



# TORFAEN COUNTY BOROUGH COUNCIL

DEPARTMENT FOR THE ENVIRONMENT

---

## REVIEW AND ASSESSMENT OF AIR QUALITY IN THE COUNTY BOROUGH OF TORFAEN

---

THE ENVIRONMENT ACT 1995: PART IV

LOCAL AIR QUALITY MANAGEMENT

UPDATING AND SCREENING ASSESSMENT

**October 2003**

# REVIEW AND ASSESSMENT OF AIR QUALITY IN THE COUNTY BOROUGH OF TORFAEN

<b>CONTENTS</b>		<b>Page</b>
-----------------	--	-------------

Chapter 1	Summary	4
Chapter 2	Introduction	6
Chapter 3	Updating and Screening Assessment for Carbon Monoxide	7
Chapter 4	Updating and Screening Assessment for Benzene	10
Chapter 5	Updating and Screening Assessment for 1,3-butadiene	13
Chapter 6	Updating and Screening Assessment for Lead	15
Chapter 7	Updating and Screening Assessment for Nitrogen Dioxide	17
Chapter 8	Updating and Screening Assessment for Sulphur Dioxide	22
Chapter 9	Updating and Screening Assessment for Fine Particulates	25
Chapter 10	Conclusion	29
Chapter 11	Recommendations	30
References & Legislation		31
Websites		32

# CHAPTER 1

## Summary

- 1.1 Part IV of the Environment Act 1995 requires each local authority to periodically review air quality in its area and the Air Quality (Wales) Regulations 2000 and the Air Quality (Amendment) (Wales) Regulations 2002 prescribe air quality objectives to be achieved by 2005. The process of reviewing and assessing air quality represents a cornerstone in the system of local air quality management (LAQM).
- 1.2 The First and Second stage reviews and assessments for Torfaen County Borough Council were published in December 1999 and June 2000 respectively. These concluded that, based on available data, the risk of the air quality objectives in respect of carbon monoxide; benzene; 1,3 butadiene; lead; nitrogen dioxide; sulphur dioxide and fine particulates (PM<sub>10</sub>) not being met within the prescribed time scales was negligible.
- 1.3 This document is Torfaen County Borough Council's Updating and Screening Assessment and represents the first step of the next review and assessment for the County Borough. It has identified those matters that have changed since the last review and assessment which could lead to an air quality objective, for one or more of the seven key pollutants referred above, being exceeded.
- 1.4 Of the seven key pollutants updated, screened and assessed, the likelihood of the air quality objectives for carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide and fine particulates being exceeded is negligible. There is therefore no requirement to proceed to a detailed assessment of any of these pollutants in Torfaen County Borough.
- 1.5 The updating screening and assessment exercise has generally confirmed that the existing arrangements for air pollution monitoring within Torfaen County Borough should be continued to cover the requirements of future Updating and Screening Assessments. However, The updating and screening assessment for nitrogen dioxide has revealed a level of uncertainty in the results. This is due primarily to the use of unratified nitrogen dioxide diffusion tube data
- 1.6 The following actions are recommended:
  1. The following road networks within Torfaen County Borough should continue to be monitored for nitrogen dioxide levels using passive diffusion tubes:
    - Snatchwood Road, Abersychan, Pontypool
    - Commercial Street, Pontypool Town Centre
    - Sunnybank Road, Griffithstown, Pontypool
    - A4051, Cwmbran Drive, Cwmbran
    - Henllys Way, Cwmbran
    - A4042 Link Road, Llantarnam, Cwmbran
    - Caerleon Road, Ponthir

- Llanyravon Way, Llanyravon, Cwmbran
  - Edlogan Way, Northville, Cwmbran
2. The current collocation exercise being carried out by the Council should be completed to determine the bias correction factor for the passive nitrogen dioxide diffusion tubes analysed by Severn Trent Laboratories. This should be completed by the end of April 2004.
  3. The automatic continuous air pollution monitoring station owned and operated by the Council should remain in position at Croesyceiliog, Cwmbran and contribute to the UK Air Pollution Monitoring Network as a DEFRA affiliated site. The following pollutants will continue to be monitored using analysers affiliated to the UK Network:
    - Nitrogen Dioxide
    - Sulphur Dioxide
    - Carbon Monoxide
    - Particulates (PM<sub>10</sub>)
    - Ozone

The results derived from this work will contribute to the Review and Assessment Progress Report, which must be completed by the end of April 2004, and to subsequent Updating and Screening Assessments.

## CHAPTER 2

### Introduction

- 2.1 Under Part IV of the Environment Act 1995, local authorities are required to review and assess air quality within their areas. The primary objective of this exercise is to identify areas where air quality is unlikely to meet the objectives prescribed in the Air Quality Regulations (Wales) 2000 and the Air Quality (Amendment) (Wales) Regulations 2002 at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, where members of the public are regularly present (relevant locations).
- 2.2 Government guidance has encouraged a phased approach to air quality review and assessment, the results of each stage determining the necessity for proceeding to more detailed study.
- 2.3 In December 1999 the First Stage Review and Assessment of Air Quality in Torfaen County Borough Council was published. This concluded that, of the seven key pollutants examined, no further action was required in respect of carbon monoxide; benzene; 1,3-butadiene, lead, fine particulates (PM<sub>10</sub>), and sulphur dioxide. It was however determined that there was a risk of the air quality objectives being exceeded due to road traffic emissions for nitrogen dioxide.
- 2.4 In June 2000, the Second Stage Review and Assessment of Air Quality in Torfaen County Borough Council was published and concluded that, on the basis of additional data gathered, the risk of the air quality objectives for nitrogen dioxide not being met was negligible. It also concluded that, in order to fulfil the requirements of the Environment Act 1995, air quality in Torfaen County Borough should be reviewed and assessed again by the end of 2003.
- 2.5 Shortly after the publication of the Second Stage Review and Assessment, the Council's Automatic Continuous Air Pollution Monitoring Station was relocated to an 'Urban Background Site' and became affiliated to the UK's Automatic Urban Rural Network. Furthermore, the siting of nitrogen dioxide diffusion tubes was revised to reflect the findings of the Second Stage report i.e. relocated to those road links within the County Borough of Torfaen that were highlighted as being potentially significant sources of nitrogen dioxide.
- 2.6 This document represents the Updating and Screening Assessment for Torfaen County Borough and considers the new monitoring data obtained since June 2000; new air quality objectives; new sources or significant changes to existing sources either locally or in neighbouring authorities and other local changes that may affect local air quality.

## CHAPTER 3

# Updating and Screening Assessment for Carbon Monoxide (CO)

### 3.1 Objectives

- 3.1.1 The adopted air quality standard for Carbon Monoxide is an 8-hour running mean concentration of  $11.6 \text{ mg/m}^3$ . The new objective has been set at a slightly tighter level of  $10.0 \text{ mg/m}^3$  as a maximum daily running 8-hour mean concentration, to be achieved by the end of 2003, bringing it in line with the second Air Quality Daughter Directive limit value.

### 3.2 The National Perspective

- 3.2.1 The main source of carbon monoxide in the UK is road transport, which accounted for 67% of total releases in 2000 (the most recent year for which estimates are available). Annual emissions of carbon monoxide have been falling steadily since the 1970's, and are expected to continue to do so. Current projections indicate that road transport emissions will decline by a further 42% between 2000 and 2005.

### 3.3 Carbon Monoxide in Torfaen County Borough

- 3.3.1 The Second Stage Review and Assessment of Air Quality in Torfaen County Borough concluded that 'the risk of air quality objectives for carbon monoxide not being met by the 31<sup>st</sup> of December 2003 is negligible' and 'no further action is required'.

### 3.4 Monitoring Data

- 3.4.1 Torfaen County Borough Council has monitored Carbon Monoxide since 2000. In June 2001, the carbon monoxide analyser at the 'Cwmbran' site became affiliated to the Automatic Urban Rural Network. The site is classified as an 'Urban Background' Site (Grid Reference: ST 305 955) and is located in the playing field of a school. The monitoring location therefore represents a site with relevant public exposure i.e. a location where members of the public are regularly present. Ratified data from the site can be viewed on the NETCEN website ([www.airquality.co.uk](http://www.airquality.co.uk)).
- 3.4.2 The data capture rate for the carbon monoxide analyser at Cwmbran exceeded 90% for the year 2000. Ratified data collected for the years 2001 and 2002 confirms that there have been no maximum daily running 8-hour concentrations greater than  $10 \text{ mg/m}^3$ .
- 3.4.3 Ratified data obtained for 2003 thus far has also confirmed that there are no current maximum daily running 8-hour concentrations greater than  $10 \text{ mg/m}^3$ .
- 3.4.4 There are no roadside sites within Torfaen County Borough monitoring Carbon Monoxide.

### **3.5 Road Traffic**

- 3.5.1 Data on background levels of carbon monoxide within Torfaen County Borough, based on 1 kilometre grid squares, have been prepared by NETCEN, part of AEA Technology, on behalf of the UK Department for Environment, Food and Rural Affairs (DEFRA) and the devolved administrations. This data is based upon annual mean background concentrations from 2001. Correction factors are provided in Chapter 2 of LAQM.TG(03) to adjust the 2001 concentrations to 2003.
- 3.5.2 On the basis of these data and data derived locally from the Cwmbran site, there are no areas within Torfaen County Borough where the annual mean background level of carbon monoxide exceeds  $1\text{mg}/\text{m}^3$ . In addition, there are no single carriageways, dual carriageways or motorways with annual average daily traffic (AADT) flows in excess of 80,000, 120,000 and 140,000 vehicles respectively.
- 3.5.3 Technical Guidance LAQM.TG(03), which provides an updating and screening checklist incorporating criteria for determining the risk of carbon monoxide levels being significant, has been used to prepare this document. In view of the information above and that provided in Torfaen County Borough's First and Second Stage Reviews, there is negligible risk of the objectives for carbon monoxide being exceeded.

### **3.6 Sources Outside Torfaen County Borough**

- 3.6.1 There are no new sources within neighbouring local authorities that will give rise to levels of carbon monoxide likely to significantly affect the air quality of Torfaen County Borough.

### **3.7 Conclusion**

- 3.7.1 The following sources have been used to determine the risk of levels of carbon monoxide exceeding the air quality objectives in Torfaen County Borough:
- Data derived from the Cwmbran Automatic Continuous Monitoring Site (owned and managed by Torfaen County Borough Council)
  - Predicted background concentrations of carbon monoxide provided by NETCEN on behalf of DEFRA and the Devolved Administrations.
  - Updating and Screening checklist for carbon monoxide (LAQM.TG(03)).
  - Torfaen County Borough Council's First Stage Review and Assessment of Air Quality (1999).
  - Torfaen County Borough Council's Second Stage Review and Assessment of Air Quality (2000).
  - Current Traffic Flow Data (Gwent Consultancy)

- Information provided by Newport City Council, Blaenau Gwent County Borough Council, Caerphilly County Borough Council and Monmouthshire County Council as neighbouring authorities.

In view of the information held in the above sources, when read in conjunction with the updating and screening checklist for carbon monoxide in Technical Guidance LAQM.TG(03), there is no requirement to proceed to a detailed assessment for carbon monoxide in Torfaen County Borough.

## CHAPTER 4

# Updating and Screening Assessment for Benzene

### 4.1 Objectives

- 4.1.1 The adopted air quality standard for Benzene is a running annual mean concentration of  $6.25\mu\text{g}/\text{m}^3$ , with an objective for the standard to be achieved by the end of 2003. However, in light of the health advice from the Expert Panel on Air Quality Standards (EPAQS) and the Department of Health's Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) to reduce concentrations of benzene in air to as low a level as possible, additional tighter objectives have also been set. The additional objective is for an annual mean of  $5\mu\text{g}/\text{m}^3$  to be achieved by the end of 2010 in England and Wales.

### 4.2 The National Perspective

- 4.2.1 The main sources of benzene emissions in the UK are petrol-engined vehicles, petrol refining and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems.
- 4.2.2 A number of policy measures already in place, or planned for the future, will continue to reduce emissions of benzene. Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1% from a previous upper limit of 5%. The European Auto-Oil programme will further reduce emissions from cars and light duty vehicles, and emissions of benzene from the storage and distribution of petrol are controlled by vapour recovery systems.

### 4.3 Benzene in Torfaen County Borough

- 4.3.1 The First Stage Review and Assessment of Air Quality in Torfaen County Borough (1999) concluded that 'the risk of air quality objective for benzene being exceeded was negligible' and 'no further action is required'.

### 4.4 Monitoring Data

- 4.4.1 As a result of the conclusion reached in the last air quality review and assessment (4.3 above), benzene has not been monitored by Torfaen County Borough Council and there are therefore, no monitoring data available for the County Borough.

### 4.5 Road Traffic

- 4.5.1 Data on background levels of benzene within Torfaen County Borough, based on 1 kilometre grid squares, have been prepared by NETCEN, part of AEA Technology, on behalf of the UK Department for Environment, Food and Rural Affairs (DEFRA) and the devolved administrations.

4.5.2 On the basis of these data, there are no areas within Torfaen County Borough where the annual mean background level of benzene exceeds  $2\mu\text{g}/\text{m}^3$ . In addition, there are no single carriageways, dual carriageways or motorways with annual average daily traffic (AADT) flows in excess of 80,000, 120,000 and 140,000 vehicles respectively.

4.5.3 Technical Guidance LAQM.TG(03), which provides an updating and screening checklist incorporating criteria for determining the risk of benzene levels being significant, has been used to prepare this document.

4.5.4 In view of the information above and that provided in Torfaen County Borough's First and Second Stage Reviews, there is negligible risk of the objectives for benzene being exceeded.

#### **4.6 Industrial Sources**

4.6.1 There are no industrial sources of benzene in Torfaen County Borough Council falling within the criteria described in the Updating and Screening checklist for benzene in Technical Guidance LAQM.TG(03).

#### **4.7 Petrol Stations**

4.7.1 There are 15 petrol filling stations within Torfaen County Borough, all but 3 of these (due a low annual throughput of petrol) are authorised under Part 1 of the Environmental Protection Act 1990. All of the 12 filling stations currently authorised are fitted with stage 1b Vapour Recovery Systems. The remainder will fall under the control of the above Act by the end of 2004.

#### **4.8 Major Fuel Depots (Petrol)**

4.8.1 There are no major fuel depots in Torfaen County Borough.

#### **4.9 Sources Outside Torfaen County Borough**

4.9.1 There are no new sources within neighbouring local authorities that will give rise to levels of benzene likely to significantly affect the air quality of Torfaen County Borough.

#### **4.10 Conclusion**

4.10.1 The following sources have been used to determine the risk of levels of benzene exceeding the air quality objectives in Torfaen County Borough:

- Predicted background concentrations of benzene provided by NETCEN on behalf of DEFRA and the Devolved Administrations.
- Updating and Screening checklist for benzene (LAQM.TG(03)).

- Torfaen County Borough Council's First Stage Review and Assessment of Air Quality (1999).
- Torfaen County Borough Council's Second Stage Review and Assessment of Air Quality (2000).
- Current Traffic Flow Data (Gwent Consultancy)
- Torfaen County Borough Council's register of processes authorised under Part 1 of the Environmental Protection Act 1990 and installations regulated under the Pollution Prevention and Control Act 1999.
- Information provided by Newport City Council, Blaenau Gwent County Borough Council, Caerphilly County Borough Council and Monmouthshire County Council as neighbouring authorities.

In view of the information held in the above sources, when read in conjunction with the updating and screening checklist for benzene in Technical Guidance LAQM.TG(03), there is no requirement to proceed to a detailed assessment for benzene in Torfaen County Borough.

## CHAPTER 5

### Updating and Screening Assessment for 1,3-Butadiene

#### 5.1 Objectives

- 5.1.1 The adopted air quality standard for 1,3-butadiene is a maximum running annual mean concentration of  $2.25\mu\text{g}/\text{m}^3$ , with an objective for the standard to be achieved by the end of 2003.

#### 5.2 The National Perspective

- 5.2.1 The main source of 1,3-butadiene in the UK is from vehicle exhausts. 1,3-butadiene is also an important industrial chemical and is handled in bulk at a small number of industrial premises.
- 5.2.2 The increasing number of vehicles equipped with three way catalysts will significantly reduce emissions of 1,3-butadiene in future years. Recently agreed further reductions in vehicle emissions and improvements to fuel quality, including those as part of the Auto-oil programme, are expected to further reduce emissions of 1,3-butadiene from vehicle exhausts.

#### 5.3 1,3-butadiene in Torfaen County Borough

- 5.3.1 The First Stage Review and Assessment of Air Quality in Torfaen County Borough (1999) concluded that 'the risk of air quality objective for 1,3-butadiene being exceeded was negligible' and 'no further action is required'.

#### 5.4 Monitoring Data

- 5.4.1 As a result of the conclusion reached in the last air quality review and assessment (5.3 above), 1,3-butadiene has not been monitored by Torfaen County Borough Council and there are therefore, no monitoring data available for the County Borough.

#### 5.5 Industrial Sources

- 5.5.1 Data on background levels of 1,3-butadiene have been prepared by NETCEN, part of AEA Technology, on behalf of the UK Department for Environment, Food and Rural Affairs (DEFRA) and the devolved administrations. This data is based upon annual mean background concentrations from 2001. Correction factors are provided in Chapter 4 of LAQM.TG (03) to adjust the 2001 concentrations to 2003.
- 5.5.2 On the basis of these data, there are currently no areas within Torfaen County Borough where the running annual mean level of 1,3-butadiene exceeds  $2.25\mu\text{g}/\text{m}^3$ . In addition, there were no industrial sources identified in the last review and assessment and no new sources have been introduced into the Torfaen County Borough area.

5.5.3 Technical Guidance LAQM.TG (03), which provides an updating and screening checklist incorporating criteria for determining the risk of 1,3-butadiene levels being significant, has been used to prepare this document.

5.5.4 In view of the information above and that provided in Torfaen County Borough's First Stage Review, there is negligible risk of the objectives for 1,3-butadiene being exceeded.

## **5.6 Sources Outside Torfaen County Borough**

5.6.1 There are no new sources within neighbouring local authorities that will give rise to levels of 1,3-butadiene likely to significantly affect the air quality of Torfaen County Borough.

## **5.7 Conclusion**

5.7.1 The following sources have been used to determine the risk of levels of 1,3-butadiene exceeding the air quality objectives in Torfaen County Borough:

- Predicted background concentrations of 1,3-butadiene provided by NETCEN on behalf of DEFRA and the Devolved Administrations.
- Updating and screening checklist for 1,3-butadiene (LAQM.TG (03)).
- Torfaen County Borough Council's First Stage Review and Assessment of Air Quality (1999).
- Torfaen County Borough Council's Second Stage Review and Assessment of Air Quality (2000).
- Torfaen County Borough Council's register of processes authorised under Part 1 of the Environmental Protection Act 1990 and installations regulated under the Pollution Prevention and Control Act 1999.
- Annex 2: Estimating Emissions (Technical Guidance LAQM.TG (03)).
- Register of Installations regulated under the Pollution Prevention and Control Act 1999 (Torfaen County Borough Council, Public Health Team).
- Information provided by Newport City Council, Blaenau Gwent County Borough Council, Caerphilly County Borough Council and Monmouthshire County Council as neighbouring authorities.

In view of the information held in the above sources, when read in conjunction with the updating and screening checklist for 1,3-butadiene in Technical Guidance LAQM.TG (03), there is no requirement to proceed to a detailed assessment for 1,3-butadiene in Torfaen County Borough.

## CHAPTER 6

### Updating and Screening Assessment for Lead

#### 6.1 Objectives

- 6.1.1 The adopted air quality standard for lead is an annual mean concentration of  $0.5 \mu\text{g}/\text{m}^3$ , with an objective for the standard to be achieved by the end of 2004. In addition, a lower air quality objective of  $0.25 \mu\text{g}/\text{m}^3$  to be achieved by the end of 2008 has also been set.

#### 6.2 The National Perspective

- 6.2.1 The agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel Fuels (part of the Auto-Oil Programme) has led to the ban on sales of leaded petrol in the UK with effect from the 1<sup>st</sup> January 2000. Emissions of lead are now restricted to a variety of industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping.

#### 6.3 Lead in Torfaen County Borough

- 6.3.1 The First Stage Review and Assessment of Air Quality in Torfaen County Borough concluded that 'the risk of air quality objectives for lead being exceeded were negligible' and 'no further action is required'.

#### 6.4 Monitoring Data

- 6.4.1 As a result of the conclusion reached in the last air quality review and assessment (6.3 above), lead has not been monitored by Torfaen County Borough Council and there are therefore, no monitoring data available for the County Borough.

#### 6.5 Industrial Sources

- 6.5.1 A single industrial source of lead in Torfaen County Borough was identified during the last review and assessment, namely the 'Exide Batteries' factory on Avondale Industrial Estate in Cwmbran. This was of particular concern as it shared close proximity to a primary school and was regulated by the Environment Agency as a Prescribed Process under the Environmental Protection Act 1990. Due to economic factors and an increasingly competitive market, the factory ceased operating in June 2002 and is now closed. Since the first review and assessment, no new sources have been introduced in the County Borough.

- 6.5.2 Technical Guidance LAQM.TG (03), which provides an updating and screening checklist incorporating criteria for determining the risk of lead levels being significant, has been used to prepare this document. In view of the information above and that provided in Torfaen County Borough's First and Second Stage Reviews, there is negligible risk of the objectives for lead being exceeded.

## **6.6 Sources Outside Torfaen County Borough**

6.6.1 There are no new sources within neighbouring local authorities that will give rise to levels of lead likely to significantly affect the air quality of Torfaen County Borough.

## **6.7 Conclusion**

6.7.1 The following sources have been used to determine the risk of levels of lead exceeding the air quality objectives in Torfaen County Borough:

- Updating and Screening checklist for lead (LAQM.TG (03)).
- Torfaen County Borough Council's First Stage Review and Assessment of Air Quality (1999).
- Torfaen County Borough Council's Second Stage Review and Assessment of Air Quality (2000).
- Register of Installations regulated under the Pollution Prevention and Control Act 1999 (Torfaen County Borough Council, Public Health Team).
- Information provided by Newport City Council, Blaenau Gwent County Borough Council, Caerphilly County Borough Council and Monmouthshire County Council as neighbouring authorities.

In view of the information held in the above sources, when read in conjunction with the updating and screening checklist for lead in Technical Guidance LAQM.TG (03), there is no requirement to proceed to a detailed assessment for lead in Torfaen County Borough.

## CHAPTER 7

# Updating and Screening Assessment for Nitrogen Dioxide

### 7.1 Objectives

- 7.1.1 Two air quality standards for Nitrogen Dioxide have been adopted, an annual mean concentration of  $40\mu\text{g}/\text{m}^3$ , and a 1-hour mean concentration of  $200\mu\text{g}/\text{m}^3$  not to be exceeded more than 18 times per year. The objectives are to be achieved by the end of 2005.
- 7.1.2 The First Air Quality Daughter Directive also sets limit values for nitrogen dioxide, which has been transposed into UK legislation. The Directive includes a 1-hour limit value of  $200\mu\text{g}/\text{m}^3$ , not to be exceeded more than 18 times per year, and an annual mean limit of  $40\mu\text{g}/\text{m}^3$ , both to be achieved by the 1<sup>st</sup> of January 2010.

### 7.2 The National Perspective

- 7.2.1 Nitrogen Dioxide ( $\text{NO}_2$ ) and Nitric Oxide ( $\text{NO}$ ) are both oxides of nitrogen, and are collectively referred to as Nitrogen Oxides ( $\text{NO}_x$ ). All combustion processes produce  $\text{NO}_x$  emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health.
- 7.2.2 The principal source of  $\text{NO}_x$  emissions is road transport, which accounted for about 49% of total UK emissions in 2000. Major roads carrying large volumes of high-speed traffic (such as motorways and other primary routes) are a predominant source, as are conurbations and city centres with congested traffic.
- 7.2.3 The contribution of road transport to  $\text{NO}_x$  emissions has declined significantly in recent years as a result of various policy measures, and further reductions are expected up until 2010 and beyond.
- 7.2.4 Other significant sources of  $\text{NO}_x$  emissions include electricity supply industry and other commercial and industrial sectors, which accounted for around 23% and 24% respectively in 1999. Emissions from both sources have also declined dramatically, due to the fitting of low nitrogen oxide burners and the increased use of natural gas.

### 7.3 Nitrogen Dioxide in Torfaen County Borough

- 7.3.1 The First Stage Review and Assessment of Air Quality in Torfaen County Borough (1999) concluded that the 'risk of the air quality objective for nitrogen dioxide being exceeded was not negligible' and recommended further consideration in a second stage review and assessment. The Second Stage Review and Assessment of Air Quality in Torfaen County Borough (2000) concluded that 'the risk of air quality objective for Nitrogen Dioxide not being met by the 31<sup>st</sup> of

November 2005 is negligible' and that 'the Authority need not consider the possibility of proceeding to a Stage Three Review and Assessment'.

## 7.4 Monitoring Data

- 7.4.1 Torfaen County Borough Council has monitored Nitrogen Dioxide using a continuous chemiluminescent analyser since 2000. In June 2001, the Nitrogen Dioxide analyser at the 'Cwmbran' site became affiliated to the Automatic Urban Rural Network. The site is classified as an 'Urban Background' Site (Grid Reference: ST 305 955) and is located in the playing field of a school. The monitoring location therefore represents a site with relevant public exposure i.e. a location where members of the public are regularly present. Ratified data from the site can be viewed on the NETCEN website ([www.airquality.co.uk](http://www.airquality.co.uk)).
- 7.4.2 The data capture rate for the Nitrogen Dioxide analyser at Cwmbran exceeded 90% for the years 2001 and 2002. Ratified data collected during 2001 and 2002 also confirms that there were no exceedences of the 1-hour mean objective ([www.airquality.co.uk](http://www.airquality.co.uk)).
- 7.4.3 Furthermore, ratified data obtained for 2003 thus far has confirmed that there are no current exceedences of the 1-hour mean objective ([www.airquality.co.uk](http://www.airquality.co.uk)).
- 7.4.4 The 12-month annual mean for 2002 as measured at the Cwmbran site is provided in Table 7.1 below. All data has been ratified.

Table 7.1 Nitrogen Dioxide 12 month annual mean for 2002 - Cwmbran Site, Torfaen		
Location	Grid Reference	12 month annual mean concentration ( $\mu\text{g}/\text{m}^3$ )
Croesyceiliog, Cwmbran	ST 305 955	21

- 7.4.4 Monitoring of Nitrogen Dioxide using diffusion tubes also takes at several locations throughout the County Borough. There are nine sites in total all representing kerbside locations:
- Snatchwood Road, Abersychan, Pontypool
  - Commercial Street, Pontypool Town Centre
  - Sunnybank Road, Griffithstown, Pontypool
  - A4051, Cwmbran Drive, Cwmbran
  - Henllys Way, Cwmbran
  - A4042 Link Road, Llantarnam Cwmbran
  - Caerleon Road, Ponthir
  - Llanyravon Way, Llanyravon, Cwmbran
  - Edlogan Way, Northville, Cwmbran

All of the above kerbside locations were specifically chosen to reflect the findings of the last review and assessment of air quality in Torfaen County Borough and represent those road networks with the highest Annual Average Daily Traffic Flows (AADT).

- 7.4.5 None of the data obtained to date has been ratified and subjected to a bias correction. An appropriate bias is to be determined as part of the ongoing nitrogen dioxide monitoring programme, and will be completed by April 2004.
- 7.4.6 The unratified data for 2002 are given in Table 7.2 below and these have been projected to 2005 using the correction factor provided in Chapter 6 of Technical Guidance LAQM.TG (03).

Table 7.2 Passive Diffusion Tube Kerbside Locations for NO <sub>2</sub> Monitoring Torfaen County Borough – January to December 2002			
Location	Grid Reference	Unratified annual mean (µg/m <sup>3</sup> )	Projected annual mean for 2005 (0.892/0.969 correction factor)
Snatchwood Road, Abersychan, Pontypool	SO269 034	30.2	27.8
Commercial Street, Pontypool Town Centre	SO283 007	37.1	34.2
Sunnybank Road, Griffithstown, Pontypool	ST289 993	19.3	17.8
A4051, Cwmbran Drive, Cwmbran	ST294 947	43.4	40
Henllys Way, Cwmbran	ST286 945	26.3	24.2
A4042 Link Road, Llantarnam Cwmbran	ST307 948	40.8	37.6
Caerleon Road, Ponthir	ST326 929	23.6	21.7
Llanyravon Way, Llanyravon, Cwmbran	ST304 948	22.2	20.4
Edlogan Way, Northville, Cwmbran	ST299 958	24.1	22.2

## 7.5 Road Traffic

- 7.5.1 There are no locations within Torfaen County Borough Council which fulfil the criteria in Technical Guidance LAQM.TG (03) of ‘narrow congested roads’ that were not assessed in the last review and assessment of air quality (2000).
- 7.5.2 Road intersections described as ‘busy’ junctions in Technical Guidance LAQM.TG (03) have been considered using traffic flow threshold greater than 10,000 vehicles per day where there are relevant locations within 10m of the kerb.
- 7.5.3 There are no busy junctions with relevant exposure within 10m of the kerb within Torfaen County Borough that were not assessed during the last review and assessment of air quality (2000).
- 7.5.4 There are no locations within Torfaen County Borough, which fulfil criteria in Technical Guidance LAQM.TG (03) of busy streets that were not assessed in the last review and assessment of air quality (2000).
- 7.5.5 There are no locations within Torfaen County Borough which fulfil the criteria in Technical Guidance LAQM.TG (03) of roads with high flows of buses and/or HGVs that were not assessed in the last review and assessment of air quality (2000).

- 7.5.6 There have been no significant new roads constructed or proposed since the last review and assessment of air quality (2000).
- 7.5.7 There were no roads close to the objective, i.e. above  $36\mu\text{g}/\text{m}^3$ , but below  $40\mu\text{g}/\text{m}^3$  identified in the last review and assessment of air quality (2000).
- 7.5.8 There are two bus stations in the County Borough, one in Pontypool Town Centre and one in Cwmbran Town Centre. Daily bus movements at these sites are in the order of 500 and 750 per day respectively. Technical Guidance LAQM.TG (03) considers bus stations with less than 1,000 bus movements per day as not being significant.

## **7.6 Industrial Sources**

- 7.6.1 There have been no new industrial sources of  $\text{NO}_x$  within Torfaen County Borough since the last review and assessment that have not been subject to either planning controls or authorisation under Part 1 of the Environmental Protection Act 1990.
- 7.6.2 Two out of the three industrial processes within Torfaen County Borough identified as giving rise to Emissions of nitrogen dioxide in the last review and assessment but not considered significant, have since ceased operation. These are Exide Batteries based in Cwmbran, and Shanks Chemical Services based in Pontypool.
- 7.6.3 The remaining industrial source of nitrogen dioxide, Knauf Insulation (formerly Owens Corning) based in Cwmbran has not seen a significant increase in emissions since the last review and assessment of air quality (2000).

## **7.7 Sources Outside Torfaen County Borough**

- 7.7.1 There are no new sources within neighbouring local authorities that will give rise to levels of Nitrogen Dioxide likely to significantly affect the air quality of Torfaen County Borough.

## **7.8 Aircraft**

- 7.8.1 There are no airports within Torfaen County Borough and therefore there is no relevant exposure within 1000m of an airport boundary.

## **7.9 Conclusion**

- 7.9.1 The following sources have been used to determine the risk of levels of Nitrogen Dioxide exceeding the air quality objectives in Torfaen County Borough:
- Data derived from the Cwmbran Automatic Continuous Monitoring Site (owned and managed by Torfaen County Borough Council)
  - Predicted background concentrations of Nitrogen Oxides provided by NETCEN on behalf of DEFRA and the Devolved Administrations.

- Updating and Screening checklist for Nitrogen Dioxide provided by technical guidance (LAQM.TG (03)).
- Torfaen County Borough Council's First Stage Review and Assessment of Air Quality (1999).
- Torfaen County Borough Council's Second Stage Review and Assessment of Air Quality (2000).
- Torfaen County Borough Council's register of processes authorised under Part 1 of the Environmental Protection Act 1990 and installations regulated under the Pollution Prevention and Control Act 1999.
- Current Traffic Flow Data (Gwent Consultancy)
- Unratified passive nitrogen dioxide diffusion tube data
- The Design Manual for Roads and Bridges Screening Method, version 1.01 (April 2003)
- Information provided by Newport City Council, Blaenau Gwent County Borough Council, Caerphilly County Borough Council and Monmouthshire County Council as neighbouring authorities.

In view of the information held in the above sources, when read in conjunction with the updating and screening checklist for Nitrogen Dioxide in Technical Guidance LAQM.TG (03), there is likely to be no requirement to proceed to a detailed assessment for Nitrogen Dioxide in Torfaen County Borough.

However, there remains a level to the uncertainty over the nitrogen dioxide diffusion tube results. This is due primarily to the use of unratified nitrogen dioxide diffusion tube data. The current collocation exercise being carried out by the Council should therefore be completed to determine the bias correction factor for the passive nitrogen dioxide diffusion tubes analysed by Severn Trent Laboratories.

This study will be completed by the end of April 2004.

## CHAPTER 8

# Updating and Screening Assessment for Sulphur Dioxide

### 8.1 Objectives

- 8.1.1 The adopted air quality standard for sulphur dioxide is a 15-minute mean concentration of  $266\mu\text{g}/\text{m}^3$ , with an objective for the standard not to be exceeded more than 35 times in a year by the end of 2005. Additional objectives have also been set which are equivalent to the EU limit values specified in the First Daughter Directive. These are for a 1-hour mean objective of  $350\mu\text{g}/\text{m}^3$ , to be exceeded no more than 24 times per year, and a 24-hour objective at  $125\mu\text{g}/\text{m}^3$ , to be exceeded no more than 3 times per year, to be achieved by the end of 2004.

### 8.2 The National Perspective

- 8.2.1 The main sources of sulphur dioxide in the UK are power stations, which accounted for more than 71% of total emissions in 2000. There are also significant emissions from other industrial combustion sources. Domestic sources now only account for 4% of emissions and road transport currently accounts for less than 1% of all emissions.

### 8.3 Sulphur dioxide in Torfaen County Borough

- 8.3.1 The First Stage Review and Assessment of Air Quality in Torfaen County Borough (1999) concluded that 'the risk of air quality objectives for sulphur dioxide not being met by the end of 2005 is negligible' and 'no further action is required'.

### 8.4 Monitoring Data

- 8.4.1 Torfaen County Borough Council has monitored sulphur dioxide on an automatic continuous basis since 2000. In June 2001, the sulphur dioxide analyser at the 'Cwmbran' site became affiliated to the Automatic Urban Rural Network. The site is classified as an 'Urban Background' Site (Grid Reference: ST 305 955) and is located in the playing field of a school. The monitoring location therefore represents a site with relevant public exposure i.e. a location where members of the public are regularly present. Ratified data from the site can be viewed on the NETCEN website ([www.airquality.co.uk](http://www.airquality.co.uk)).
- 8.4.2 The data capture rate for the sulphur dioxide analyser at Cwmbran currently exceeds 90%. Data collected for the years 2001 and 2002 confirms that none of the air quality standards in respect of sulphur dioxide have been exceeded ([www.airquality.co.uk](http://www.airquality.co.uk)).
- 8.4.3 Data obtained for 2003 has also confirmed that there are no current exceedences of the relevant objectives ([www.airquality.co.uk](http://www.airquality.co.uk)).

## **8.5 New Industrial Sources**

8.5.1 There are no new industrial sources of sulphur dioxide that have not been assessed as part of either planning consent or by way of authorisation under Part 1 of the Environmental Protection Act 1990.

## **8.6 Industrial Sources with Substantially Increased Emissions**

8.6.1 There are no industrial sources within Torfaen County Borough with substantially increased emissions of sulphur dioxide.

8.6.2 Two out of the three industrial processes within Torfaen County Borough identified as giving rise to Emissions of sulphur dioxide in the last review and assessment but not considered significant, have since ceased operation. These are Exide Batteries based in Cwmbran, and Shanks Chemical Services based in Pontypool.

8.6.3 The remaining industrial source of sulphur dioxide, Knauf Insulation (formerly Owens Corning) based in Cwmbran, has not seen a significant increase in emissions since the last review and assessment of air quality (2000).

## **8.7 Areas of Domestic Coal Burning**

8.7.1 There are certain pockets of coal fired homes in the North of the County Borough, particularly within the town of Blaenavon. However, information obtained from a review of domestic smoke complaints received by the Public Health Team, indicates that there is an insufficient density of coal fired homes in Torfaen County Borough to be significant as defined in Technical Guidance LAQM.TG(03).

## **8.8 Boilers**

8.8.1 There are no boiler plants with an output greater than 5-mega watts thermal within 500m of any relevant location within Torfaen County Borough.

## **8.9 Shipping**

8.9.1 Torfaen County Borough has no coastline and therefore no significant shipping to consider.

## **8.10 Railway Locomotives**

8.10.1 There are no locations within Torfaen County Borough where diesel locomotives regularly remain stationary for 15 minutes or more.

## **8.11 Sources Outside Torfaen County Borough**

8.11.1 There are no new sources within neighbouring local authorities that will give rise to levels of sulphur dioxide likely to significantly affect the air quality of Torfaen County Borough.

## 8.12 Conclusion

8.12.1 The following sources have been used to determine the risk of levels of sulphur dioxide exceeding the air quality objectives in Torfaen County Borough:

- Data derived from the Cwmbran Automatic Continuous Monitoring Site (owned and managed by Torfaen County Borough Council)
- Predicted background concentrations of sulphur dioxide provided by NETCEN on behalf of DEFRA and the Devolved Administrations.
- Updating and Screening checklist for sulphur dioxide (LAQM.TG(03)).
- Torfaen County Borough Council's First Stage Review and Assessment of Air Quality (1999).
- Torfaen County Borough Council's Second Stage Review and Assessment of Air Quality (2000).
- Torfaen County Borough Council's register of processes authorised under Part 1 of the Environmental Protection Act 1990 and installations regulated under the Pollution Prevention and Control Act 1999.
- Information provided by Newport City Council, Blaenau Gwent County Borough Council, Caerphilly County Borough Council and Monmouthshire County Council as neighbouring authorities.

In view of the information held in the above sources, when read in conjunction with the updating and screening checklist for sulphur dioxide in Technical Guidance LAQM.TG(03), there is no requirement to proceed to a detailed assessment for sulphur dioxide in Torfaen County Borough.

## CHAPTER 9

# Updating and Screening Assessment for Fine Particles (PM<sub>10</sub>)

### 9.1 Objectives

- 9.1.1 Two air quality standards for PM<sub>10</sub> have been adopted, which are equivalent to the EU Stage 1 limit values in the First Air Quality Daughter Directive. The objectives are 40µg/m<sup>3</sup> as the annual mean and 50µg/m<sup>3</sup> as the fixed 24-hour mean to be exceeded no more than 35 days per year, to be achieved by the end of 2004.
- 9.1.2 The EU has also set indicative limit values for PM<sub>10</sub> which are to be achieved by the 1<sup>st</sup> January 2010. These Stage 2 Limit Values are considerably more stringent, and are 20µg/m<sup>3</sup> as the annual mean and 50µg/m<sup>3</sup> as the 24-hour mean to be exceeded no more than 7 days per year.

### 9.2 The National Perspective

- 9.2.1 There is a wide range of emission sources that contribute to PM<sub>10</sub> concentrations in the UK. It has been confirmed that these sources can be usefully divided into 3 main categories. Primary particle emissions are derived directly from combustion sources, including road traffic, power generation and industrial processes etc. Secondary particles are formed by chemical reactions in the atmosphere, and comprise principally of sulphates and nitrates. Coarse particles comprise of emissions from a wide range of sources, including re-suspended dusts from road traffic, construction works, mineral extraction processes, wind blown dusts and soils, sea salt and biological particles.

### 9.3 PM<sub>10</sub> in Torfaen County Borough

- 9.3.1 The First Stage Review and Assessment of Air Quality in Torfaen County Borough (1999) concluded that ‘the risk of the air quality objectives for PM<sub>10</sub> being exceeded by the end of 2005 is negligible’ and ‘no further action is required’.

### 9.4 Monitoring Data

- 9.4.1 Ratified monitoring data for PM<sub>10</sub> have been collated at the Cwmbran monitoring site using a TEOM particulate monitor. In June 2001, the TEOM monitor at the ‘Cwmbran’ site became affiliated to the Automatic Urban Rural Network. The site is classified as an ‘Urban Background’ Site (Grid Reference: ST 305 955) and is located in the playing field of a school. The monitoring location therefore represents a site with relevant public exposure i.e. a location where members of the public are regularly present. Ratified data from the site can be viewed on the NETCEN website ([www.airquality.co.uk](http://www.airquality.co.uk)).
- 9.4.2 The data capture rate for the TEOM monitor at Cwmbran currently exceeds 90%. Data collected for the years 2001 and 2002 also exceeded 90%.

9.4.3 The 12-month annual mean for 2002 as measured at the Cwmbran site is provided in Table 9.1 below. All data has been corrected using the default 1.3 correction factor to estimate gravimetric concentrations.

Table 9.1 PM10 Data - Cwmbran Site, Torfaen 2002		
Location	Grid Reference	12 month annual mean concentration ( $\mu\text{g}/\text{m}^3$ )
Croesyceiliog, Cwmbran	ST 305 955	18.2

9.4.4 Ratified data from the site confirms that there was one exceedence of the  $50\mu\text{g}/\text{m}^3$  24-hour objective during 2002 ([www.airquality.co.uk](http://www.airquality.co.uk)).

9.4.5 Accordingly, it is predicted that there will be less than 35, 24-hour exceedences of the  $50\mu\text{g}/\text{m}^3$  objective in 2004.

## 9.5 Road Traffic

9.5.1 Road intersections described as ‘busy’ junctions in Technical Guidance LAQM.TG(03) have been considered using traffic flow threshold greater than 10,000 vehicles per day where there are relevant exposure within 10m of the kerb.

9.5.2 There are no busy junctions with relevant exposure within 10m of the kerb within Torfaen County Borough.

9.5.3 There are no locations within Torfaen County Borough, which fulfil criteria in Technical Guidance LAQM: TG (03) of busy streets that were not assessed in the last review and assessment of air quality (1999).

9.5.4 There are no roads within Torfaen County Borough with an unusually high proportion of heavy-duty vehicles (greater than 20% of AADT flow). As such there are no areas of relevant exposure.

9.5.5 There have been no significant roads constructed or proposed since the last round of review and assessment within Torfaen County Borough (1999).

9.5.6 There are no roads within Torfaen County Borough where more than 30, 24-hour exceedences of  $50\mu\text{g}/\text{m}^3$  were predicted at relevant locations in 2004, during the first round of the review and assessment (1999).

9.5.7 There are no roads with traffic flows greater than 10,000 vehicles per day annual average daily traffic flow (AADT) that have experienced increases in traffic greater than 25% of their AADT.

## **9.6 New Industrial Sources**

9.6.1 There are no new industrial sources of PM<sub>10</sub> that have not been assessed as part of either planning consent or by way of authorisation under Part 1 of the Environmental Protection Act 1990. Furthermore, no exceedences of the objectives at relevant locations have been predicted.

## **9.7 Industrial Sources with Substantially Increased Emissions**

9.7.1 There are no industrial sources within Torfaen County Borough with substantially increased emissions of PM<sub>10</sub> as defined in LAQM.TG(03).

9.7.2 Two out of the three industrial processes within Torfaen County Borough identified as giving rise to Emissions of PM<sub>10</sub> in the last review and assessment but not considered significant, have since ceased operation. These are Exide Batteries based in Cwmbran, and Shanks Chemical Services based in Pontypool.

9.7.3 The remaining industrial source of PM<sub>10</sub>, Knauf Insulation (formerly Owens Corning) based in Cwmbran, has not seen a significant increase in emissions since the last review and assessment of air quality (2000).

## **9.8 Domestic Sources**

9.8.1 There are certain pockets of coal fired homes in the North of the County Borough, particularly within the town of Blaenavon. However, information obtained from a review of domestic smoke complaints received by the Public Health Team, indicates that there is an insufficient density of coal fired homes in Torfaen County Borough to be significant as defined in Technical Guidance LAQM.TG(03).

## **9.9 Quarries, Landfill Sites and Opencast Coal Sites**

9.9.1 All quarries, landfill sites and opencast sites were evaluated in the last review and assessment of air quality and it was established that there was a negligible risk of the objectives for PM<sub>10</sub> not being met. There are currently no active landfill sites, quarries or opencast coal sites within the County Borough.

## **9.10 Aircraft**

9.10.1 There are no airports within Torfaen County Borough and therefore there is no relevant exposure within 500m of an airport boundary.

## **9.11 Sources Outside Torfaen County Borough**

9.11.1 There are no new sources within neighbouring local authorities that will give rise to levels of PM<sub>10</sub> likely to significantly affect the air quality of Torfaen County Borough.

## 9.12 Conclusion

9.12.1 The following sources have been used to determine the risk of levels of particulate matter (PM<sub>10</sub>) exceeding the air quality objectives in Torfaen County Borough:

- Ratified data derived from TEOM monitor located at the Cwmbran Automatic Continuous Monitoring Site via the national network website [www.airquality.co.uk](http://www.airquality.co.uk) (Site owned and managed by Torfaen County Borough Council)
- Predicted background concentrations of PM<sub>10</sub> provided by NETCEN on behalf of DEFRA and the Devolved Administrations.
- Updating and Screening checklist for PM<sub>10</sub> provided by Technical Guidance (LAQM.TG(03)).
- Torfaen County Borough Council's First Stage Review and Assessment of Air Quality (1999).
- Torfaen County Borough Council's Second Stage Review and Assessment of Air Quality (2000).
- Torfaen County Borough Council's register of processes authorised under Part 1 of the Environmental Protection Act 1990 and installations regulated under the Pollution Prevention and Control Act 1999.
- Current Traffic Flow Data (Gwent Consultancy)
- Information provided by Newport City Council, Blaenau Gwent County Borough Council, Caerphilly County Borough Council and Monmouthshire County Council as neighbouring authorities.

In view of the information held in the above sources, when read in conjunction with the updating and screening checklist for PM<sub>10</sub> in Technical Guidance LAQM.TG(03), there is no requirement to proceed to a detailed assessment for PM<sub>10</sub> in Torfaen County Borough.

## CHAPTER 10

### Conclusion

- 10.1 An updating and screening assessment has been carried out for Torfaen County Borough Council in line with the guidance provided by Part IV of the Environment Act 1995, Local Air Quality Management Technical Guidance LAQM.TG(03).
- 10.2 Of the seven pollutants examined, the concentration levels of carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide and fine particulates throughout the County Borough are unlikely to exceed the Air Quality Objectives set for them. There is therefore no requirement to proceed to a detailed assessment of any of these pollutants in Torfaen County Borough.
- 10.3 The updating and screening assessment for nitrogen dioxide has revealed a level of uncertainty in the results. This is due primarily to the use of unratified nitrogen dioxide diffusion tube data. At the time of writing this report, only a few months of collocation work had been conducted by the Council. This falls short of the nine-month requirement as stipulated in LAQM.TG (03). Furthermore, the laboratory currently processing the nitrogen dioxide diffusion tubes is currently unable to provide a bias correction derived from the collocation of tubes with a chemiluminescence monitor. Consequently the data obtained so far cannot be ratified and used to inform any future decisions on air quality in the County Borough.

## CHAPTER 11

### Recommendations

11.1 In view of the conclusions reached in Chapter 10, the following actions are recommended.

- The tri-tube collocation study currently being carried out by Torfaen County Borough Council should be completed to allow the collection of at least nine month's worth of data. A bias correction factor can then be determined for the passive nitrogen dioxide diffusion tubes analysed by Severn Trent Laboratories.

This will be completed by the end of April 2004.

## References and Legislation

### References

- 1 Department for Environment, Food and Rural Affairs (2003), *Part IV of the Environment Act 1995: Local Air Quality Management, Technical Guidance LAQM.TG(03)*. PB7514. DEFRA, London. ISBN 0-85521-021-4.
- 2 Department for Environment, Food and Rural Affairs (2003), *Part IV of the Environment Act 1995: Local Air Quality Management, Policy Guidance LAQM.PG(03)*. PB7516. DEFRA, London. ISBN 0-85521-020-6.
- 3 Department for Environment, Food and Rural Affairs (2003), *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum*. The Stationary Office Ltd, London.
- 4 Department for Environment, Transport and the Regions (2000), *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Working Together for Clean Air*. The Stationary Office Ltd, London.
- 5 The Highways Agency (2003) *Design Manual for Roads and Bridges (DMRB)*, Version 1.01 April 2003.
- 6 Torfaen County Borough Council (1999), *A First Stage Review and Assessment of Air Quality within Torfaen*, Environmental Management Department, December 1999.
- 7 Torfaen County Borough Council (2000), *A Second Stage Review and Assessment of Air Quality within Torfaen*, Environmental Management Department, June 2000.

### Legislation

- 1 Air Quality (Wales) Regulations 2000 SI No.1940.
- 2 Air Quality (Amendment) (Wales) Regulations 2002 SI No.3182.
- 3 Environment Act 1995
- 4 Environmental Protection Wales, The Air Quality Limit Values (Wales) Regulations 2002 SI No.3183

## Websites

National Air Quality Network

[www.airquality.co.uk](http://www.airquality.co.uk)

DEFRA

[www.defra.gov.uk](http://www.defra.gov.uk)

National Assembly for Wales

[www.wales.gov.uk](http://www.wales.gov.uk)

Air Quality Consultants Ltd and The University of the West  
Of England, Bristol

[www.uwe.ac.uk/aqm/review](http://www.uwe.ac.uk/aqm/review)

Casella Stanger

[www.stanger.co.uk/airqual/modelhlp](http://www.stanger.co.uk/airqual/modelhlp)