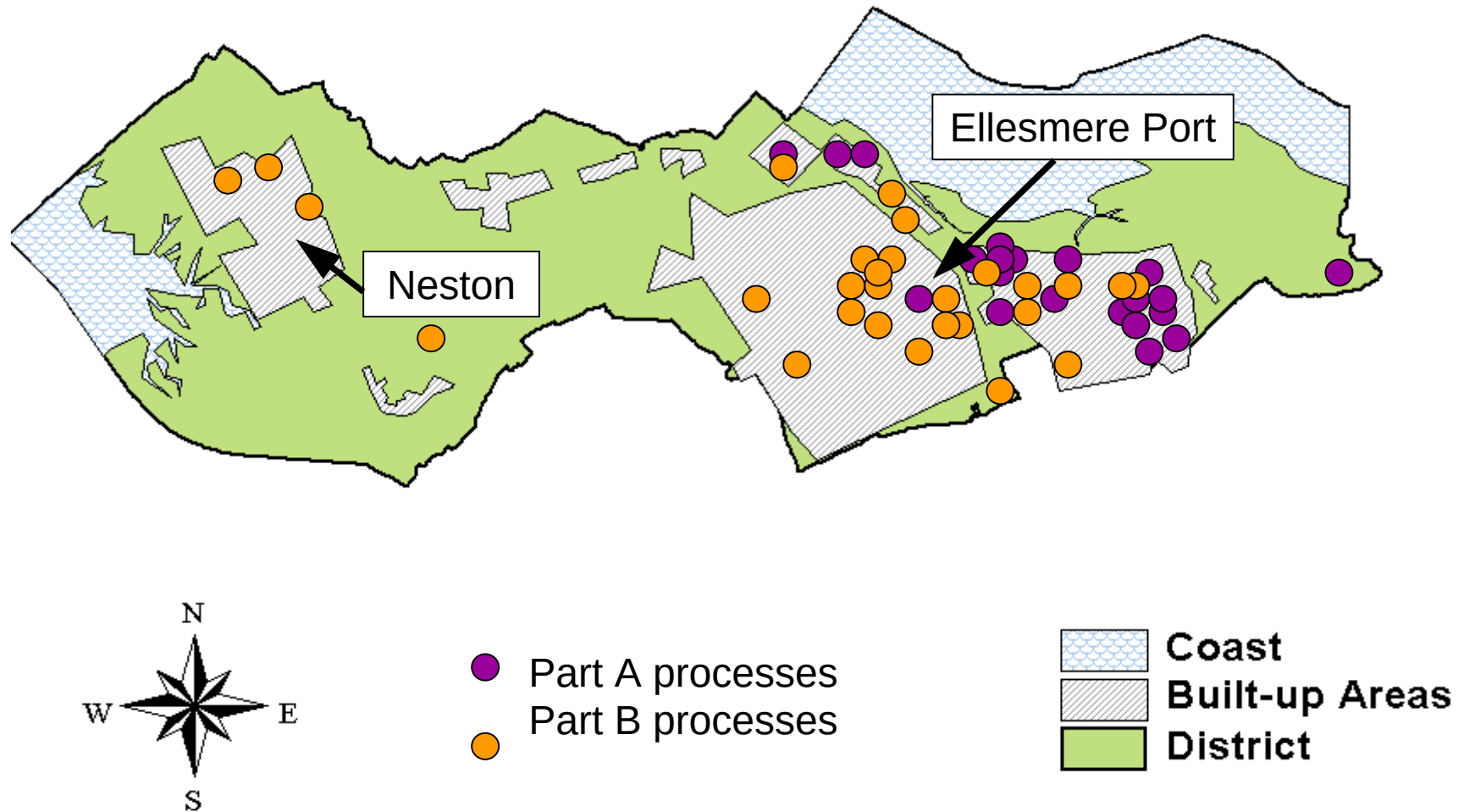
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FIGURE 2

Smoke Control Areas, shown in black, are in force across most of the
Ellesmere Port urban area.

FIGURE 3

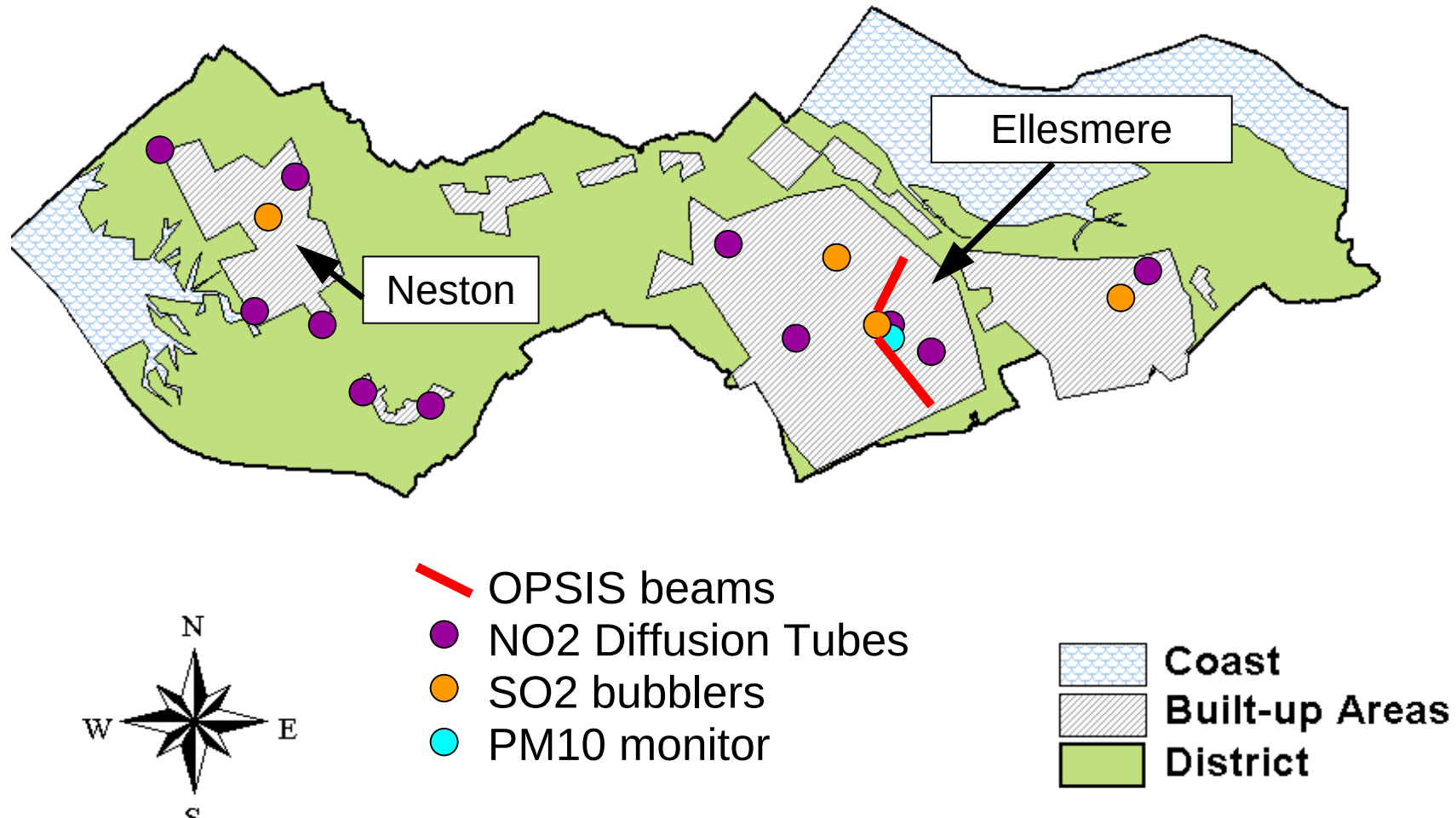
PRESCRIBED PROCESSES



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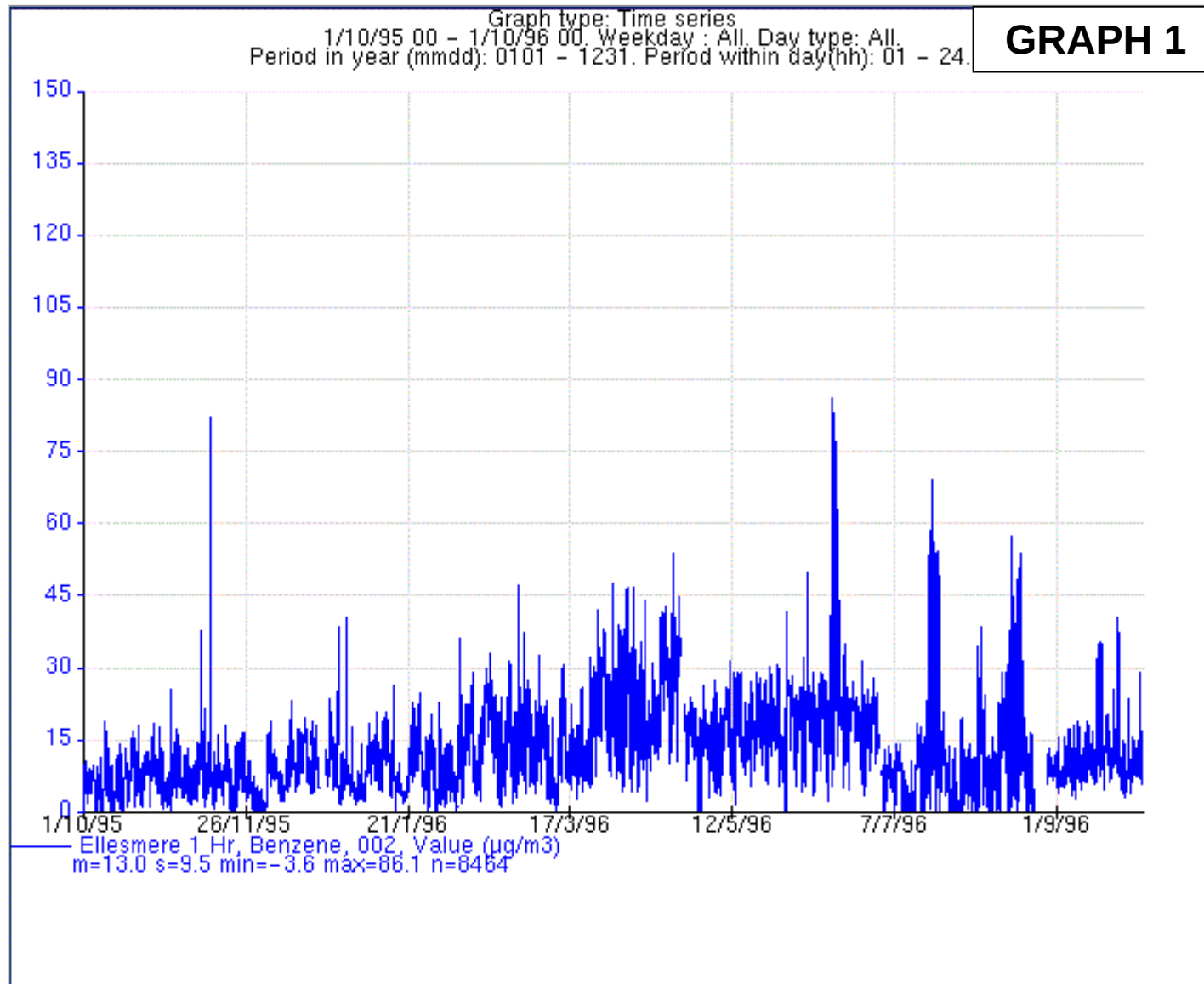
MONITORING EQUIPMENT

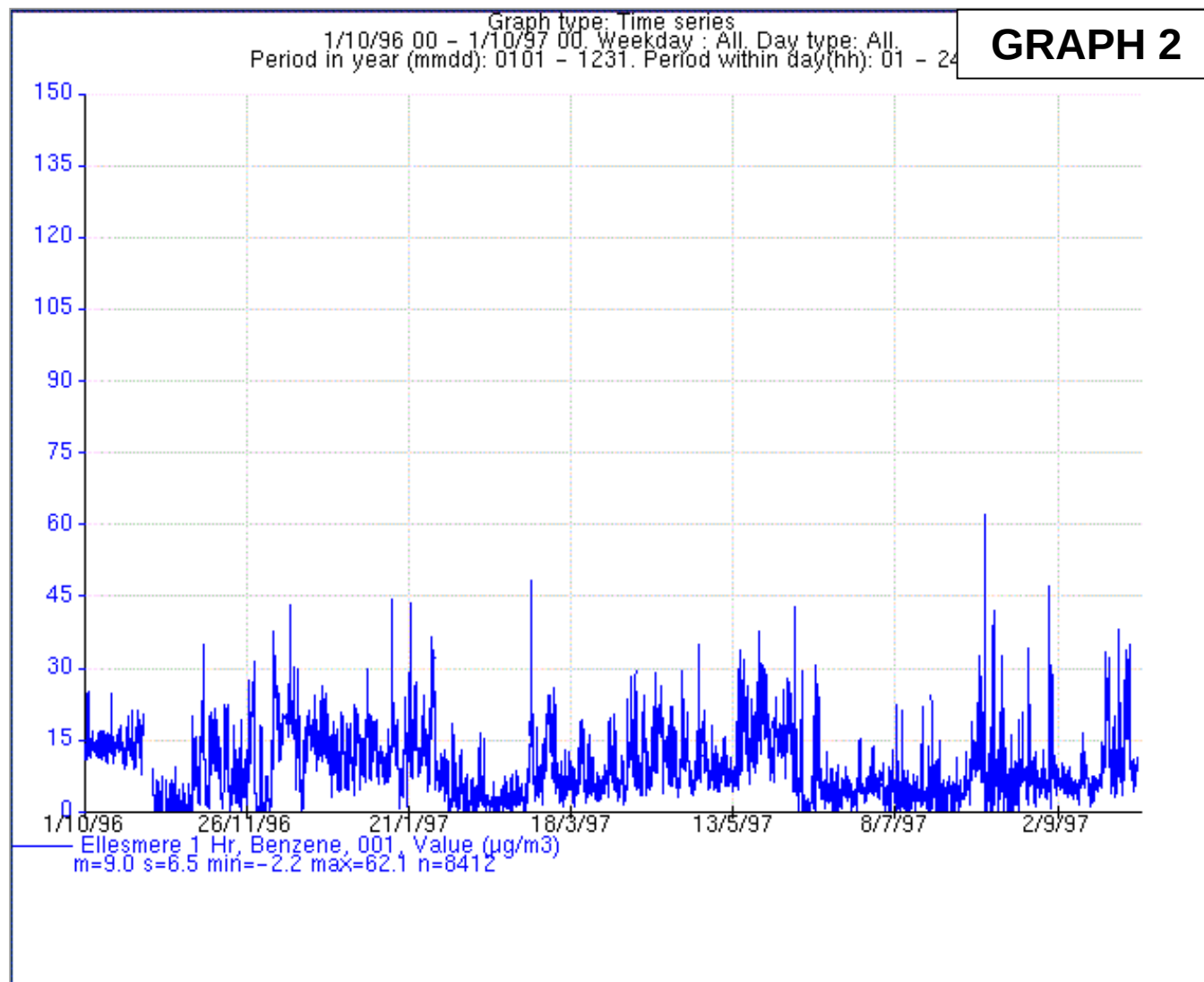
FIGURE 4

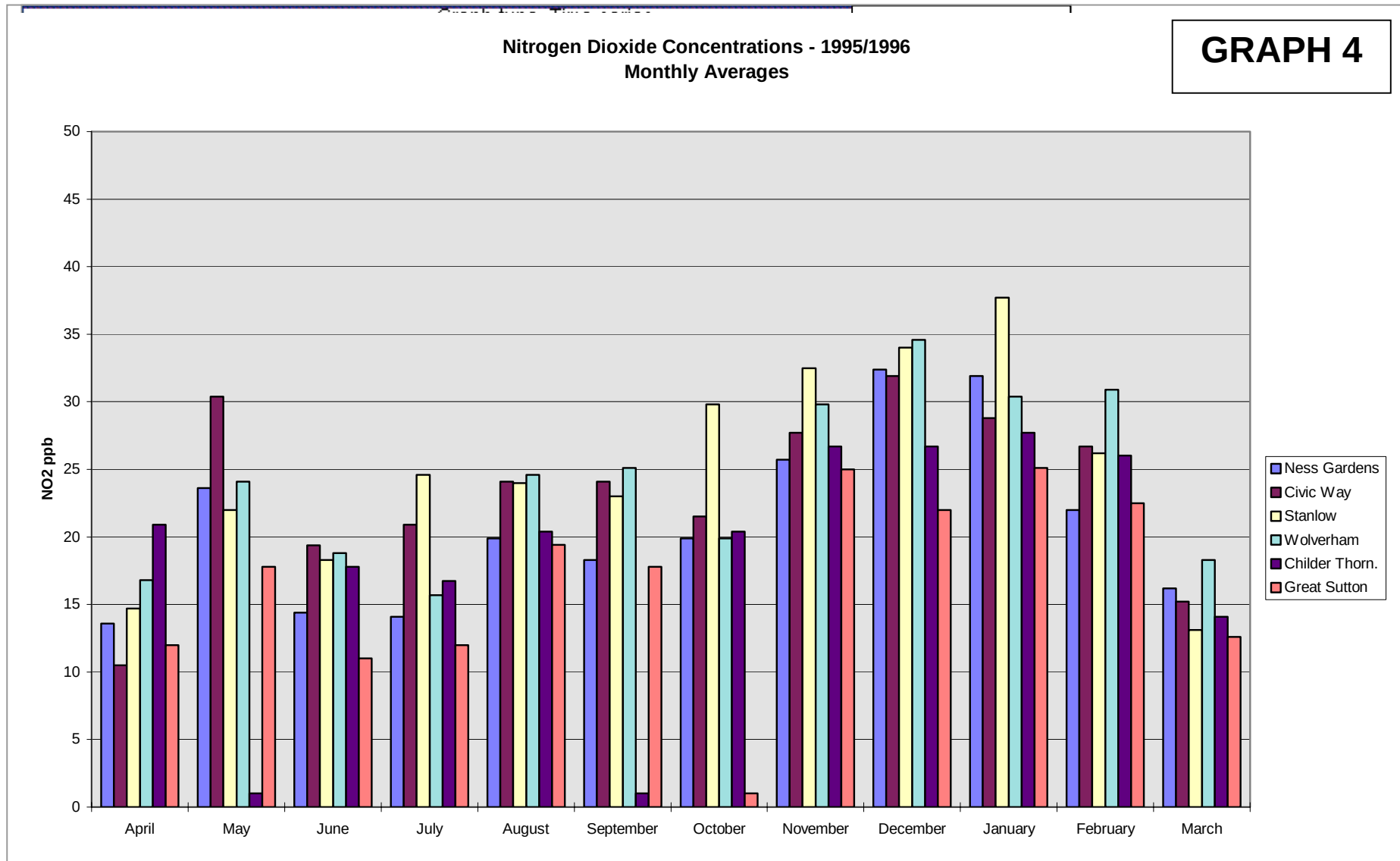


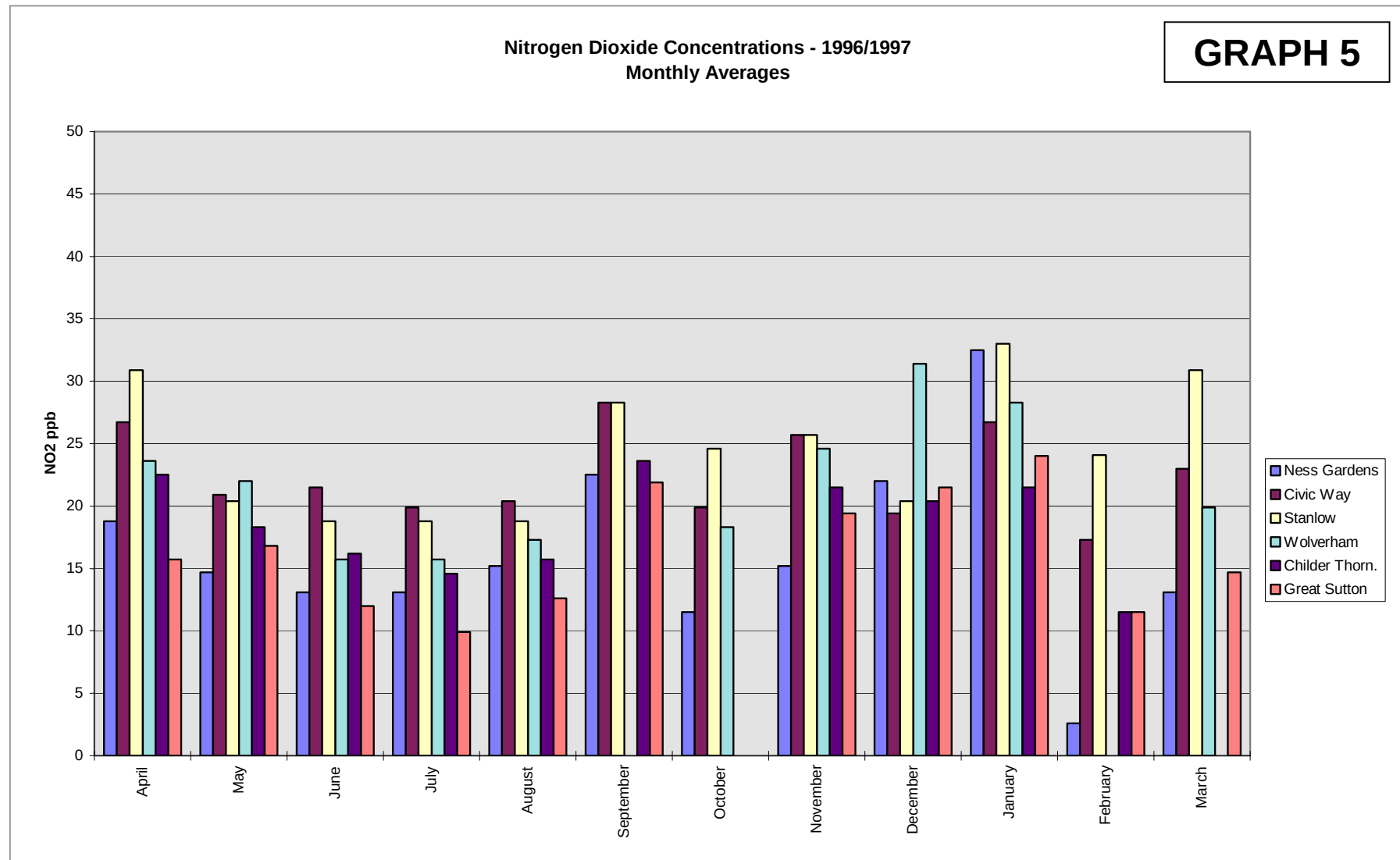
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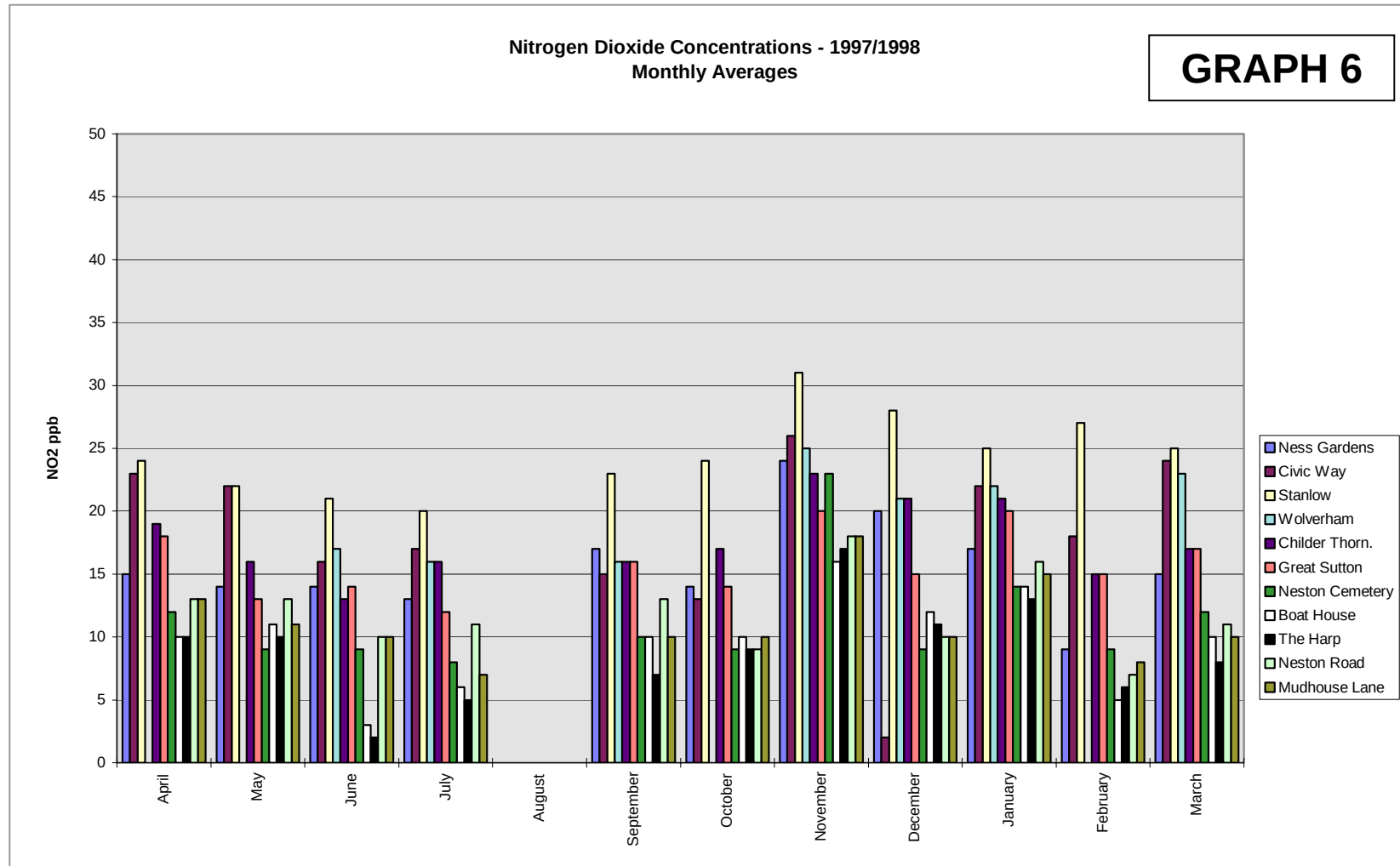
14.0 APPENDIX 3

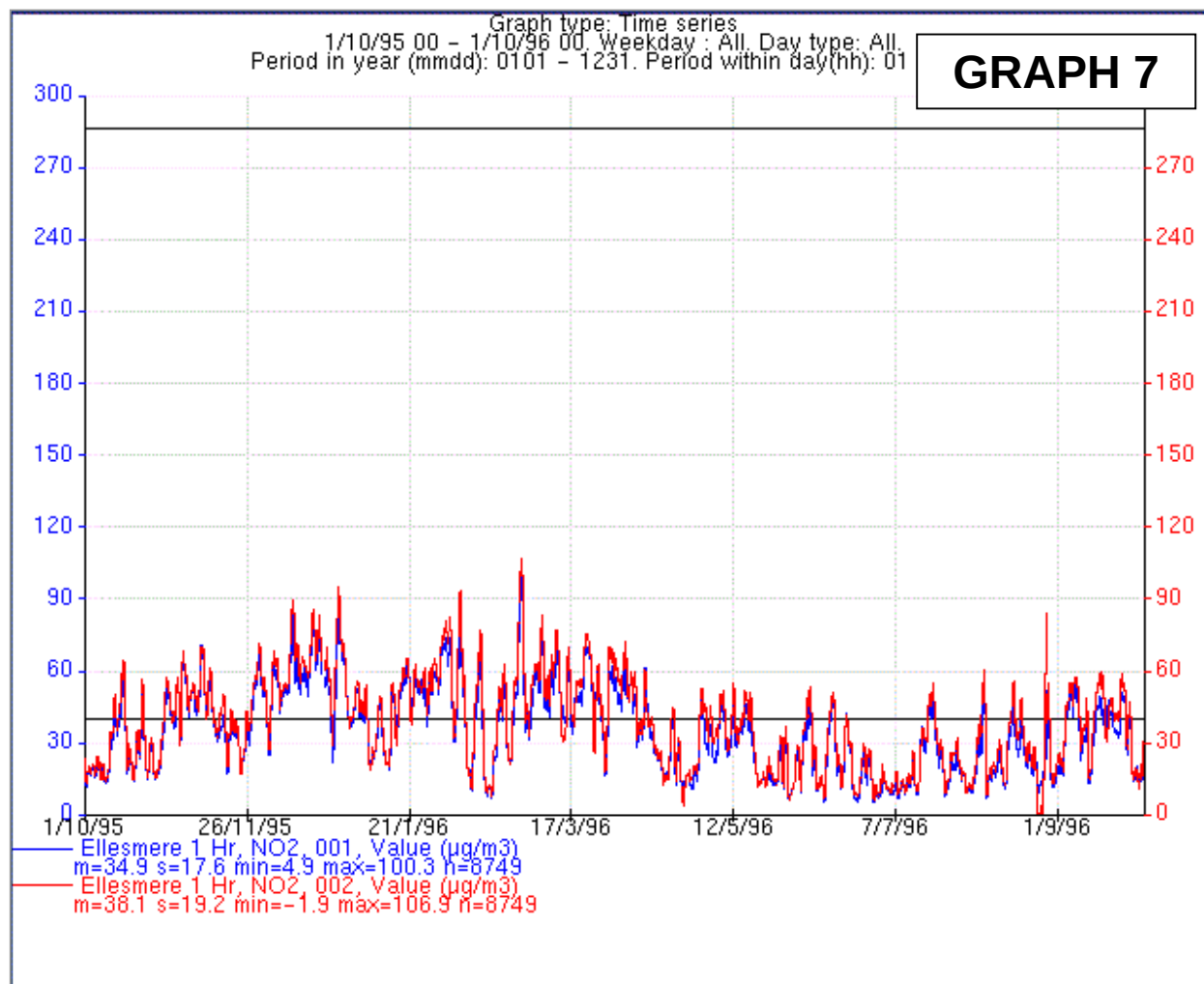


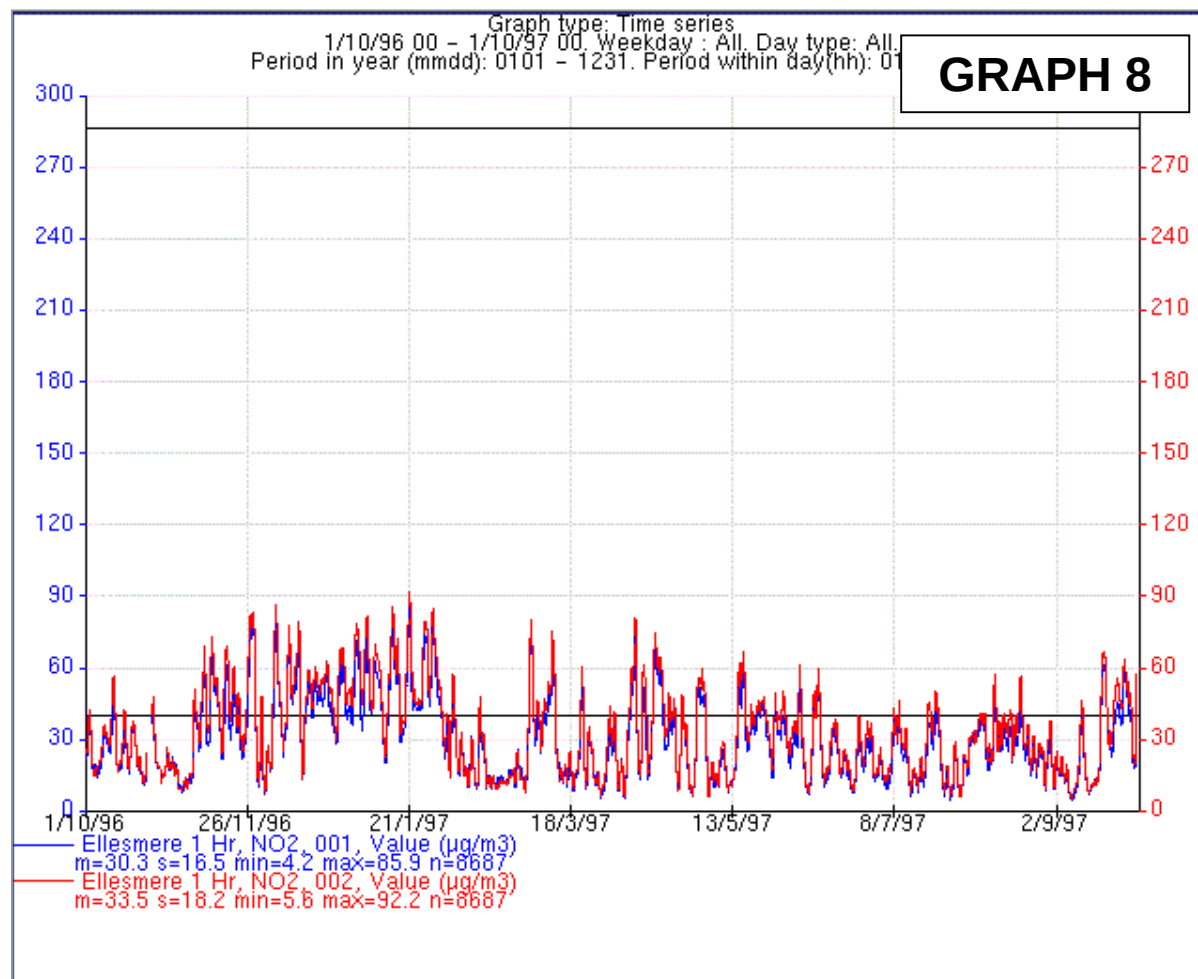


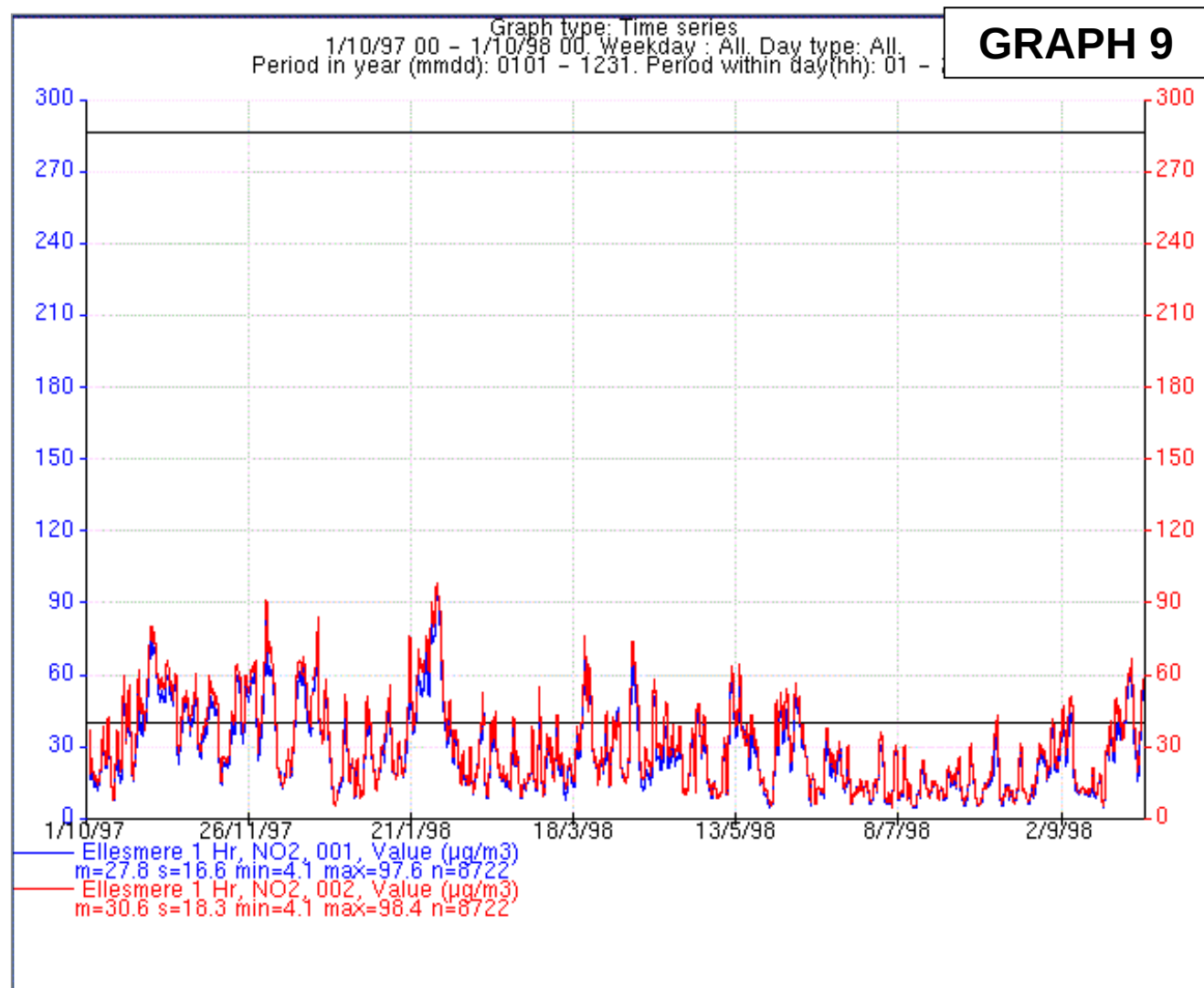


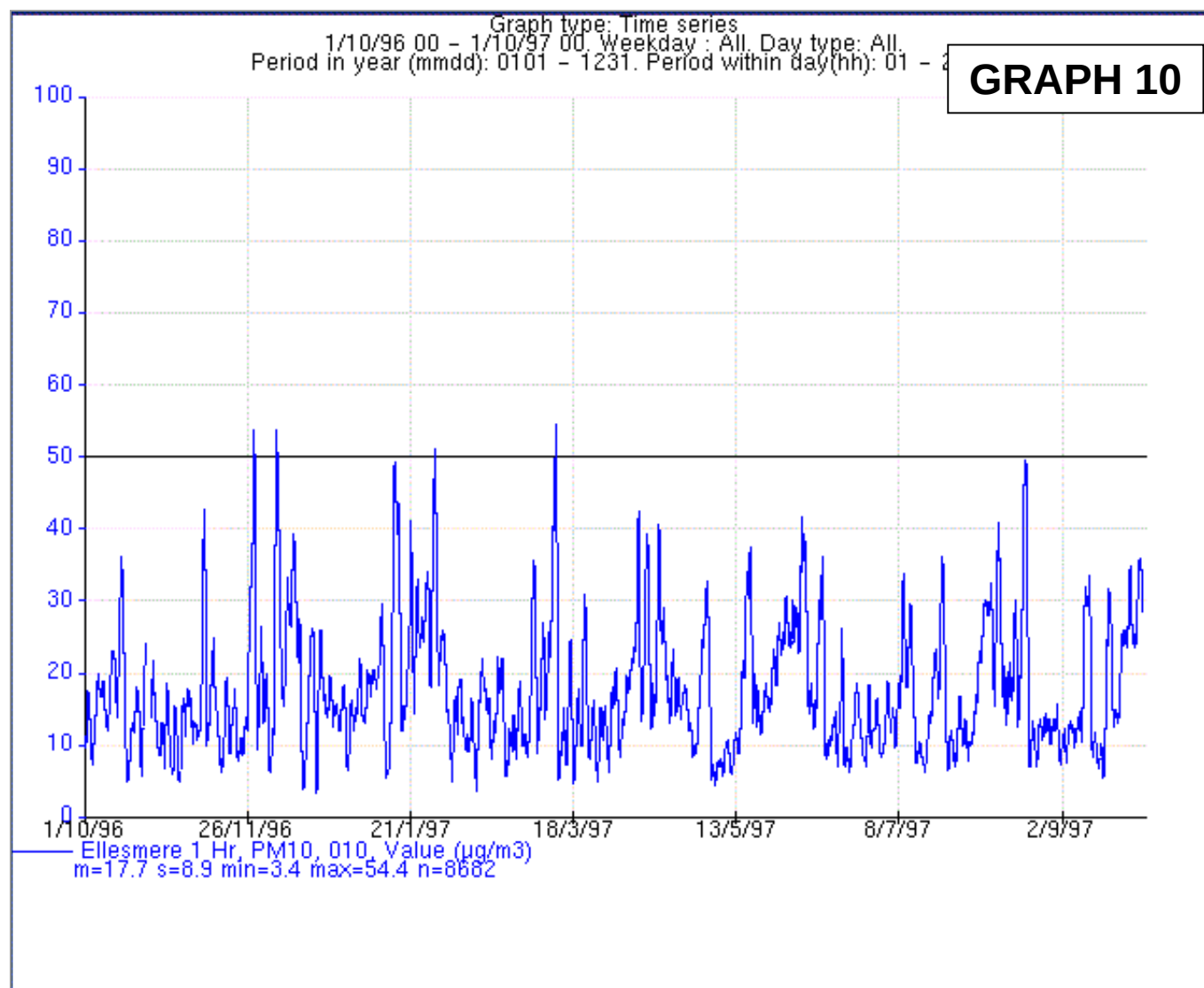












Stage 1 Review and Assessment
Air Quality in Ellesmere Port and Neston

