NATIONAL ENVIRONMENT PROTECTION (AMBIENT AIR QUALITY) MEASURE

NEW SOUTH WALES ANNUAL COMPLIANCE REPORT 2007

Prepared 8th December 2008

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Acronyms, abbreviations and glossary

Following is a list of acronyms, abbreviations and terms used in this report.

AAQ NEPM	Ambient Air Quality – National Environment Protection Measure
ABS	Australian Bureau of Statistics
Ambient air	The external air environment (does not include the air environment inside buildings or structures)
AQMP	Air Quality Monitoring Plan
AS	Australian Standards
BAM	Beta Attenuation Monitor
CO	Carbon monoxide
DEC	Department of Environment and Conservation (NSW)
DECC	Department of Environment and Climate Change (NSW) – formerly the DEC
EPA	Environment Protection Authority (predecessor of the DEC)
FDMS	Filter Dynamics Measurement System (used with TEOM)
FRM	Federal Reference Method (USEPA)
GRUB	Generally Representative Upper Bound
ICP-AES	Inductively Coupled Plasma-Atomic Emission Spectroscopy
Monitoring station	A facility for measuring the concentration of one or more pollutants in the ambient air in a region or sub-region
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
O_3	Ozone
Pb	Lead
$PM_{2.5}$	Particulate Matter with aerodynamic diameter of 2.5 microns or less
PM_{10}	Particulate Matter with aerodynamic diameter of 10 microns or less
POEO	Protection of the Environment Operations Act (1997) – key piece of environmental protection legislation in NSW
ppm	Parts per million by volume – parts of pollutant per million parts of air
PRC	Peer Review Committee
RAAS	Reference Ambient Air Sampler
SO_2	Sulfur dioxide
TEOM	Tapered Element Oscillating Microbalance
USEPA	United States Environmental Protection Agency
$\mu g/m^3$	microgram (1 millionth of a gram) per cubic metre referenced to a temperature of 0°C and an absolute pressure of 101.325 kilopascals.
VOC	Volatile Organic Compounds – means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate, which participates in atmospheric photochemical reactions and generally having a vapour pressure greater than 0.1 mm Hg at normal temperature and pressure

Introduction

The goal of the National Environment Protection Measure for Ambient Air Quality (AAQ NEPM) is to meet the NEPM standards (within the maximum number of allowable exceedences) by 2008.

This report, required under Clause (18) of the Ambient Air Quality NEPM, demonstrates that in 2007 NSW has met the requirements of the Ambient Air Quality NEPM for most pollutants. Levels of carbon monoxide, nitrogen dioxide, lead and sulfur dioxide continue to be well below the NEPM standards. Levels of ozone exceeded the NEPM standards in the Sydney and Illawarra regions and exceedences of the PM_{10} standard were recorded in Sydney, the Illawarra, lower Hunter, Albury, Tamworth and Wagga Wagga.

Air quality is addressed as a priority under the NSW State Plan, released in 2006. The target under the State Plan's cleaner air priority is to meet the national air quality goals as identified in the Ambient Air Quality NEPM.

The NSW air quality management plan, *Action for Air*, was released in 1998 and updated in *Action for Air: 2006 Update*. *Action for Air* outlines a broad range of strategies used to manage air quality in NSW such as integrating air quality goals and urban transport planning; providing more and better transport choices; making cars, trucks and buses cleaner; promoting cleaner homes and business; and managing the impact of open burning. *Action for Air* is a 25-year plan that is reviewed regularly to assess achievements and the need for adaptation of control strategies.

Action for Air requires a broadly based public forum to be convened every three years to encourage public input on air quality trends and strategies. During 2007 a range of stakeholder consultations were held including a major public forum in November 2007 with the theme of 'Clean Air, Cool Climate'. The proceedings can be found at http://www.environment.nsw.gov.au/air/actionforair/caf2007.htm.

A major new emissions inventory for the NSW Greater Metropolitan Region was finalized in 2007 and is informing the development of new strategies to address the NEPM goals. A detailed analysis of air quality trends for the 10 years of the Action for Air plan was also published in 2007 (http://www.environment.nsw.gov.au/air/cpairqual.htm).

Meeting the Ambient Air Quality NEPM goal for ozone will be a challenge for the major urban areas of NSW given pressures from a growing population, urban expansion and increase in motor vehicle use. However, NSW has a broad range of strategies in place and being developed under *Action for Air* to reduce precursor pollutants. These include the requirement for Stage 1 and Stage 2 vapour controls at service stations, mandatory limits for petrol volatility in summer and the NSW Cleaner Vehicles and Fuels Strategy as well as initiatives to assist local councils to manage precursor emissions from smaller, commercial/industrial sources and domestic sources.

A regulatory framework, which restricts emissions from larger industry through licence limits and load-based fees, is in place. The regulations limiting industrial emissions were reviewed and strengthened in 2005. These measures, together with stricter motor vehicle emission standards, tighter fuel regulations, and new actions brought forward under the NSW State Plan and *Action for Air* review will help move NSW towards meeting the NEPM goal for ozone in the longer term.

Even discounting for bushfire and dust storm events, meeting the goal of the Ambient Air Quality NEPM for particles, measured as PM_{10}, presents a challenge for NSW. This is particularly the case in rural population centres where a combination of topography, climate, agricultural activities and relatively high use of solid fuel heaters, can combine to produce elevated levels of fine particles.

As for ozone, *Action for Air* includes a broad range of strategies for managing particle emissions across mobile, industry and domestic sources and additional actions will be brought forward under *Action for Air*. Some of the more significant initiatives in place are:

- National vehicle emission and fuel quality standards;
- The NSW diesel retrofit program;

- Actions under the Diesel National Environment Protection Measure which requires jurisdictions to assess the impact of emissions from in service diesel vehicles and where necessary to implement programs to reduce them. NSW programs include the Smoky Vehicle Enforcement program;
- Particle emissions limits for industrial combustion processes under the Protection of the Environment (Clean Air) Regulation;
- Environmental Impact Assessment processes for new developments;
- Emission limits for particles from solid fuel heaters.

The NSW Government's $5 million Clean Air, Healthy Communities fund is providing for a range of new initiatives to improve air quality and at the same time reduce greenhouse gas emissions.

Ambient Air Quality NEPM Monitoring

The *NSW Ambient Air Quality NEPM Monitoring Plan* details the monitoring that NSW performs to assess compliance with the Ambient Air Quality NEPM. The majority of monitoring occurs in the high population regions of Sydney, Newcastle and Wollongong. These regions contain over 60% of the NSW population. Campaign monitoring is also performed at a number of rural population centres.

The network is designed to characterise general air quality and frequently will pick up individual pollutant events. This approach ensures that there is adequate coverage of the populated areas and of the broad differences in pollutant distribution within a region. The choice of stations in each region was made to optimise both population coverage and representation of the occurrences of higher pollutant concentration.

NSW characterises the air quality to which the general population is exposed in a region by monitoring all air pollutants of interest in a network of trend stations. These stations capture the majority of pollution events that occur from time to time, but are supplemented by additional permanent upper bound stations at which selected pollutants only will be monitored to ensure that all major pollutant events are captured and reported.

Campaign monitoring will be undertaken in regional centres. Initial monitoring is occurring at Albury, Wagga Wagga, Bathurst and Tamworth. Data from these stations will be used to validate and review the screening measures applied to the urban centres outside the Sydney-Wollongong-Newcastle regions.

In total, NSW currently monitors the majority of pollutants at eight trend stations (T), selected individual pollutants at four additional permanent upper bound stations or performance stations (P), and selected pollutants on a campaign basis at a further seven stations (C) in Sydney, the Lower Hunter and regional centres.

In addition NSW also maintains a number of air quality monitoring stations that are not designated for NEPM monitoring. Some stations that are designated NEPM stations for particular pollutants are not designated for other pollutants. For instance St Marys is designated as a NEPM station for ozone however nitrogen dioxide and PM_{10} are also measured at this station. Data from stations that are not designated as NEPM stations for a particular pollutant are not presented in this report.

The NSW monitoring network for the Ambient Air Quality NEPM is outlined in table 1. More detailed information on NEPM monitoring in NSW is provided in *Appendix A*.

New sites and site closures

The Blacktown monitoring station was closed in June 2004 as the land where the station was located was sold for residential development. The location of this monitoring station, directly on the Blacktown Ridge provided valuable data that contributed to a better understanding of air movements between the Hawkesbury basin and the Parramatta River valley. A new station was established at Prospect in February 2007. The station is sited such that the key characteristics of the old Blacktown station should also be evident at the new Prospect station.

The Warrawong station was closed in April 2006.

Table 1: NSW Ambient Air Quality NEPM monitoring network

Station	Station type [1]	Year established	Number of parameters	Ozone	Nitrogen dioxide	PM_{10}	Carbon monoxide	Sulfur dioxide
Sydney								
Blacktown [6]	T	1992 – 2004	5	X	X	X	X	X
Bringelly	T	1992	4	X	X	X		X
Central Coast [2]	C	To be established	4	X	X	X		X
Chullora [3]	T	2003	5	X	X	X	X	X
Liverpool	C	1990	5	X	X	X	X	
Macarthur	T	2003	5	X	X	X	X	X
Oakdale	P	1996	2	X		X		
Prospect [6]	T	2007	5	X	X	X	X	X
Richmond	T	1992	4	X	X	X		X
Rozelle	T	1978	4	X	X	X	X	
St Marys	P	1992	1	X				
Lower Hunter								
Newcastle	T	1992	5	X	X	X	X	X
Maitland [2]	T	To be established	4	X	X	X		X
Beresfield [4]	C	1993	1			X		
Wallsend [4]	C	1992	3	X	X			X
Illawarra								
Albion Park	P	1978 – 2005	4	X	X	X		X
Albion Park South	P	2005	4	X	X	X		X
Kembla Grange	P	1994	2	X		X		
Warrawong [7]	P	1993 – 2006	1					X
Wollongong	T	1993	5	X	X	X	X	X
Regional NSW								
Albury	C	2000	1			X		
Bathurst [8]	C	2000	2	X		X		
Dubbo [5]	C	Dependent on campaign monitoring results	1			X		
Lismore [5]	C		1			X		
Orange [5]	C		1			X		
Tamworth	C	2000	1			X		
Wagga Wagga	C	2001	1			X		

(1) P denotes performance; T denotes trend; C denotes campaign.

(2) Postponed – under review.

(3) Replaced the Lidcombe trend station.

(4) Data from Beresfield and Wallsend will be reported at least until the Maitland station is established.

(5) Monitoring subject to results from initial campaign monitoring.

(6) Prospect station replaces Blacktown station from 2007.

(7) Warrawong station closed in April 2006.

(8) Bathurst ozone analyzer removed in August 2007 due to the completion of the campaign.

Assessment of compliance with standards and 2008 goal

Air quality is assessed against the Ambient Air Quality (AAQ) NEPM standards and goals as specified in Schedule 2 of the NEPM and reproduced below in Table 2.

The **Standards** against which air quality is assessed are concentrations in parts per million (ppm) or micrograms per cubic metre ($\mu g/m^3$) – (see column 3 of Table 2.)

The **Goal** of the AAQ NEPM is to achieve the Standards as assessed in accordance with the monitoring protocol within 10 years of commencement (i.e. 2008) to the extent specified in Schedule 2 of the NEPM. The extent is expressed as a maximum allowable number of exceedences for each standard (see column 4 in Table 2). These are set to account for unusual meteorological conditions and, in the case of particles, natural events such as dust storms and bushfires, that can't be controlled through normal air quality management programs.

The AAQ NEPM also specifies advisory reporting standards for $PM_{2.5}$ (see Table 2). The goal for $PM_{2.5}$ is to collect sufficient data to facilitate a review of the $PM_{2.5}$ standards currently underway.

Table 2: NEPM Standards and Goals

Pollutant	Averaging period	AAQ NEPM Standard maximum concentration	AAQ NEPM Goal. maximum number of allowable exceedances
Carbon monoxide	8 hour rolling average	9.0 ppm	1 day a year
Nitrogen dioxide	1 hour average	0.12 ppm	1 day a year
	1 year average	0.03 ppm	None
Photochemical oxidants – as ozone	1 hour average	0.10 ppm	1 day a year
	4 hour rolling average	0.08 ppm	1 day a year
Sulfur dioxide	1 hour average	0.20 ppm	1 day a year
	1 day average	0.08 ppm	1 day a year
	1 year average	0.02 ppm	None
Particles as PM_{10}	1 day average	50 $\mu g/m^3$	5 days a year
Lead	1 day average	0.50 $\mu g/m^3$	None
Particles as $PM_{2.5}$ [#]	1 day average	25 $\mu g/m^3$	Gather sufficient data nationally to facilitate a review of Advisory Reporting Standard.
	1 year average	8 $\mu g/m^3$	

[#] - Reporting standard only.

The following tables summarise compliance with the standards and goals of the AAQ NEPM. For each pollutant, the data availability (quarterly and annual), the number of days when standards were exceeded, the annual mean (where an annual standard exists) and an assessment of compliance, are given for each monitoring station within each region.

A station's performance is assessed as **complying with the NEPM (i.e. 'MET')** if the number of exceedences is no more than the number specified in Schedule 2 of the AAQ NEPM and data availability was at least 75% in each quarter of 2007. A region demonstrates compliance with the NEPM when either all stations in the region demonstrate compliance, or when the region meets approved *pollutant screening criteria*.

A station's performance is assessed as **not complying with the NEPM (i.e.'NOT MET')** if there is more than the number of exceedences specified in Schedule 2 of the AAQ NEPM, even if the data availability rates are less than the 75% required.

A station's performance is assessed as **'NOT DEMONSTRATED' (ND)** if it records no exceedences, or exceedences on a number of days less than that allowed, but has data availability rates less than 75% in any quarter. This may be due to instrument failures, temporary closures for upgrading or closures to allow relocation of the station.

These categories (i.e. MET, NOT MET and ND) are used in the tables on the following pages.

Calculation and reporting methods used comply with the requirements detailed in the NEPC Peer Review Committee Technical paper No 8: Annual Reports (NEPC 2002).

PM_{10} TEOM data indicate data which has undergone an internal correction factor for USEPA equivalency but without subsequent treatment or temperature adjustment.

All days where a particular standard for a pollutant has been exceeded are listed. Also listed are the stations that recorded an exceedence of the standard on that day, and for averaging periods less than twenty-four hours, the number of averaging periods in the day that the standard was exceeded.

Where possible, a brief comment is given for particular pollution events. Events that have been clearly influenced by extraordinary natural events, such as bushfires and dust storms, are highlighted. It should be noted that the absence of a comment does not necessarily indicate the absence of such influences, rather that there is no clear information available. In some cases it is likely that there has been some influence, but the extent of this influence cannot be absolutely determined.

Data loss

The only significant loss of data during 2007 were due to the following:

- The establishment of the Prospect site in February.
- Floods at the Newcastle site in June. The site was re-opened in December.
- The removal of the ozone analyser at Bathurst in August due to the end of the campaign.

Apart from the data loss issues outlined above, the following instrument failures led to data availability rates lower then the Ambient Air Quality NEPM goal for:

- Carbon monoxide at Chullora.
- Sulfur dioxide at Albion Park South, Wollongong & Wallsend.
- PM_{10} at Albion Park South & Tamworth.

Carbon monoxide

Comment

During 2007, no exceedences of the AAQ NEPM standard for carbon monoxide were recorded in NSW. All monitoring stations complied with the AAQ NEPM 8 hour average goal for carbon monoxide except Chullora, Prospect and Newcastle where compliance was not demonstrated.

Carbon monoxide levels are well below the AAQ NEPM standard. The highest recorded value in NSW, during 2007, was 2.1ppm at Liverpool. This is only 23% of the standard. Levels in all regions are significantly lower than the NEPM standard.

Table 3: 2007 compliance summary for CO in New South Wales

AAQ NEPM Standard 9.0 ppm (8-hour average)

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Sydney							
Chullora	99.0	67.5	96.8	99.3	90.7	0	ND
Liverpool	95.8	97.1	92.7	93.4	94.7	0	Met
Macarthur	83.1	96.5	97.2	99.0	94.0	0	Met
Prospect	34.2	90.2	93.8	94.8	78.5	0	ND
Rozelle	97.8	99.0	88.8	98.9	96.1	0	Met
Illawarra							
Wollongong	100.0	81.8	85.1	96.1	90.7	0	Met
Lower Hunter							
Newcastle	88.6	74.1		12.3	43.4	0	ND

ND Not demonstrated.

Table 4: Summary for CO - Daily maximum rolling 8-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Chullora	90.7	322	1.8	26-Jul 01:00	1.6	04-Jul 01:00
Liverpool	94.7	339	2.1	25-Jul 03:00	2.0	27-Jul 03:00
Macarthur	94.0	338	1.8	14-Sep 03:00	1.7	17-Sep 03:00
Prospect	78.5	284	2.0	17-May 03:00	2.0	09-May 03:00
Rozelle	96.1	342	1.8	23-Jun 03:00	1.7	26-May 03:00
Illawarra						
Wollongong	90.7	331	1.5	24-Jan 15:00	1.4	13-Jan 20:00
Lower Hunter						
Newcastle	43.4	148	1.7	27-May 03:00	1.6	26-May 02:00

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Nitrogen dioxide

Comment

During 2007, no exceedences of the AAQ NEPM standard for nitrogen dioxide were recorded in NSW. All monitoring stations complied with the AAQ NEPM 1 hour average and 1 year average goals for nitrogen dioxide, except Prospect and Newcastle where compliance was not demonstrated.

Nitrogen dioxide levels are well below the AAQ NEPM standard. The highest recorded 1 hour value in NSW, during 2007, was 0.053ppm at Liverpool. This is only 44% of the standard. The highest recorded annual average in NSW, during 2007, was 0.013ppm at Chullora. This is only 43% of the standard. Levels in all regions are significantly lower than the NEPM standard.

Table 5: 2007 compliance summary for NO_2 in New South Wales

							AAQ NEPM standard 0.12 ppm (1-hour average) 0.03 ppm (1-year average)		
Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of Exceed-ences (days)	Annual mean (ppm)	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual			1-hour	1-year
Sydney									
Bringelly	89.5	94.4	93.1	91.8	92.2	0	0.006	Met	Met
Chullora	94.7	87.6	84.7	94.0	90.3	0	0.013	Met	Met
Liverpool	92.3	92.9	89.0	88.0	90.5	0	0.012	Met	Met
Macarthur	82.3	91.9	92.8	93.8	90.2	0	0.011	Met	Met
Prospect		74.8	92.3	90.5	64.7	0	0.012	ND	ND
Richmond	93.4	82.5	86.9	93.6	89.1	0	0.006	Met	Met
Rozelle	93.1	94.4	92.1	77.4	89.2	0	0.012	Met	Met
Central Coast [1]									
Illawarra									
Albion Park South	89.4	94.7	93.9	94.1	93.0	0	0.004	Met	Met
Wollongong	95.5	79.9	93.7	89.4	89.6	0	0.009	Met	Met
Lower Hunter									
Newcastle	93.5	64.6		5.8	40.6	0	0.007	ND	ND
Maitland [2]									
Wallsend	94.2	94.3	94.4	92.7	93.9	0	0.008	Met	Met

ND Not demonstrated.

(1) Station to be established.

(2) Station to be established. Data reported from Wallsend in the interim.

Table 6: Summary for NO_2 - Daily maximum 1-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	92.2	355	0.044	22-Oct 19:00	0.037	02-Aug 14:00
Chullora	90.3	343	0.049	25-May 20:00	0.049	08-May 20:00
Liverpool	90.5	345	0.053	19-Apr 17:00	0.052	22-Oct 18:00
Macarthur	90.2	344	0.047	04-Oct 20:00	0.044	08-May 19:00
Prospect	64.7	252	0.049	27-May 20:00	0.049	08-May 18:00
Richmond	89.1	339	0.029	14-May 20:00	0.028	05-Oct 22:00
Rozelle	89.2	343	0.050	15-Oct 19:00	0.046	08-May 19:00
Illawarra						
Albion Park South	93.0	354	0.045	22-Oct 15:00	0.044	19-Oct 17:00
Wollongong	89.6	341	0.043	11-Oct 20:00	0.041	15-Oct 19:00
Lower Hunter						
Newcastle	40.6	146	0.032	02-May 19:00	0.031	24-May 19:00
Wallsend	93.9	358	0.035	19-Apr 18:00	0.034	08-May 18:00

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Ozone

Comment

During 2007, six (6) Sydney monitoring stations exceeded the AAQ NEPM 1 hour standard for ozone and seven (7) Sydney monitoring stations and two (2) Illawarra monitoring stations exceeded the AAQ NEPM 4 hour standard for ozone.

There were no exceedences of the AAQ NEPM 1 and 4 hour standard for ozone at Chullora, Rozelle, Wollongong, Newcastle, Wallsend and Bathurst. Prospect did not exceed the AAQ NEPM 1 hour standard for ozone, however exceeded the AAQ NEPM 4 hour standard for ozone.

The Illawarra region complied with both the AAQ NEPM 1 and 4 hour goals for ozone. Sydney as a region, did not meet the AAQ NEPM standards and goals for ozone while the lower Hunter did not demonstrate compliance due to low data availability.

Table 7: 2007 compliance summary for O_3 in New South Wales

AAQ NEPM standard
0.10 ppm (1-hour average)
0.08 ppm (4-hour average)

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedences (days)		Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual	1-hour	4-hour	1-hour	4-hour
Sydney									
Bringelly	89.5	94.4	92.9	91.8	92.1	**4**	**4**	Not met	Not met
Chullora	95.3	88.4	94.4	94.1	93.0	0	0	Met	Met
Liverpool	90.2	90.8	90.5	89.5	90.3	**2**	**2**	Not met	Not met
Macarthur	81.3	94.5	92.9	93.8	90.6	**3**	**7**	Not met	Not met
Oakdale	75.1	87.6	94.4	93.1	87.6	**4**	**6**	Not met	Not met
Prospect	31.3	85.5	83.2	92.3	73.3	0	1	ND	ND
Richmond	93.1	92.9	84.9	93.4	91.1	1	**3**	Met	Not met
Rozelle	92.0	94.6	91.9	89.4	92.0	0	0	Met	Met
St Marys	95.4	92.7	91.2	89.5	92.2	**3**	**4**	Not met	Not met
Central Coast (1)									
Illawarra									
Albion Park South	83.4	94.1	94.0	94.1	91.4	0	1	Met	Met
Kembla Grange	95.4	95.0	93.7	92.3	94.1	0	1	Met	Met
Wollongong	95.7	78.8	93.8	92.4	90.2	0	0	Met	Met
Lower Hunter									
Maitland (2)									
Newcastle	95.0	71.7		10.5	43.9	0	0	ND	ND
Wallsend	94.4	93.4	90.9	90.6	92.3	0	0	Met	Met
Regional									
Bathurst	95.1	95.6	27.9		54.3	0	0	ND	ND

ND Not demonstrated.

Bold font indicates values that exceed the AAQ NEPM standard

(1) Station to be established

(2) Station to be established. Data reported from Wallsend in the interim.

Comment

Ozone events in the Sydney and Illawarra regions are highly variable in terms of both frequency and severity. This is largely the result of the annual variability of meteorological conditions, which has the greatest effect on measures of frequency but can also have some influence on measures of peak concentrations. In the Sydney region emissions of ozone precursors (NOx and VOCs) are sufficient to generate concentrations of ozone well above the AAQ NEPM standards (DEC 2006).

The highest recorded 1-hour average in NSW, during 2007, was 0.142 ppm recorded at Oakdale on the 12th January. This is 142% of the AAQ NEPM 1 hour standard for ozone.

Table 8: Summary for O_3 - Daily maximum 1-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	92.1	355	**0.111**	20-Jan 15:00	**0.105**	04-Mar 15:00
Chullora	93.0	357	0.088	20-Jan 13:00	0.082	04-Mar 15:00
Liverpool	90.3	344	**0.116**	20-Jan 14:00	**0.102**	04-Mar 16:00
Macarthur	90.6	345	**0.121**	11-Jan 14:00	**0.120**	12-Jan 13:00
Oakdale	87.6	334	**0.142**	12-Jan 14:00	**0.120**	11-Jan 17:00
Prospect	73.3	283	0.089	04-Mar 16:00	0.074	03-Mar 18:00
Richmond	91.1	348	**0.134**	12-Jan 14:00	0.099	11-Jan 17:00
Rozelle	92.0	354	0.088	22-Oct 13:00	0.073	04-Mar 15:00
St Marys	92.2	352	**0.123**	12-Jan 13:00	**0.104**	11-Jan 16:00
Illawarra						
Albion Park South	91.4	348	0.092	03-Mar 15:00	0.082	20-Jan 14:00
Kembla Grange	94.1	358	0.093	22-Oct 15:00	0.079	03-Mar 17:00
Wollongong	90.2	345	0.077	03-Mar 17:00	0.076	22-Oct 14:00
Lower Hunter						
Newcastle	43.9	166	0.053	11-Mar 14:00	0.052	03-Mar 13:00
Wallsend	92.3	352	0.070	04-Mar 14:00	0.070	11-Mar 15:00
Regional						
Bathurst	54.3	206	0.068	19-Jan 17:00	0.067	12-Jan 10:00

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Comment

The highest recorded 4-hour average in NSW, during 2007, was 0.116 ppm recorded at Oakdale on the 12th January. This is 145% of the AAQ NEPM 4 hour standard for ozone.

Table 9: Summary for O_3 - Daily maximum rolling 4-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	94.8	353	**0.095**	11-Jan 16:00	**0.095**	04-Mar 17:00
Chullora	97.1	357	0.074	20-Jan 15:00	0.074	04-Mar 17:00
Liverpool	92.3	341	**0.094**	20-Jan 15:00	**0.091**	04-Mar 17:00
Macarthur	94.1	345	**0.101**	11-Jan 16:00	**0.098**	20-Jan 16:00
Oakdale	91.0	334	**0.116**	12-Jan 15:00	**0.100**	11-Jan 18:00
Prospect	75.1	281	**0.085**	04-Mar 17:00	0.068	11-Mar 18:00
Richmond	94.1	348	**0.121**	12-Jan 15:00	**0.091**	11-Jan 19:00
Rozelle	93.7	352	0.075	22-Oct 15:00	0.066	04-Mar 16:00
St Marys	93.1	348	**0.105**	12-Jan 15:00	**0.094**	04-Mar 17:00
Illawarra						
Albion Park South	94.6	347	**0.080**	03-Mar 16:00	0.068	22-Oct 19:00
Kembla Grange	97.8	358	**0.082**	22-Oct 16:00	0.078	03-Mar 17:00
Wollongong	93.2	345	0.073	03-Mar 18:00	0.071	22-Oct 16:00
Lower Hunter						
Newcastle	45.6	166	0.047	02-Mar 15:00	0.046	21-Apr 17:00
Wallsend	95.1	352	0.068	04-Mar 15:00	0.060	27-Oct 17:00
Regional						
Bathurst	56.7	207	0.066	19-Jan 19:00	0.063	06-Feb 15:00

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Comment

The 1-hour ozone standard was exceeded at six stations in Sydney (Bringelly, Liverpool, Macarthur, Oakdale, Richmond and St Marys) and these are identified in the table below. Oakdale and Bringelly had the highest number of exceedences of 4 each. There were no exceedences of the 1 hour standard in the Illawarra, the Lower Hunter or Bathurst.

Table 10: Days when O_3 1-hour Ambient Air Quality NEPM standard exceeded (2007)

Date	Stations where standard exceeded and hour of exceedence	Comments(#)
11-Jan-2007	Bringelly (14-15), St Marys (16), Macarthur (14-15), Oakdale (17-18)	
12-Jan-2007	Bringelly (13), Richmond (12-15), St Marys (13-14), Macarthur (12-13), Oakdale(13-15)	
17-Jan-2007	Oakdale (16)	
20-Jan-2007	Liverpool (13-14), Bringelly (15), Macarthur (15), Oakdale (16-17)	
04-Mar-2007	Liverpool (16), Bringelly (15), St Marys (15)	

(#) Events that can be clearly identified as influencing pollution levels

Comment

The 4-hour ozone standard was exceeded at seven stations in Sydney (Bringelly, Liverpool, Macarthur, Oakdale, Prospect, Richmond and St Marys) and the Illawarra (Albion Park South and Kembla Grange) and these are identified in the table below. There were no exceedences in the 4 hour standard in the Lower Hunter, Bathurst and Wollongong.

Table 11: Days when O_3 4-hour Ambient Air Quality NEPM standard exceeded (2007)

Date	Stations where standard exceeded and hour of exceedence	Comments(#)
06-Jan-2007	Macarthur (16)	
11-Jan-2007	Bringelly (15-18), Richmond (17-20), St Marys (16-19), Macarthur (15-18), Oakdale (15-20)	
12-Jan-2007	Bringelly (14-15), Richmond (13-18), St Marys (14-16), Macarthur (13-15), Oakdale (13-17)	
17-Jan-2007	Macarthur (16), Oakdale (16-17)	
19-Jan-2007	Oakdale (18)	
20-Jan-2007	Liverpool (14-17), Bringelly (15-18), St Marys (15-18), Macarthur (15-18), Oakdale (16-20)	
23-Jan-2007	Macarthur (16)	Bushfires at Mt Kuring-gai
03-Mar-2007	Albion Park South (16)	
04-Mar-2007	Bringelly (16-19), Liverpool (16-18), Richmond (16-18), St Marys (16-18), Prospect (16-18), Macarthur (17)	
22-Oct-2007	Kembla Grange (16)	Bushfires Mt Kembla
15-Nov-2007	Oakdale(17)	

(#) Events that can be clearly identified as influencing pollution levels

Action for Air, the NSW Government's Air Quality Management Plan for Sydney, the Lower Hunter and the Illawarra, sets out a program of measures that target ground level ozone in summer. The Plan covers strategies designed to reduce emissions from industry, motor vehicles and domestic/commercial sources. These include the Cleaner Vehicles Action Plan; emission limits and load based licensing for industrial facilities; the Cleaner Industries Program; and the Clean Air Program. A number of other measures are also being pursued as part of the ozone management strategy, including reducing the volatility of petrol in summer and vapour recovery at service stations and bulk terminals.

Sulfur dioxide

Comment

During 2007, no exceedences of the AAQ NEPM 1 hour average, 24 hour average and 1 year average standard for sulfur dioxide were recorded in NSW. All monitoring stations complied with the AAQ NEPM 1 hour average, 24 hour average and 1 year average goals for sulfur dioxide, except Prospect, Albion Park South, Wollongong, Wallsend and Newcastle where compliance was not demonstrated.

Table 12: 2007 compliance summary for SO_2 in New South Wales

										AAQ NEPM standards 0.20 ppm (1-hour average) 0.08 ppm (24-hour average) 0.02 ppm (1-year average)		
Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedences (days)		Annual Mean (ppm)	Performance against the standards and goal		
	Q1	Q2	Q3	Q4	Annual	1-hour	24-hour		1-hour	24-hour	1-year
Sydney											
Bringelly	89.5	94.4	76.9	76.1	84.2	0	0	0.000	Met	Met	Met
Chullora	95.0	88.5	86.6	76.9	86.7	0	0	0.001	Met	Met	Met
Macarthur	82.8	94.0	92.8	94.0	90.9	0	0	0.001	Met	Met	Met
Prospect	33.5	89.7	76.4	67.8	67.0	0	0	0.001	ND	ND	ND
Richmond	92.7	89.3	89.7	92.5	91.0	0	0	0.000	Met	Met	Met
Central Coast [1]											
Illawarra											
Albion Park South	89.4	94.7	92.3	56.2	83.1	0	0	0.001	ND	ND	ND
Wollongong	95.6	79.4	93.3	47.4	78.9	0	0	0.001	ND	ND	ND
Lower Hunter											
Maitland [2]											
Newcastle	93.3	71.4		14.6	44.5	0	0	0.001	ND	ND	ND
Wallsend	94.3	94.3	85.9	61.5	83.9	0	0	0.001	ND	ND	ND

ND Not demonstrated.

(1) Station to be established.

(2) Station to be established. Data reported from Wallsend in the interim.

Comment

Sulfur dioxide levels are well below the AAQ NEPM standard. The highest recorded 1 hour value in NSW, for 2007, was 0.043ppm at Newcastle. This is only 22% of the standard. The highest recorded 24 hour average in NSW, for 2007, was 0.013 at Albion Park South. This is only 16% of the standard. The highest recorded annual average in NSW, for 2007, was 0.001 at Albion Park South. This is only 5% of the standard. Levels in all regions are significantly lower than the NEPM standard.

Table 13: Summary for SO_2 - Daily maximum 1-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	84.2	317	0.017	31-Jul 17:00	0.011	18-Feb 09:00
Chullora	86.7	326	0.020	03-Feb 08:00	0.020	15-May 13:00
Macarthur	90.9	346	0.015	31-Jul 18:00	0.014	08-Mar 02:00
Prospect	67.0	245	0.022	05-Sep 06:00	0.017	31-Jul 16:00
Richmond	91.0	346	0.024	31-Jul 17:00	0.012	20-Feb 13:00
Illawarra						
Albion Park South	83.1	307	0.038	20-Jan 11:00	0.036	11-Mar 16:00
Wollongong	78.9	290	0.032	24-Jan 13:00	0.029	13-Jan 19:00
Lower Hunter						
Newcastle	44.5	167	0.043	27-May 14:00	0.033	31-May 11:00
Wallsend	83.9	305	0.039	11-Apr 14:00	0.033	05-Apr 11:00

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Table 14: Summary for SO_2 - Maximum 24-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	86.8	317	0.003	31-Jul	0.002	20-Dec
Chullora	89.3	326	0.004	24-Feb	0.004	15-May
Macarthur	94.8	346	0.004	31-Jul	0.003	15-Dec
Prospect	67.1	245	0.005	31-Jul	0.004	23-Mar
Richmond	94.8	346	0.004	31-Jul	0.003	20-Feb
Illawarra						
Albion Park South	84.1	307	0.013	20-Jan	0.013	11-Jan
Wollongong	79.5	290	0.008	13-Jan	0.006	27-Jan
Lower Hunter						
Newcastle	45.8	167	0.012	16-Dec	0.012	15-Dec
Wallsend	83.6	305	0.007	18-Jun	0.007	10-Jun

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Particles as PM_{10}

Comment

During 2007, all regions in NSW except Tamworth, recorded exceedences of the AAQ NEPM 24-hr standard for PM_{10}. Five (5) Sydney monitoring stations, three (3) Illawarra monitoring stations, two (2) lower Hunter monitoring stations and 3 Regional monitoring stations recorded exceedences of the AAQ NEPM 24-hr standard for PM_{10}. The only monitoring stations to record no exceedences were Oakdale, Prospect, Richmond and Tamworth.

The Sydney, Illawarra and Lower Hunter regions complied with the AAQ NEPM 24-hr goal for PM_{10}. Albury and Wagga Wagga failed to comply with the AAQ NEPM 24-hr goal for PM_{10}.

In the Sydney region (Prospect), the Illawarra (Albion Park South), the Lower Hunter (Newcastle) and in Regional NSW (Tamworth), compliance was not demonstrated for PM_{10}.

Table 15: 2007 compliance summary for PM_{10} in New South Wales

						AAQ NEPM Standard 50 µg/m^3 (24-hour average)	
Region/ Performance monitoring Station	Data availability rates (% of days)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Sydney							
Bringelly	100.0	100.0	98.9	98.9	99.5	1	Met
Chullora	100.0	91.2	100.0	98.9	97.5	2	Met
Liverpool	97.8	95.6	89.1	100.0	95.6	1	Met
Macarthur	92.2	98.9	98.9	95.7	96.4	1	Met
Oakdale	95.6	94.5	100.0	97.8	97.0	0	Met
Prospect	34.4	97.8	100.0	97.8	82.7	0	ND
Richmond	100.0	100.0	95.7	97.8	98.4	0	Met
Rozelle	100.0	93.4	97.8	98.9	97.5	1	Met
Central Coast (1)							
Illawarra							
Albion Park South	58.9	98.9	96.7	98.9	88.5	1	ND
Kembla Grange	100.0	98.9	98.9	100.0	99.5	3	Met
Wollongong	100.0	97.8	87.0	96.7	95.3	3	Met
Lower Hunter							
Beresfield	90.0	97.8	79.3	93.5	90.1	5	Met
Maitland (2)							
Newcastle	94.4	73.6		21.7	47.1	2	ND
Regional							
Albury	94.4	74.7	98.9	96.7	91.2	**11**	Not met
Bathurst	97.8	98.9	98.9	84.8	95.1	2	Met
Dubbo (1)							
Lismore (1)							
Orange (1)							
Tamworth	90.0	76.9	77.2	51.1	73.7	0	ND
Wagga Wagga	98.9	96.7	96.7	97.8	97.5	**34**	Not met

ND Not demonstrated. **Bold** font indicates values that exceed the AAQ NEPM standard

(1) Station to be established

(2) Station to be established. Data reported from Beresfield in the interim.

Comment

The highest PM_{10} level recorded in NSW during 2007, was 197.7µg/m^3 recorded at Albury on the 13th January during the Victorian bushfire emergency. This is 395% of the AAQ NEPM 24 hour standard for PM_{10}.

The highest PM_{10} level recorded in the Sydney region during 2007 was 64.3µg/m^3 recorded at Chullora on the 4th May. The highest PM_{10} level recorded in the Illawarra region during 2007 was 60.1µg/m^3 recorded at Kembla Grange on the 22nd October. The highest PM_{10} level recorded in the Lower Hunter region during 2007 was 62.0µg/m^3 recorded at Beresfield on the 4th May. The highest PM_{10} level recorded in regional NSW was recorded at Albury as detailed above.

Table 16: Summary for PM_{10} – Maximum 24-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	6th Highest Value	6th Highest Date
Sydney						
Bringelly	99.5	363	**50.4**	30-Jan	45.2	20-Oct
Chullora	97.5	356	**64.3**	04-May	38.6	20-Oct
Liverpool	95.6	349	**51.8**	04-May	40.1	30-Jan
Macarthur	96.4	352	**52.0**	04-May	36.8	12-Jan
Oakdale	97.0	354	48.2	04-May	33.4	25-Dec
Prospect	82.7	302	46.6	20-Oct	41.6	21-Apr
Richmond	98.4	359	44.2	23-Jan	34.3	30-Oct
Rozelle	97.5	356	**53.0**	04-May	37.2	30-Jan
Illawarra						
Albion Park South	88.5	323	**53.8**	30-Jan	37.6	04-May
Kembla Grange	99.5	363	**60.1**	22-Oct	49.4	04-May
Wollongong	95.3	348	**58.8**	22-Oct	45.7	30-Jan
Lower Hunter						
Beresfield	90.1	329	**62.0**	04-May	49.9	31-Jan
Newcastle	47.1	172	**58.2**	05-May	44.4	30-Jan
Regional						
Albury	91.2	333	**197.7**	13-Jan	**94.7**	21-Apr
Bathurst	95.1	347	**164.0**	02-Oct	40.9	01-Oct
Tamworth	73.7	269	48.9	03-Oct	34.7	06-May
Wagga Wagga	97.5	356	**105.3**	13-Jan	**75.8**	15-Mar

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Comment

The 24 hour PM_{10} standard was exceeded at five stations in Sydney (Bringelly, Chullora, Liverpool, Macarthur and Rozelle), three stations in the Illawarra (Albion Park South, Kembla Grange, Wollongong), two stations in the Lower Hunter (Beresfield and Newcastle) and three stations in Regional NSW (Albury, Bathurst and Wagga Wagga). The days on which these excedences occurred are identified in the table below.

During January and February in 2007, there was a total of 19 exceedences at the Albury and Wagga Wagga monitoring stations. These exceedences can be attributed to the Victorian bushfire emergency in north eastern Victoria. Other events effecting the PM_{10} values at these monitoring stations were the dust storms on the 11th February, 15th March and the 20th April.

The monitoring station at Wagga Wagga had 34 exceedences of the AAQ NEPM 24 hour PM_{10} standard and this was by far the most number of exceedences in NSW. The next was Albury with 11 exceedences. Of these 34 exceedences at Wagga Wagga, 16 or 47% can be attributed to the Victorian bushfire emergency in January and February.

Two exceedences were recorded at Bathurst on the 27th January and the 2nd October. The exceedence on the 2nd October can be attributed to a dust storm at Bathurst.

With the exception of Wagga Wagga, and considering natural events and climatological effects, PM_{10} levels are generally below the goal set by the NEPM. Nevertheless the Department of Environment and Climate Change continues to work towards reducing emissions of anthropogenically-produced particles. Key strategies in the management of particle emissions are outlined in *Action for Air*.

Table 17: Days when PM_{10} 24-hour Ambient Air Quality NEPM standard exceeded (2007)

Date	Stations where standard exceeded	Comments(#)
09-Jan-2007	Albury	Victorian bushfire emergency in north eastern Victoria influencing only Albury and Wagga Wagga. (Dec 2006 – Feb 2007) Smaller fires in the Snowy Mtns (17-22 Jan & 2-11 Feb) Bushfire at Mt Mt Kuring-gai. (22nd Jan). Dust storm in eastern Riverina. (11th Feb).
12-Jan-2007	Kembla Grange, Wagga Wagga	
13-Jan-2007	Albury, Wagga Wagga	
14-Jan-2007	Albury, Wagga Wagga	
15-Jan-2007	Beresfield	
17-Jan-2007	Albury	
20-Jan-2007	Wollongong, Wagga Wagga	
21-Jan-2007	Wollongong	
22-Jan-2007	Beresfield	
27-Jan-2007	Wagga Wagga, Bathurst	
29-Jan-2007	Wagga Wagga	
30-Jan-2007	Bringelly, Kembla Grange, Albion Park South	
01-Feb-2007	Wagga Wagga	
03-Feb-2007	Wagga Wagga	
04-Feb-2007	Wagga Wagga	
06-Feb-2007	Wagga Wagga	
07-Feb-2007	Wagga Wagga	
08-Feb-2007	Wagga Wagga	
09-Feb-2007	Wagga Wagga	
10-Feb-2007	Wagga Wagga	
11-Feb-2007	Wagga Wagga	
06-Mar-2007	Albury	
07-Mar-2007	Albury	
09-Mar-2007	Wagga Wagga	
11-Mar-2007	Wagga Wagga	
12-Mar-2007	Wagga Wagga	
15-Mar-2007	Wagga Wagga, Albury	Dust storm in eastern Riverina.
12-Apr-2007	Wagga Wagga	
13-Apr-2007	Wagga Wagga	
15-Apr-2007	Wagga Wagga	
16-Apr-2007	Wagga Wagga	
17-Apr-2007	Wagga Wagga	
18-Apr-2007	Wagga Wagga	
19-Apr-2007	Albury, Wagga Wagga	
20-Apr-2007	Albury, Wagga Wagga	Dust storm in eastern Riverina.
21-Apr-2007	Albury, Wagga Wagga	
27-Apr-2007	Albury	
04-May-2007	Rozelle, Beresfield, Liverpool, Chullora, Newcastle, Macarthur	
05-May-2007	Beresfield, Chullora, Newcastle	
11-May-2007	Wagga Wagga	
02-Oct-2007	Bathurst	Dust storm and smoke at Bathurst.
03-Oct-2007	Beresfield, Wagga Wagga	
19-Oct-2007	Wagga Wagga	
20-Oct-2007	Wagga Wagga	
22-Oct-2007	Wollongong, Kembla Grange, Wagga Wagga	Bushfires at Mt Kembla influencing Wollongong and Kembla Grange.
17-Nov-2007	Wagga Wagga	

(#) Events that can be clearly identified as influencing pollution levels

Lead

Changes to fuel formulation have brought marked reductions in the levels of lead in the atmosphere. Annual averages throughout New South Wales are now typically less than 0.03µg/m^3 with many 24-hour average samples below the minimum detection limit for lead of 0.007µg/m^3 using ICP-AES (Inductively Coupled Plasma-Atomic Emission Spectroscopy) analysis. Since 2002 the highest annual average recorded in New South Wales was 0.09µg/m^3 at Wallsend during 2003, only 18% of the standard.

With a complete ban on lead in petrol now in force, the primary source of lead in air at the regional scale has been eliminated.

The Department of Environment and Climate Change began phasing out ambient lead monitoring for the AAQ NEPM during 2004. All lead monitoring ceased from 1st January 2005.

A report summarising the case for a cessation of lead monitoring was presented to NEPC.

Statistical summary and trends

The following section provides a basic statistical summary, using percentiles, for each station and for each standard. Percentiles for daily maximum values are presented. As discussed in Appendix C *Data availability* only valid days are used in calculating these statistics.

For stations that have data sets of two years or longer, trend data, in the form of annual maximums, are provided for each standard for each pollutant. Trend data are presented if any monitoring of a particular pollutant occurred at a station in a given year and the annual data availability rate for the pollutant at that station is fifteen percent or greater.

Carbon Monoxide

Statistical summary

Table 18: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Chullora	90.7	1.8	1.4	1.3	1.1	0.8	0.5	0.3	0.2
Liverpool	94.7	2.1	1.7	1.6	1.3	1.1	0.6	0.4	0.2
Macarthur	94.0	1.8	1.5	0.8	0.6	0.5	0.4	0.3	0.2
Prospect	78.5	2.0	1.5	1.4	1.3	1.0	0.6	0.3	0.2
Rozelle	96.1	1.8	1.4	1.1	0.8	0.8	0.5	0.3	0.2
Illawarra									
Wollongong	90.7	1.5	1.2	1.1	1.0	0.8	0.6	0.4	0.2
Lower Hunter									
Newcastle	43.4	1.7	1.6	1.4	1.1	0.8	0.5	0.2	0.2

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Trend analysis

Table 19: Daily maximum rolling 8-hour average concentrations for CO (ppm)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Blacktown/Prospect*	4.7	3.5	3.1	2.6	3.0	2.5	1.7			2.0*
Chullora							3.4	2.8	2.3	1.8
Liverpool	5.4	4.0	4.8	3.5	3.6	5.5	3.0	2.8	2.1	2.1
Macarthur								1.0	1.8	1.8
Rozelle	5.9	4.0	4.5	3.2	2.8	2.2	2.2	2.1	2.0	1.8
Illawarra										
Wollongong	2.2	2.4	2.4	4.2	2.3	2.1	2.1	2.6	1.5	1.5
Lower Hunter										
Newcastle	4.3	3.3	3.1	4.0	3.2	2.8	2.4	1.9	2.2	1.7

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Table 20: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations

Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	89.6	0	4.7	4.0	3.8	2.5	2.1	1.2	0.7	0.4
1999[(1)]	98.2	0	3.5	3.0	2.7	2.1	1.8	1.2	0.6	0.2
2000[(1)]	92.3	0	3.1	2.4	2.3	2.0	1.6	1.0	0.4	0.2
2001[(1)]	95.5	0	2.6	1.9	1.8	1.6	1.3	0.8	0.3	0.2
2002[(1)]	94.5	0	3.0	2.4	2.0	1.8	1.3	0.6	0.3	0.1
2003[(1)]	93.6	0	2.5	1.9	1.6	1.2	0.8	0.4	0.1	0.0
2004[(1)]	40.9	0	1.7	1.5	1.3	1.1	0.8	0.4	0.1	0.0
2005[#]	0.0									
2006[#]	0.0									
2007[(2)]	78.5	0	2.0	1.5	1.4	1.3	1.0	0.6	0.3	0.2

Station closed pending relocation.

Table 21: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations

Station: Chullora

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2004	84.8	0	3.4	2.1	1.9	1.6	1.3	0.8	0.5	0.3
2005	97.0	0	2.8	1.9	1.7	1.5	1.2	0.7	0.4	0.3
2006	94.7	0	2.3	1.5	1.4	1.1	1.0	0.6	0.4	0.3
2007	90.7	0	1.8	1.4	1.3	1.1	0.8	0.5	0.3	0.2

Table 22: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	74.6	0	5.4	4.5	4.1	3.1	2.5	1.5	0.9	0.6
1999	81.6	0	4.0	3.9	3.6	3.1	2.5	1.6	0.8	0.5
2000	98.0	0	4.8	3.6	3.3	2.8	2.1	1.3	0.9	0.5
2001	98.1	0	3.5	2.9	2.8	2.6	1.8	1.1	0.7	0.5
2002	85.6	0	3.6	3.0	2.9	2.4	1.9	1.2	0.7	0.5
2003	93.4	0	5.5	3.1	2.8	2.2	1.6	1.0	0.6	0.4
2004	97.3	0	3.0	2.7	2.4	2.1	1.4	0.9	0.5	0.3
2005	91.9	0	2.8	2.4	2.0	1.7	1.4	0.9	0.5	0.3
2006	96.4	0	2.1	1.8	1.6	1.5	1.3	0.8	0.5	0.3
2007	94.7	0	2.1	1.7	1.6	1.3	1.1	0.6	0.4	0.2

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Table 23: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations

Station: Macarthur

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	55.2	0	1.0	0.8	0.7	0.6	0.5	0.4	0.3	0.2
2006	98.2	0	1.8	1.6	1.2	0.5	0.4	0.3	0.2	0.2
2007	94.0	0	1.8	1.5	0.8	0.6	0.5	0.4	0.3	0.2

Table 24: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations

Station: Rozelle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	92.9	0	5.9	5.0	4.0	2.8	2.2	1.3	0.9	0.6
1999	83.3	0	4.0	2.5	2.5	2.0	1.6	1.0	0.6	0.4
2000	90.0	0	4.5	2.4	2.3	1.7	1.3	0.8	0.5	0.4
2001	95.0	0	3.2	2.4	2.1	1.7	1.3	0.7	0.5	0.3
2002	87.5	0	2.8	1.7	1.6	1.3	1.1	0.7	0.5	0.3
2003	93.1	0	2.2	1.5	1.4	1.1	0.9	0.6	0.4	0.3
2004	94.0	0	2.2	1.8	1.7	1.3	1.0	0.7	0.4	0.3
2005	97.3	0	2.1	1.7	1.5	1.2	1.0	0.6	0.4	0.2
2006	96.6	0	2.0	1.4	1.3	1.1	0.9	0.6	0.3	0.3
2007	96.1	0	1.8	1.4	1.1	0.8	0.8	0.5	0.3	0.2

Table 25: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	97.1	0	2.2	2.1	2.0	1.8	1.4	1.0	0.6	0.4
1999	98.2	0	2.4	2.2	2.1	1.6	1.3	0.9	0.6	0.4
2000	98.7	0	2.4	1.9	1.7	1.4	1.2	0.8	0.5	0.3
2001	97.6	0	4.2	1.7	1.5	1.1	1.0	0.7	0.5	0.3
2002	91.2	0	2.3	1.9	1.7	1.5	1.2	0.9	0.5	0.3
2003	96.4	0	2.1	1.7	1.5	1.3	1.0	0.7	0.5	0.3
2004	97.3	0	2.1	1.5	1.4	1.2	1.0	0.7	0.5	0.3
2005	96.8	0	2.6	1.8	1.4	1.2	1.1	0.7	0.5	0.3
2006	98.6	0	1.5	1.2	1.1	0.9	0.8	0.6	0.4	0.3
2007	90.7	0	1.5	1.2	1.1	1.0	0.8	0.6	0.4	0.2

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Table 26: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	75.5	0	4.3	3.0	2.7	2.1	1.4	0.7	0.3	0.1
1999	67.6	0	3.3	2.8	2.5	1.7	1.0	0.3	0.1	0.0
2000	83.1	0	3.1	2.8	2.6	2.0	1.3	0.7	0.4	0.2
2001	96.7	0	4.0	2.6	2.4	1.7	1.4	0.7	0.4	0.3
2002	94.6	0	3.2	2.1	1.9	1.4	1.0	0.6	0.4	0.3
2003	93.0	0	2.8	2.0	1.8	1.5	1.0	0.6	0.3	0.2
2004	97.0	0	2.4	1.7	1.6	1.3	1.1	0.6	0.3	0.2
2005	95.8	0	1.9	1.6	1.4	1.1	0.9	0.4	0.3	0.2
2006	94.7	0	2.2	1.5	1.4	0.9	0.7	0.4	0.3	0.2
2007	43.4	0	1.7	1.6	1.4	1.1	0.8	0.5	0.2	0.2

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Nitrogen Dioxide

Statistical summary

Table 27: Statistical summary for NO_2 - Daily maximum 1-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	92.2	0.044	0.032	0.029	0.024	0.021	0.016	0.012	0.009
Chullora	90.3	0.049	0.047	0.044	0.038	0.035	0.030	0.024	0.018
Liverpool	90.5	0.053	0.044	0.039	0.035	0.032	0.028	0.023	0.018
Macarthur	90.2	0.047	0.042	0.040	0.038	0.033	0.029	0.023	0.018
Prospect	64.7	0.049	0.043	0.040	0.036	0.033	0.029	0.025	0.020
Richmond	89.1	0.029	0.027	0.025	0.023	0.021	0.016	0.013	0.009
Rozelle	89.2	0.050	0.043	0.040	0.037	0.033	0.027	0.023	0.015
Illawarra									
Albion Park South	93.0	0.045	0.033	0.030	0.026	0.021	0.015	0.010	0.006
Wollongong	89.6	0.043	0.038	0.036	0.032	0.029	0.025	0.020	0.015
Lower Hunter									
Newcastle	40.6	0.032	0.030	0.029	0.026	0.025	0.021	0.015	0.009
Wallsend	93.9	0.035	0.032	0.031	0.028	0.026	0.022	0.016	0.011

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Trend analysis

Table 28: Maximum 1-hour average concentrations for NO_2 (ppm)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Blacktown/Prospect*	0.060	0.058	0.070	0.058	0.057	0.055	0.048			0.049*
Bringelly	0.050	0.045	0.045	0.048	0.052	0.044	0.041	0.045	0.040	0.044
Chullora/Lidcombe*	**0.126***	0.073*	0.070*	0.071*	0.052*	0.066	0.056	0.064	0.066	0.049
Liverpool	0.063	0.054	0.079	0.067	0.068	0.064	0.060	0.063	0.053	0.053
Macarthur							0.052	0.081	0.066	0.047
Richmond	0.053	0.044	0.037	0.038	0.048	0.036	0.037	0.036	0.044	0.029
Rozelle	0.081	0.062	0.070	0.066	0.086	0.052	0.064	0.052	0.057	0.050
Illawarra										
Albion Park / Albion Park South*	0.081	0.049	0.055	0.051	0.048	0.048	0.044	0.044	0.051*	0.045*
Wollongong	0.058	0.062	0.065	0.056	0.056	0.049	0.044	0.058	0.050	0.043
Lower Hunter										
Newcastle	0.039	0.049	0.044	0.040	0.047	0.039	0.044	0.041	0.042	0.032
Wallsend	0.035	0.034	0.054	0.044	0.043	0.050	0.041	0.038	0.037	0.035

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 29: Annual average concentrations for NO_2 (ppm)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Blacktown	0.015	0.014	0.013	0.013	0.014	0.013	0.013			
Bringelly	0.006	0.007	0.007	0.006	0.009	0.007	0.006	0.006	0.006	0.006
Chullora/Lidcombe*	0.016*	0.016*	0.015*	0.016*	0.013*	0.016	0.016	0.014	0.014	0.013
Liverpool	0.014	0.014	0.014	0.014	0.015	0.013	0.013	0.013	0.013	0.012
Macarthur							0.009	0.012	0.011	0.011
Richmond	0.007	0.007	0.006	0.007	0.007	0.007	0.007	0.006	0.006	0.006
Rozelle	0.016	0.015	0.014	0.014	0.015	0.014	0.014	0.013	0.013	0.012
Illawarra										
Albion Park / Albion Park South*	0.004	0.004	0.005	0.004	0.004	0.005	0.004	0.013	0.005*	0.004*
Wollongong	0.010	0.011	0.010	0.010	0.011	0.010	0.009	0.009	0.009	0.009
Lower Hunter										
Newcastle	0.008	0.009	0.009	0.009	0.009	0.008	0.009	0.009	0.008	0.007
Wallsend	0.008	0.009	0.008	0.009	0.009	0.008	0.008	0.008	0.009	0.008

AAQ NEPM Standard - 0.03 ppm (Annual average)

Table 30: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Blacktown(1)/Prospect(2)

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998(1)	84.6	0	0.060	0.050	0.048	0.043	0.039	0.031	0.026	0.021
1999(1)	90.8	0	0.058	0.048	0.047	0.040	0.035	0.030	0.026	0.021
2000(1)	90.3	0	0.070	0.054	0.043	0.039	0.034	0.029	0.024	0.019
2001(1)	93.3	0	0.058	0.047	0.045	0.037	0.034	0.030	0.025	0.020
2002(1)	92.4	0	0.057	0.050	0.046	0.043	0.037	0.032	0.026	0.020
2003(1)	89.8	0	0.055	0.049	0.047	0.038	0.035	0.030	0.025	0.020
2004(1)	39.3	0	0.048	0.043	0.043	0.039	0.036	0.030	0.024	0.019
2005#	0.0									
2006#	0.0									
2007(2)	64.7	0	0.049	0.043	0.040	0.036	0.033	0.029	0.025	0.020

Station closed pending relocation.

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Table 31: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	85.1	0	0.050	0.032	0.031	0.028	0.024	0.018	0.014	0.010
1999	90.4	0	0.045	0.037	0.034	0.027	0.025	0.020	0.015	0.011
2000	93.4	0	0.045	0.033	0.029	0.026	0.022	0.019	0.015	0.011
2001	94.4	0	0.048	0.033	0.031	0.026	0.023	0.019	0.015	0.011
2002	93.1	0	0.052	0.041	0.038	0.033	0.029	0.022	0.017	0.012
2003	87.1	0	0.044	0.031	0.028	0.023	0.021	0.017	0.013	0.010
2004	91.1	0	0.041	0.031	0.029	0.026	0.022	0.017	0.013	0.010
2005	91.5	0	0.045	0.033	0.030	0.026	0.022	0.018	0.014	0.009
2006	92.1	0	0.040	0.035	0.031	0.026	0.023	0.018	0.014	0.010
2007	92.2	0	0.044	0.032	0.029	0.024	0.021	0.016	0.012	0.009

Table 32: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Lidcombe(1) / Chullora(2)

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998(1)	69.4	1	**0.126**	0.052	0.050	0.046	0.040	0.031	0.026	0.021
1999(1)	88.9	0	0.073	0.051	0.047	0.043	0.039	0.035	0.028	0.021
2000(1)	91.7	0	0.070	0.055	0.051	0.042	0.036	0.030	0.025	0.021
2001(1)	93.8	0	0.071	0.055	0.050	0.042	0.038	0.033	0.028	0.022
2002(1)	30.8	0	0.052	0.044	0.040	0.036	0.032	0.027	0.022	0.018
2003(2)	76.0	0	0.066	0.054	0.048	0.043	0.038	0.033	0.028	0.022
2004(2)	84.3	0	0.056	0.051	0.050	0.044	0.041	0.034	0.028	0.023
2005(2)	92.5	0	0.064	0.047	0.043	0.040	0.037	0.030	0.026	0.021
2006(2)	91.7	0	0.066	0.053	0.046	0.042	0.037	0.031	0.025	0.019
2007(2)	90.3	0	0.049	0.047	0.044	0.038	0.035	0.030	0.024	0.018

Table 33: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	85.1	0	0.063	0.050	0.046	0.040	0.035	0.028	0.022	0.018
1999	87.9	0	0.054	0.046	0.044	0.041	0.038	0.032	0.027	0.021
2000	89.2	0	0.079	0.057	0.049	0.042	0.036	0.030	0.025	0.021
2001	94.3	0	0.067	0.051	0.045	0.043	0.037	0.031	0.027	0.021
2002	93.0	0	0.068	0.051	0.047	0.045	0.040	0.033	0.028	0.022
2003	89.2	0	0.064	0.047	0.042	0.038	0.034	0.028	0.024	0.020
2004	93.7	0	0.060	0.050	0.048	0.042	0.036	0.031	0.025	0.021
2005	92.0	0	0.063	0.050	0.044	0.039	0.034	0.029	0.025	0.020
2006	92.7	0	0.053	0.049	0.047	0.041	0.036	0.029	0.024	0.018
2007	90.5	0	0.053	0.044	0.039	0.035	0.032	0.028	0.023	0.018

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 34: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Macarthur

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2004	16.2	0	0.052	0.050	0.045	0.039	0.031	0.024	0.020	0.016
2005	91.9	0	0.081	0.051	0.048	0.042	0.035	0.030	0.025	0.019
2006	93.9	0	0.066	0.048	0.047	0.043	0.036	0.030	0.024	0.018
2007	90.2	0	0.047	0.042	0.040	0.038	0.033	0.029	0.023	0.018

Table 35: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	84.2	0	0.053	0.037	0.033	0.028	0.025	0.021	0.017	0.013
1999	89.2	0	0.044	0.032	0.029	0.026	0.024	0.021	0.016	0.011
2000	93.3	0	0.037	0.027	0.027	0.025	0.023	0.019	0.015	0.011
2001	92.3	0	0.038	0.031	0.030	0.027	0.025	0.020	0.016	0.011
2002	92.9	0	0.048	0.037	0.032	0.029	0.027	0.023	0.018	0.012
2003	93.0	0	0.036	0.031	0.029	0.026	0.024	0.021	0.016	0.012
2004	88.4	0	0.037	0.034	0.033	0.029	0.027	0.021	0.015	0.012
2005	90.1	0	0.036	0.031	0.030	0.027	0.025	0.020	0.015	0.011
2006	91.4	0	0.044	0.035	0.032	0.027	0.024	0.020	0.015	0.011
2007	89.1	0	0.029	0.027	0.025	0.023	0.021	0.016	0.013	0.009

Table 36: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Rozelle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	72.0	0	0.081	0.057	0.053	0.046	0.042	0.033	0.027	0.020
1999	87.4	0	0.062	0.047	0.044	0.041	0.037	0.030	0.025	0.019
2000	94.3	0	0.070	0.057	0.051	0.044	0.038	0.031	0.025	0.020
2001	93.2	0	0.066	0.051	0.049	0.040	0.037	0.032	0.026	0.019
2002	87.1	0	0.086	0.058	0.053	0.045	0.041	0.035	0.027	0.019
2003	88.6	0	0.052	0.047	0.046	0.041	0.038	0.032	0.026	0.020
2004	89.2	0	0.064	0.051	0.047	0.042	0.037	0.031	0.025	0.019
2005	91.2	0	0.052	0.046	0.044	0.040	0.036	0.031	0.024	0.017
2006	92.9	0	0.057	0.048	0.044	0.038	0.035	0.030	0.025	0.018
2007	89.2	0	0.050	0.043	0.040	0.037	0.033	0.027	0.023	0.015

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Table 37: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Albion Park[(1)]/Albion Park South[(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	87.4	0	0.081	0.042	0.038	0.033	0.024	0.017	0.010	0.004
1999[(1)]	90.4	0	0.049	0.042	0.037	0.031	0.025	0.015	0.009	0.005
2000[(1)]	90.3	0	0.055	0.044	0.041	0.031	0.024	0.017	0.010	0.005
2001[(1)]	93.0	0	0.051	0.040	0.035	0.028	0.024	0.017	0.010	0.004
2002[(1)]	57.5	0	0.048	0.035	0.034	0.029	0.024	0.015	0.008	0.005
2003[(1)]	90.0	0	0.048	0.039	0.036	0.030	0.023	0.017	0.011	0.006
2004[(1)]	91.4	0	0.044	0.036	0.034	0.027	0.021	0.016	0.011	0.006
2005[(1)]	4.8	0	0.035	0.034	0.034	0.032	0.024	0.010	0.005	0.004
2006[(2)]	78.9	0	0.051	0.039	0.033	0.027	0.022	0.017	0.012	0.007
2007[(2)]	93.0	0	0.045	0.033	0.030	0.026	0.021	0.015	0.010	0.006

Table 38: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	86.9	0	0.058	0.044	0.042	0.036	0.031	0.025	0.021	0.016
1999	90.8	0	0.062	0.046	0.042	0.037	0.032	0.027	0.022	0.016
2000	93.0	0	0.065	0.049	0.043	0.034	0.030	0.025	0.021	0.017
2001	93.6	0	0.056	0.043	0.040	0.037	0.031	0.027	0.022	0.016
2002	94.2	0	0.056	0.048	0.044	0.039	0.036	0.029	0.023	0.016
2003	93.3	0	0.049	0.039	0.036	0.035	0.032	0.027	0.022	0.017
2004	92.2	0	0.044	0.039	0.038	0.033	0.029	0.026	0.021	0.015
2005	88.6	0	0.058	0.042	0.037	0.032	0.029	0.025	0.020	0.015
2006	87.8	0	0.050	0.044	0.040	0.035	0.031	0.025	0.020	0.015
2007	89.6	0	0.043	0.038	0.036	0.032	0.029	0.025	0.020	0.015

Table 39: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	83.4	0	0.039	0.035	0.034	0.031	0.029	0.024	0.019	0.011
1999	90.2	0	0.049	0.040	0.038	0.034	0.030	0.025	0.020	0.012
2000	90.1	0	0.044	0.038	0.034	0.031	0.028	0.024	0.018	0.011
2001	91.5	0	0.040	0.034	0.032	0.030	0.029	0.026	0.020	0.012
2002	85.9	0	0.047	0.040	0.037	0.034	0.031	0.025	0.019	0.012
2003	95.0	0	0.039	0.035	0.034	0.032	0.029	0.025	0.019	0.011
2004	91.0	0	0.044	0.037	0.035	0.032	0.029	0.025	0.020	0.012
2005	89.7	0	0.041	0.034	0.033	0.031	0.029	0.026	0.019	0.012
2006	89.2	0	0.042	0.034	0.033	0.031	0.029	0.024	0.018	0.010
2007	40.6	0	0.032	0.030	0.029	0.026	0.025	0.021	0.015	0.009

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Table 40: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	78.6	0	0.035	0.034	0.030	0.028	0.025	0.022	0.017	0.013
1999	85.6	0	0.034	0.033	0.030	0.027	0.025	0.021	0.017	0.012
2000	91.8	0	0.054	0.037	0.033	0.029	0.026	0.022	0.017	0.012
2001	87.5	0	0.044	0.039	0.036	0.032	0.030	0.024	0.018	0.014
2002	63.2	0	0.043	0.038	0.034	0.029	0.027	0.024	0.018	0.014
2003	85.9	0	0.050	0.037	0.034	0.029	0.027	0.022	0.016	0.013
2004	92.2	0	0.041	0.035	0.033	0.029	0.027	0.023	0.017	0.013
2005	93.4	0	0.038	0.033	0.032	0.029	0.028	0.023	0.018	0.012
2006	92.1	0	0.037	0.035	0.034	0.029	0.027	0.023	0.018	0.013
2007	93.9	0	0.035	0.032	0.031	0.028	0.026	0.022	0.016	0.011

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Ozone

Statistical summary

Due to mathematical rounding of the ozone concentration from parts per hundred million to parts per million there may be some instances in which exceedences are recorded, when the ozone concentration is equal to the AAQ NEPM standard. These instances will be noted in each of the tables in which this occurs.

Table 41: Statistical summary for O_3 - Daily maximum 1-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	92.1	**0.111**	0.093	0.079	0.069	0.058	0.044	0.033	0.028
Chullora	93.0	0.088	0.067	0.063	0.054	0.044	0.036	0.029	0.024
Liverpool	90.3	**0.116**	0.086	0.074	0.062	0.052	0.039	0.029	0.025
Macarthur	90.6	**0.121**	0.095	0.086	0.070	0.059	0.043	0.032	0.027
Oakdale	87.6	**0.142**	0.099	0.089	0.070	0.060	0.044	0.034	0.030
Prospect	73.3	0.089	0.069	0.065	0.061	0.053	0.040	0.030	0.025
Richmond	91.1	**0.134**	0.081	0.073	0.067	0.058	0.046	0.034	0.029
Rozelle	92.0	0.088	0.055	0.050	0.046	0.041	0.033	0.028	0.023
St Marys	92.2	**0.123**	0.089	0.076	0.065	0.056	0.044	0.033	0.028
Illawarra									
Albion Park South	91.4	0.092	0.068	0.058	0.050	0.042	0.035	0.031	0.028
Kembla Grange	94.1	0.093	0.066	0.061	0.048	0.043	0.034	0.031	0.027
Wollongong	90.2	0.077	0.066	0.059	0.050	0.042	0.034	0.029	0.025
Lower Hunter									
Newcastle	43.9	0.053	0.051	0.050	0.046	0.040	0.033	0.028	0.023
Wallsend	92.3	0.070	0.061	0.054	0.049	0.045	0.035	0.029	0.025
Regional									
Bathurst	54.3	0.068	0.065	0.061	0.053	0.050	0.039	0.032	0.029

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 42: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	94.8	**0.095**	0.079	0.070	0.058	0.052	0.040	0.031	0.027
Chullora	97.1	0.074	0.063	0.056	0.049	0.041	0.033	0.027	0.022
Liverpool	92.3	**0.094**	0.072	0.066	0.057	0.047	0.035	0.028	0.023
Macarthur	94.1	**0.101**	**0.082**	0.076	0.063	0.054	0.039	0.030	0.025
Oakdale	91.0	**0.116**	**0.083**	0.075	0.063	0.053	0.042	0.033	0.029
Prospect	75.1	**0.085**	0.063	0.059	0.054	0.048	0.037	0.028	0.023
Richmond	94.1	**0.121**	0.071	0.067	0.059	0.053	0.042	0.032	0.028
Rozelle	93.7	0.075	0.049	0.045	0.042	0.037	0.031	0.026	0.021
St Marys	93.1	**0.105**	**0.080**	0.069	0.057	0.050	0.039	0.031	0.027
Illawarra									
Albion Park South	94.6	**0.080#**	0.060	0.055	0.046	0.039	0.033	0.030	0.026
Kembla Grange	97.8	**0.082**	0.061	0.056	0.045	0.040	0.033	0.029	0.025
Wollongong	93.2	0.073	0.061	0.054	0.045	0.039	0.033	0.028	0.023
Lower Hunter									
Newcastle	45.6	0.047	0.046	0.045	0.041	0.036	0.031	0.026	0.021
Wallsend	95.1	0.068	0.053	0.049	0.044	0.040	0.033	0.028	0.023
Regional									
Bathurst	56.7	0.066	0.061	0.059	0.050	0.048	0.037	0.031	0.028

No exceedences due to mathematical rounding of the maximum value from parts per hundred million to parts per million.

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 43: Maximum 1-hour average concentrations for O_3 (ppm)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Blacktown/Prospect*	**0.109**	0.091	**0.113**	**0.153**	**0.130**	**0.181**	**0.123**			0.089*
Bringelly	**0.113**	**0.114**	**0.130**	**0.175**	**0.118**	**0.155**	**0.122**	**0.112**	**0.119**	**0.111**
Chullora/Lidombe*	**0.142***	0.092*	**0.118***	**0.156***	0.100*	0.084	**0.105**	0.086	**0.117**	0.088
Liverpool	**0.130**	**0.102**	**0.133**	**0.141**	**0.100**	**0.151**	**0.113**	**0.149**	**0.128**	**0.116**
Macarthur							0.099	**0.142**	**0.128**	**0.121**
Oakdale	**0.109**	**0.107**	**0.126**	**0.135**	0.094	**0.102**	**0.124**	**0.130**	**0.109**	**0.142**
Richmond	**0.113**	**0.127**	0.088	**0.117**	**0.125**	**0.148**	0.096	**0.125**	**0.108**	**0.134**
Rozelle	0.088	0.059	0.080	**0.115**	0.100	0.083	0.094	0.081	0.093	0.088
St Marys	**0.122**	**0.113**	**0.158**	**0.146**	**0.119**	0.093	**0.142**	**0.113**	**0.124**	**0.123**
Illawarra										
Albion Park/ Albion Park South*	**0.140**	0.090	**0.106**	0.088	0.094	**0.130**	**0.112**	0.073	0.096*	0.092*
Kembla Grange	**0.137**	**0.101**	**0.117**	**0.119**	0.099	**0.113**	**0.120**	0.091	0.093	0.093
Wollongong	**0.105**	0.087	**0.108**	**0.116**	**0.121**	0.097	**0.103**	**0.102**	0.096	0.077
Lower Hunter										
Newcastle	0.080	0.066	0.071	0.072	0.083	0.079	**0.112**	0.078	0.068	0.053
Wallsend	0.095	0.069	0.073	0.078	0.081	0.077	**0.103**	0.094	0.086	0.070
Regional										
Bathurst				0.063	0.064	0.056	0.092	0.056	0.075	0.068

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 44: Maximum rolling 4-hour average concentrations for O_3 (ppm)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Blacktown/Prospect*	**0.097**	0.077	**0.101**	**0.120**	**0.107**	**0.157**	**0.107**			**0.085***
Bringelly	**0.089**	**0.092**	**0.115**	**0.128**	**0.099**	**0.133**	**0.110**	**0.102**	**0.110**	**0.095**
Chullora/Lidcombe*	**0.119***	**0.077***	**0.095***	**0.137***	**0.084***	0.077	**0.086**	**0.080**	**0.104**	0.074
Liverpool	**0.108**	**0.084**	**0.107**	**0.120**	**0.089**	**0.132**	**0.092**	**0.121**	**0.124**	**0.094**
Macarthur							**0.084**	**0.126**	**0.117**	**0.101**
Oakdale	**0.092**	**0.090**	**0.098**	**0.105**	**0.080**	**0.089**	**0.099**	**0.106**	**0.086**	**0.116**
Richmond	**0.097**	**0.098**	0.078	**0.111**	**0.112**	**0.138**	**0.088**	**0.101**	**0.095**	**0.121**
Rozelle	0.079	0.053	0.073	**0.083**	**0.087**	0.070	**0.087**	0.065	**0.082**	0.075
St Marys	**0.091**	**0.091**	**0.136**	**0.125**	**0.093**	**0.091**	**0.128**	**0.091**	**0.109**	**0.105**
Illawarra										
Albion Park/ Albion Park South*	**0.116**	**0.081**	**0.083**	**0.082**	**0.083**	**0.111**	**0.092**	0.063	0.078*	**0.080***
Kembla Grange	**0.117**	**0.081**	**0.089**	**0.092**	**0.083**	**0.107**	**0.100**	**0.084**	**0.081**	**0.082**
Wollongong	**0.082**	0.073	**0.086**	**0.091**	**0.099**	**0.080**	**0.090**	**0.099**	**0.086**	0.073
Lower Hunter										
Newcastle	0.068	0.065	0.065	0.069	0.077	0.061	0.073	0.070	0.064	0.047
Wallsend	**0.084**	0.059	0.070	0.073	0.074	0.059	0.078	0.074	0.066	0.068
Regional										
Bathurst				0.060	0.062	0.053	0.067	0.055	0.071	0.066

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 45: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	83.8	**3**	**0.109**	0.093	0.083	0.063	0.052	0.038	0.024	0.018
1999[(1)]	95.1	0	0.091	0.079	0.075	0.063	0.050	0.035	0.026	0.020
2000[(1)]	91.5	**2**	**0.113**	0.088	0.075	0.061	0.051	0.037	0.028	0.024
2001[(1)]	93.6	**5**	**0.153**	**0.107**	0.088	0.075	0.054	0.040	0.030	0.024
2002[(1)]	91.7	**2**	**0.130**	0.093	0.083	0.068	0.059	0.043	0.033	0.026
2003[(1)]	90.3	**3**	**0.181**	0.085	0.073	0.061	0.050	0.037	0.029	0.025
2004[(1)]	39.5	**2**	**0.123**	0.093	0.089	0.080	0.066	0.050	0.036	0.028
2005[#]	0.0									
2006[#]	0.0									
2007[(2)]	73.3	0	0.089	0.069	0.065	0.061	0.053	0.040	0.030	0.025

Station closed pending relocation.

Table 46: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	74.5	**4**	**0.113**	**0.101**	0.098	0.078	0.066	0.044	0.029	0.024
1999	92.1	**3**	**0.114**	0.100	0.094	0.073	0.055	0.037	0.029	0.024
2000	94.9	**3**	**0.130**	0.096	0.092	0.070	0.059	0.039	0.032	0.027
2001	91.5	**9**	**0.175**	**0.115**	**0.102**	0.074	0.059	0.042	0.033	0.027
2002	93.0	**2**	**0.118**	0.098	0.090	0.074	0.064	0.045	0.034	0.028
2003	91.3	**3**	**0.155**	0.095	0.076	0.065	0.056	0.041	0.032	0.028
2004	91.1	**6**	**0.122**	**0.104**	0.091	0.074	0.060	0.044	0.033	0.029
2005	88.4	**3**	**0.112**	0.084	0.078	0.065	0.056	0.043	0.034	0.029
2006	92.1	**6**	**0.119**	**0.106**	0.093	0.070	0.057	0.044	0.033	0.028
2007	92.1	**4**	**0.111**	0.093	0.079	0.069	0.058	0.044	0.033	0.028

Table 47: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Lidcombe[(1)] / Chullora[(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	89.5	**5**	**0.142**	**0.106**	0.080	0.070	0.051	0.034	0.025	0.020
1999[(1)]	89.4	0	0.092	0.076	0.065	0.055	0.043	0.031	0.025	0.020
2000[(1)]	94.7	1	**0.118**	0.080	0.071	0.058	0.048	0.033	0.026	0.021
2001[(1)]	94.5	**4**	**0.156**	0.094	0.085	0.066	0.050	0.035	0.025	0.020
2002[(1)]	31.0	0[#]	0.100	0.078	0.074	0.061	0.046	0.037	0.029	0.021
2003[(2)]	80.6	0	0.084	0.066	0.063	0.046	0.040	0.034	0.028	0.023
2004[(2)]	87.2	1	**0.105**	0.087	0.074	0.061	0.050	0.038	0.030	0.026
2005[(2)]	92.0	0	0.086	0.069	0.066	0.057	0.048	0.037	0.031	0.025
2006[(2)]	94.3	1	**0.117**	0.077	0.072	0.057	0.048	0.037	0.030	0.024
2007[(2)]	93.0	0	0.088	0.067	0.063	0.054	0.044	0.036	0.029	0.024

No exceedences due to mathematical rounding of the maximum value from parts per hundred million to parts per million.

Bold font indicates values that exceed the AAQ NEPM standard *AAQ NEPM Standard - 0.10 ppm (1-hour average)*

Table 48: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	93.1	**4**	**0.130**	0.098	0.091	0.069	0.055	0.035	0.023	0.018
1999	83.6	1	**0.102**	0.086	0.077	0.064	0.045	0.032	0.025	0.020
2000	93.3	**2**	**0.133**	0.088	0.079	0.069	0.058	0.035	0.028	0.024
2001	94.7	**5**	**0.141**	**0.103**	0.089	0.071	0.053	0.039	0.030	0.025
2002	93.6	1#	**0.100**	0.087	0.084	0.064	0.054	0.039	0.030	0.025
2003	93.3	**4**	**0.151**	0.087	0.065	0.054	0.045	0.035	0.029	0.024
2004	92.3	**3**	**0.113**	0.096	0.084	0.068	0.054	0.040	0.030	0.026
2005	88.0	1	**0.149**	0.082	0.077	0.059	0.052	0.040	0.032	0.027
2006	91.4	**4**	**0.128**	0.092	0.084	0.069	0.054	0.040	0.030	0.025
2007	90.3	**2**	**0.116**	0.086	0.074	0.062	0.052	0.039	0.029	0.025

Exceedence due to mathematical rounding of the maximum value from parts per hundred million to parts per million.

Table 49: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Macarthur

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2004	16.2	0	0.099	0.086	0.082	0.070	0.062	0.055	0.038	0.028
2005	94.7	**6**	**0.142**	**0.104**	0.090	0.073	0.061	0.044	0.033	0.029
2006	94.3	**8**	**0.128**	**0.111**	**0.100**	0.073	0.059	0.044	0.032	0.027
2007	90.6	**3**	**0.121**	0.095	0.086	0.070	0.059	0.043	0.032	0.027

Table 50: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Oakdale

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	54.5	**2**	**0.109**	0.086	0.084	0.071	0.058	0.042	0.034	0.028
1999	89.6	**5**	**0.107**	**0.104**	0.090	0.068	0.055	0.041	0.031	0.027
2000	90.1	**4**	**0.126**	0.100	0.086	0.065	0.055	0.039	0.030	0.027
2001	34.8	**7**	**0.135**	**0.118**	**0.115**	0.089	0.072	0.045	0.032	0.025
2002	18.6	0	0.094	0.088	0.088	0.082	0.077	0.062	0.047	0.037
2003	91.1	1	**0.102**	0.079	0.073	0.063	0.054	0.041	0.033	0.029
2004	85.6	**7**	**0.124**	**0.105**	0.089	0.072	0.063	0.047	0.035	0.031
2005	91.9	**4**	**0.130**	0.097	0.084	0.070	0.058	0.043	0.034	0.030
2006	87.9	1	**0.109**	0.088	0.081	0.068	0.060	0.048	0.035	0.030
2007	87.6	**4**	**0.142**	0.099	0.089	0.070	0.060	0.044	0.034	0.030

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 51: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	91.1	1	**0.113**	0.090	0.078	0.067	0.056	0.041	0.031	0.025
1999	92.0	1	**0.127**	0.076	0.074	0.064	0.054	0.040	0.032	0.027
2000	89.7	0	0.088	0.080	0.071	0.062	0.051	0.039	0.030	0.025
2001	90.8	**5**	**0.117**	**0.106**	0.095	0.074	0.057	0.042	0.034	0.028
2002	92.5	**2**	**0.125**	0.094	0.084	0.070	0.063	0.045	0.034	0.029
2003	86.1	**2**	**0.148**	0.083	0.078	0.061	0.053	0.039	0.030	0.026
2004	89.5	0	0.096	0.080	0.075	0.065	0.058	0.045	0.034	0.029
2005	91.8	**2**	**0.125**	0.090	0.081	0.065	0.058	0.046	0.035	0.030
2006	92.8	**2**	**0.108**	0.086	0.077	0.068	0.058	0.046	0.035	0.029
2007	91.1	1	**0.134**	0.081	0.073	0.067	0.058	0.046	0.034	0.029

Table 52: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Rozelle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	72.5	0	0.088	0.056	0.050	0.045	0.040	0.027	0.020	0.015
1999	89.9	0	0.059	0.050	0.047	0.038	0.032	0.025	0.020	0.015
2000	87.8	0	0.080	0.068	0.058	0.048	0.036	0.030	0.026	0.021
2001	93.4	1	**0.115**	0.066	0.057	0.047	0.040	0.032	0.026	0.021
2002	88.1	0#	0.100	0.073	0.066	0.053	0.043	0.035	0.028	0.023
2003	91.2	0	0.083	0.064	0.058	0.045	0.037	0.031	0.027	0.023
2004	88.9	0	0.094	0.077	0.072	0.056	0.045	0.034	0.027	0.024
2005	88.9	0	0.081	0.067	0.059	0.051	0.044	0.034	0.029	0.024
2006	92.2	0	0.093	0.069	0.060	0.051	0.042	0.033	0.027	0.023
2007	92.0	0	0.088	0.055	0.050	0.046	0.041	0.033	0.028	0.023

No exceedence due to mathematical rounding of the maximum value from parts per hundred million to parts per million.

Table 53: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: St Marys

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	84.9	**3**	**0.122**	0.097	0.081	0.065	0.056	0.039	0.027	0.023
1999	88.3	**2**	**0.113**	0.091	0.083	0.062	0.052	0.034	0.026	0.021
2000	91.5	**3**	**0.158**	0.096	0.086	0.069	0.058	0.041	0.032	0.027
2001	90.3	**6**	**0.146**	**0.111**	0.099	0.076	0.059	0.042	0.033	0.028
2002	95.3	1	**0.119**	0.091	0.082	0.067	0.059	0.046	0.034	0.028
2003	92.7	0	0.093	0.071	0.066	0.058	0.052	0.037	0.030	0.026
2004	93.6	**3**	**0.142**	0.091	0.082	0.067	0.058	0.044	0.033	0.029
2005	92.1	**2**	**0.113**	0.086	0.076	0.066	0.058	0.042	0.034	0.029
2006	92.6	**3**	**0.124**	0.089	0.076	0.067	0.056	0.043	0.032	0.027
2007	92.2	**3**	**0.123**	0.089	0.076	0.065	0.056	0.044	0.033	0.028

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 54: Statistical summary for O_3 - Annual daily maximum 1-hour average concentration

Station: Albion Park [(1)]/ Albion Park South [(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	89.9	**2**	**0.140**	0.099	0.086	0.062	0.050	0.036	0.029	0.026
1999[(1)]	90.4	0	0.090	0.084	0.067	0.051	0.043	0.034	0.029	0.025
2000[(1)]	90.0	1	**0.106**	0.086	0.079	0.059	0.045	0.035	0.030	0.026
2001[(1)]	93.6	0	0.088	0.074	0.065	0.054	0.044	0.037	0.032	0.027
2002[(1)]	57.6	0	0.094	0.077	0.068	0.048	0.043	0.033	0.027	0.024
2003[(1)]	92.8	**4**	**0.130**	0.081	0.063	0.044	0.040	0.034	0.030	0.027
2004[(1)]	93.5	1	**0.112**	0.080	0.062	0.051	0.044	0.035	0.030	0.027
2005[(1)]	4.8	0	0.067	0.066	0.065	0.062	0.049	0.039	0.030	0.025
2006[(2)]	86.2	0	0.096	0.082	0.074	0.054	0.046	0.037	0.031	0.027
2007[(2)]	91.4	0	0.092	0.068	0.058	0.050	0.042	0.035	0.031	0.028

Table 55: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Kembla Grange

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	87.1	**2**	**0.137**	0.098	0.092	0.063	0.050	0.036	0.029	0.025
1999	91.1	1	**0.101**	0.079	0.065	0.051	0.042	0.033	0.028	0.024
2000	93.9	**3**	**0.117**	0.087	0.077	0.056	0.045	0.034	0.029	0.025
2001	82.3	**2**	**0.119**	0.085	0.078	0.056	0.046	0.036	0.030	0.025
2002	91.7	0	0.099	0.084	0.079	0.053	0.044	0.036	0.031	0.026
2003	93.3	**2**	**0.113**	0.092	0.066	0.044	0.038	0.033	0.030	0.026
2004	91.3	**3**	**0.120**	0.077	0.060	0.051	0.043	0.036	0.031	0.027
2005	92.6	0	0.091	0.071	0.065	0.051	0.044	0.036	0.032	0.027
2006	94.6	0	0.093	0.067	0.063	0.051	0.045	0.036	0.030	0.027
2007	94.1	0	0.093	0.066	0.061	0.048	0.043	0.034	0.031	0.027

Table 56: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	87.0	1	**0.105**	0.082	0.071	0.060	0.048	0.034	0.027	0.023
1999	87.7	0	0.087	0.067	0.062	0.046	0.041	0.032	0.027	0.021
2000	94.1	1	**0.108**	0.083	0.074	0.061	0.046	0.034	0.028	0.024
2001	94.0	1	**0.116**	0.074	0.071	0.061	0.050	0.037	0.030	0.025
2002	90.7	**2**	**0.121**	0.084	0.081	0.062	0.048	0.036	0.030	0.024
2003	92.8	0	0.097	0.080	0.070	0.046	0.040	0.033	0.029	0.025
2004	92.5	1	**0.103**	0.082	0.069	0.055	0.043	0.034	0.029	0.026
2005	92.4	1	**0.102**	0.071	0.065	0.054	0.046	0.035	0.030	0.026
2006	94.6	0	0.096	0.072	0.063	0.053	0.046	0.035	0.030	0.026
2007	90.2	0	0.077	0.066	0.059	0.050	0.042	0.034	0.029	0.025

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 57: Statistical summary for O_3 - Annual daily maximum 1-hour average concentration

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	94.6	0	0.080	0.065	0.054	0.044	0.040	0.031	0.026	0.021
1999	92.0	0	0.066	0.055	0.051	0.046	0.040	0.033	0.027	0.022
2000	88.4	0	0.071	0.065	0.058	0.048	0.042	0.032	0.027	0.023
2001	93.3	0	0.072	0.063	0.057	0.047	0.040	0.034	0.029	0.025
2002	94.0	0	0.083	0.077	0.061	0.054	0.046	0.037	0.030	0.025
2003	92.4	0	0.079	0.061	0.054	0.045	0.039	0.035	0.030	0.025
2004	92.3	1	**0.112**	0.068	0.065	0.052	0.044	0.036	0.030	0.025
2005	92.4	0	0.078	0.061	0.057	0.049	0.042	0.035	0.030	0.026
2006	93.7	0	0.068	0.061	0.059	0.047	0.042	0.035	0.030	0.024
2007	43.9	0	0.053	0.051	0.050	0.046	0.040	0.033	0.028	0.023

Table 58: Statistical summary for O_3 - Annual daily maximum 1-hour average concentration

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	86.6	0	0.095	0.072	0.063	0.050	0.041	0.033	0.027	0.022
1999	83.2	0	0.069	0.057	0.054	0.047	0.042	0.033	0.027	0.021
2000	90.4	0	0.073	0.066	0.060	0.048	0.042	0.032	0.027	0.023
2001	87.9	0	0.078	0.070	0.063	0.053	0.046	0.036	0.028	0.023
2002	81.9	0	0.081	0.074	0.069	0.056	0.049	0.038	0.031	0.025
2003	91.6	0	0.077	0.064	0.060	0.049	0.042	0.034	0.029	0.025
2004	88.2	1	**0.103**	0.071	0.065	0.054	0.047	0.037	0.031	0.026
2005	91.3	0	0.094	0.068	0.063	0.052	0.046	0.037	0.031	0.026
2006	93.2	0	0.086	0.068	0.061	0.050	0.045	0.036	0.029	0.024
2007	92.3	0	0.070	0.061	0.054	0.049	0.045	0.035	0.029	0.025

Table 59: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Bathurst

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	50.4	0	0.063	0.052	0.050	0.048	0.045	0.036	0.032	0.027
2002	34.7	0	0.064	0.063	0.062	0.057	0.052	0.044	0.038	0.032
2003	76.4	0	0.056	0.051	0.049	0.046	0.042	0.036	0.032	0.029
2004	89.9	0	0.092	0.067	0.059	0.054	0.050	0.043	0.034	0.029
2005	90.7	0	0.056	0.054	0.052	0.048	0.044	0.038	0.033	0.030
2006	94.5	0	0.075	0.066	0.059	0.054	0.048	0.041	0.034	0.029
2007	54.3	0	0.068	0.065	0.061	0.053	0.050	0.039	0.032	0.029

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 60: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	84.9	**3**	**0.097**	0.079	0.069	0.055	0.047	0.035	0.023	0.017
1999[(1)]	99.3	0	0.077	0.064	0.061	0.054	0.045	0.031	0.024	0.018
2000[(1)]	95.3	**3**	**0.101**	0.078	0.065	0.054	0.045	0.034	0.026	0.021
2001[(1)]	97.7	**8**	**0.120**	**0.091**	**0.080**	0.065	0.048	0.036	0.029	0.022
2002[(1)]	95.7	**6**	**0.107**	**0.083**	0.077	0.061	0.054	0.040	0.031	0.024
2003[(1)]	94.3	**3**	**0.157**	0.078	0.066	0.056	0.045	0.035	0.028	0.023
2004[(1)]	41.3	**4**	**0.107**	**0.082**	0.080	0.070	0.061	0.044	0.033	0.026
2005[#]	0.0									
2006[#]	0.0									
2007[(2)]	75.1	1	**0.085**	0.063	0.059	0.054	0.048	0.037	0.028	0.023

Station closed pending relocation.

Table 61: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	77.6	**9**	**0.089**	**0.085**	**0.083**	0.064	0.056	0.038	0.027	0.023
1999	96.0	**4**	**0.092**	0.078	0.074	0.061	0.049	0.034	0.028	0.023
2000	99.3	**6**	**0.115**	**0.086**	0.076	0.063	0.052	0.037	0.030	0.026
2001	95.4	**12**	**0.128**	**0.098**	**0.086**	0.069	0.054	0.039	0.032	0.026
2002	96.8	**7**	**0.099**	**0.088**	0.078	0.066	0.055	0.041	0.033	0.026
2003	95.3	**5**	**0.133**	**0.082**	0.068	0.057	0.050	0.038	0.031	0.027
2004	95.1	**7**	**0.110**	**0.085**	0.078	0.064	0.053	0.041	0.032	0.028
2005	92.4	**3**	**0.102**	0.074	0.066	0.059	0.050	0.039	0.033	0.028
2006	96.2	**6**	**0.110**	**0.083**	0.075	0.062	0.051	0.041	0.031	0.026
2007	94.8	**4**	**0.095**	0.079	0.070	0.058	0.052	0.040	0.031	0.027

Table 62: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Lidcombe[(1)] / Chullora[(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998 [(1)]	87.8	**5**	**0.119**	**0.082**	0.073	0.056	0.045	0.031	0.023	0.017
1999 [(1)]	91.0	0	0.077	0.065	0.056	0.050	0.039	0.029	0.023	0.018
2000 [(1)]	98.7	**2**	**0.095**	0.074	0.066	0.053	0.043	0.031	0.025	0.019
2001 [(1)]	98.5	**4**	**0.137**	**0.080**	0.076	0.057	0.044	0.032	0.024	0.019
2002 [(1)]	32.4	1	**0.084**	0.072	0.063	0.052	0.043	0.035	0.027	0.020
2003 [(2)]	84.2	0	0.077	0.057	0.053	0.041	0.037	0.032	0.026	0.021
2004 [(2)]	91.2	**4**	**0.086**	0.077	0.065	0.054	0.045	0.035	0.029	0.024
2005 [(2)]	96.2	1[#]	**0.080**	0.064	0.059	0.052	0.042	0.034	0.028	0.023
2006 [(2)]	98.8	**2**	**0.104**	0.070	0.063	0.053	0.044	0.034	0.028	0.022
2007 [(2)]	97.1	0	0.074	0.063	0.056	0.049	0.041	0.033	0.027	0.022

Exceedence due to mathematical rounding of the maximum value from parts per hundred million to parts per million.

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 63: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	97.2	**5**	**0.108**	**0.084**	0.077	0.058	0.046	0.031	0.022	0.016
1999	87.3	1	**0.084**	0.068	0.065	0.054	0.041	0.030	0.023	0.018
2000	97.5	**3**	**0.107**	0.076	0.070	0.059	0.047	0.033	0.027	0.022
2001	99.0	**7**	**0.120**	**0.093**	0.078	0.064	0.048	0.036	0.029	0.023
2002	97.7	**5**	**0.089**	0.078	0.068	0.058	0.048	0.035	0.028	0.023
2003	97.1	**3**	**0.132**	0.073	0.054	0.048	0.040	0.033	0.028	0.022
2004	96.4	**5**	**0.092**	**0.080**	0.071	0.059	0.048	0.037	0.029	0.024
2005	92.0	**2**	**0.121**	0.073	0.067	0.053	0.046	0.036	0.030	0.025
2006	95.2	**4**	**0.124**	0.075	0.073	0.062	0.049	0.036	0.028	0.023
2007	92.3	**2**	**0.094**	0.072	0.066	0.057	0.047	0.035	0.028	0.023

Table 64: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Macarthur

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2004	16.9	1	**0.084**	0.077	0.068	0.059	0.054	0.047	0.037	0.027
2005	98.9	**7**	**0.126**	**0.091**	0.077	0.061	0.054	0.040	0.032	0.028
2006	98.5	**8**	**0.117**	**0.093**	**0.081**	0.066	0.054	0.040	0.030	0.026
2007	94.1	**7**	**0.101**	**0.082**	0.076	0.063	0.054	0.039	0.030	0.025

Table 65: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Oakdale

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	56.8	**2**	**0.092**	0.079	0.075	0.061	0.051	0.039	0.032	0.027
1999	93.3	**6**	**0.090**	**0.083**	0.075	0.059	0.050	0.038	0.030	0.027
2000	94.0	**4**	**0.098**	**0.082**	0.072	0.055	0.047	0.037	0.029	0.026
2001	36.2	**8**	**0.105**	**0.096**	**0.093**	**0.084**	0.057	0.042	0.030	0.025
2002	19.3	1#	**0.080**	0.079	0.076	0.073	0.068	0.055	0.043	0.035
2003	95.0	**3**	**0.089**	0.072	0.064	0.056	0.048	0.039	0.032	0.028
2004	89.2	**7**	**0.099**	**0.088**	0.077	0.064	0.056	0.044	0.034	0.030
2005	95.1	**4**	**0.106**	0.079	0.072	0.062	0.052	0.040	0.032	0.029
2006	91.6	1	**0.086**	0.077	0.070	0.061	0.053	0.044	0.034	0.029
2007	91.0	**6**	**0.116**	**0.083**	0.075	0.063	0.053	0.042	0.033	0.029

Exceedence due to mathematical rounding of the maximum value from parts per hundred million to parts per million.

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 66: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	94.8	**2**	**0.097**	0.074	0.068	0.058	0.050	0.037	0.029	0.024
1999	95.9	1	**0.098**	0.071	0.064	0.053	0.048	0.038	0.031	0.025
2000	93.2	0	0.078	0.065	0.061	0.054	0.046	0.036	0.028	0.024
2001	94.5	**6**	**0.111**	**0.084**	0.074	0.065	0.051	0.039	0.032	0.026
2002	96.3	**4**	**0.112**	**0.080**	0.073	0.062	0.056	0.042	0.032	0.027
2003	89.5	**3**	**0.138**	0.076	0.067	0.055	0.048	0.037	0.029	0.025
2004	93.8	1	**0.088**	0.073	0.067	0.057	0.052	0.042	0.033	0.028
2005	96.3	**4**	**0.101**	0.080	0.066	0.059	0.052	0.042	0.033	0.028
2006	97.3	**2**	**0.095**	0.075	0.072	0.061	0.052	0.042	0.034	0.027
2007	94.1	**3**	**0.121**	0.071	0.067	0.059	0.053	0.042	0.032	0.028

Table 67: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Rozelle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	75.1	0	0.079	0.046	0.044	0.039	0.034	0.025	0.019	0.014
1999	92.6	0	0.053	0.043	0.039	0.035	0.029	0.023	0.019	0.014
2000	91.5	0	0.073	0.058	0.050	0.042	0.034	0.028	0.024	0.019
2001	97.4	1	**0.083**	0.055	0.050	0.040	0.036	0.030	0.024	0.020
2002	92.1	1	**0.087**	0.061	0.054	0.047	0.040	0.032	0.026	0.021
2003	95.3	0	0.070	0.057	0.052	0.039	0.034	0.030	0.025	0.021
2004	92.9	1	**0.087**	0.071	0.065	0.050	0.041	0.032	0.026	0.022
2005	92.9	0	0.065	0.058	0.054	0.045	0.039	0.032	0.027	0.023
2006	96.6	1	**0.082**	0.062	0.055	0.046	0.037	0.030	0.026	0.021
2007	93.7	0	0.075	0.049	0.045	0.042	0.037	0.031	0.026	0.021

Table 68: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: St Marys

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	88.6	**4**	**0.091**	0.080	0.071	0.057	0.049	0.034	0.026	0.021
1999	92.2	**3**	**0.091**	0.073	0.065	0.057	0.046	0.031	0.025	0.019
2000	95.6	**5**	**0.136**	**0.083**	0.076	0.063	0.053	0.038	0.030	0.025
2001	94.2	**11**	**0.125**	**0.092**	**0.085**	0.067	0.051	0.040	0.031	0.027
2002	99.7	**7**	**0.093**	**0.084**	0.070	0.060	0.053	0.042	0.032	0.026
2003	96.8	**2**	**0.091**	0.062	0.059	0.051	0.046	0.035	0.029	0.025
2004	97.8	**4**	**0.128**	0.078	0.067	0.060	0.053	0.041	0.032	0.028
2005	96.2	**3**	**0.091**	0.077	0.067	0.058	0.050	0.040	0.032	0.028
2006	96.6	**4**	**0.109**	0.079	0.067	0.059	0.052	0.041	0.030	0.026
2007	93.1	**4**	**0.105**	**0.080**	0.069	0.057	0.050	0.039	0.031	0.027

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 69: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Albion Park [(1)]/ Albion Park South [(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	91.2	**5**	**0.116**	**0.084**	0.065	0.052	0.044	0.033	0.028	0.025
1999[(1)]	89.4	1	**0.081**	0.070	0.056	0.045	0.038	0.032	0.028	0.024
2000[(1)]	93.7	**4**	**0.083**	0.080	0.065	0.051	0.041	0.034	0.028	0.025
2001[(1)]	97.7	1	**0.082**	0.064	0.059	0.049	0.041	0.036	0.031	0.026
2002[(1)]	60.0	1	**0.083**	0.069	0.065	0.043	0.039	0.031	0.026	0.023
2003[(1)]	96.8	**4**	**0.111**	0.070	0.058	0.040	0.037	0.033	0.029	0.025
2004[(1)]	97.5	1	**0.092**	0.073	0.055	0.046	0.040	0.033	0.029	0.026
2005[(1)]	5.0	0	0.063	0.059	0.058	0.054	0.047	0.039	0.029	0.023
2006[(2)]	90.0	0	0.078	0.070	0.062	0.048	0.042	0.035	0.030	0.026
2007[(2)]	94.6	1#	**0.080**	0.060	0.055	0.046	0.039	0.033	0.030	0.026

Exceedence due to mathematical rounding of the maximum value from parts per hundred million to parts per million.

Table 70: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Kembla Grange

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	87.7	**6**	**0.117**	**0.081**	0.074	0.053	0.044	0.033	0.027	0.023
1999	88.9	1	**0.081**	0.067	0.056	0.044	0.037	0.031	0.027	0.023
2000	97.9	**4**	**0.089**	0.077	0.067	0.050	0.039	0.032	0.028	0.024
2001	85.7	**2**	**0.092**	0.071	0.061	0.051	0.042	0.034	0.029	0.024
2002	95.8	1	**0.083**	0.071	0.070	0.046	0.040	0.034	0.029	0.024
2003	97.4	**3**	**0.107**	0.073	0.056	0.041	0.036	0.032	0.028	0.025
2004	95.4	**3**	**0.100**	0.067	0.053	0.047	0.040	0.034	0.030	0.026
2005	96.7	1	**0.084**	0.060	0.059	0.047	0.040	0.035	0.031	0.026
2006	98.9	1	**0.081**	0.061	0.055	0.046	0.041	0.034	0.029	0.025
2007	97.8	1	**0.082**	0.061	0.056	0.045	0.040	0.033	0.029	0.025

Table 71: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	87.3	1	**0.082**	0.076	0.067	0.050	0.042	0.031	0.026	0.022
1999	85.4	0	0.073	0.058	0.054	0.043	0.037	0.030	0.025	0.019
2000	98.2	**3**	**0.086**	0.076	0.067	0.056	0.040	0.031	0.027	0.023
2001	98.0	1	**0.091**	0.068	0.064	0.052	0.044	0.034	0.029	0.024
2002	94.6	**2**	**0.099**	0.076	0.068	0.056	0.043	0.034	0.028	0.023
2003	96.4	1#	**0.080**	0.072	0.059	0.042	0.037	0.032	0.028	0.024
2004	96.3	**2**	**0.090**	0.067	0.058	0.050	0.040	0.032	0.028	0.025
2005	96.2	1	**0.099**	0.063	0.058	0.048	0.041	0.033	0.029	0.024
2006	98.6	1	**0.086**	0.064	0.055	0.047	0.042	0.033	0.028	0.024
2007	93.2	0	0.073	0.061	0.054	0.045	0.039	0.033	0.028	0.023

Exceedence due to mathematical rounding of the maximum value from parts per hundred million to parts per million.

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 72: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentrations

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	98.6	0	0.068	0.058	0.049	0.040	0.034	0.029	0.024	0.019
1999	96.0	0	0.065	0.050	0.047	0.042	0.037	0.032	0.026	0.021
2000	92.1	0	0.065	0.059	0.051	0.043	0.038	0.030	0.025	0.021
2001	97.4	0	0.069	0.057	0.051	0.042	0.037	0.032	0.027	0.023
2002	98.2	0	0.077	0.063	0.054	0.050	0.041	0.034	0.028	0.023
2003	96.3	0	0.061	0.052	0.049	0.041	0.038	0.033	0.028	0.024
2004	96.4	0	0.073	0.061	0.059	0.048	0.041	0.034	0.028	0.024
2005	96.5	0	0.070	0.052	0.049	0.044	0.039	0.033	0.028	0.024
2006	97.9	0	0.064	0.054	0.052	0.043	0.038	0.033	0.028	0.022
2007	45.6	0	0.047	0.046	0.045	0.041	0.036	0.031	0.026	0.021

Table 73: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	90.2	1	**0.084**	0.061	0.052	0.043	0.037	0.030	0.026	0.020
1999	86.7	0	0.059	0.050	0.047	0.042	0.038	0.031	0.024	0.020
2000	94.2	0	0.070	0.059	0.056	0.045	0.038	0.030	0.026	0.022
2001	91.7	0	0.073	0.062	0.056	0.048	0.041	0.033	0.027	0.022
2002	85.6	0	0.074	0.067	0.065	0.052	0.043	0.035	0.029	0.023
2003	95.7	0	0.059	0.057	0.054	0.044	0.039	0.032	0.028	0.024
2004	92.0	0	0.078	0.064	0.057	0.049	0.044	0.035	0.029	0.025
2005	95.4	0	0.074	0.061	0.056	0.048	0.041	0.034	0.029	0.025
2006	97.3	0	0.066	0.062	0.056	0.046	0.039	0.033	0.027	0.023
2007	95.1	0	0.068	0.053	0.049	0.044	0.040	0.033	0.028	0.023

Table 74: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Bathurst

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	52.3	0	0.060	0.051	0.049	0.046	0.042	0.035	0.030	0.025
2002	36.1	0	0.062	0.058	0.057	0.054	0.049	0.042	0.037	0.030
2003	79.6	0	0.053	0.049	0.047	0.044	0.040	0.036	0.031	0.028
2004	93.7	0	0.067	0.058	0.055	0.050	0.048	0.041	0.033	0.027
2005	94.5	0	0.055	0.052	0.049	0.046	0.041	0.036	0.032	0.029
2006	98.5	0	0.071	0.061	0.056	0.050	0.045	0.040	0.033	0.028
2007	56.7	0	0.066	0.061	0.059	0.050	0.048	0.037	0.031	0.028

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Sulfur Dioxide

Statistical summary

Table 75: Statistical summary for SO_2 - Daily maximum 1-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	84.2	0.017	0.008	0.007	0.005	0.004	0.002	0.001	0.000
Chullora	86.7	0.020	0.016	0.012	0.009	0.007	0.004	0.002	0.001
Macarthur	90.9	0.015	0.011	0.009	0.007	0.005	0.003	0.002	0.001
Prospect	67.0	0.022	0.016	0.013	0.009	0.006	0.004	0.002	0.001
Richmond	91.0	0.024	0.007	0.007	0.005	0.004	0.002	0.001	0.000
Illawarra									
Albion Park South	83.1	0.038	0.032	0.030	0.018	0.013	0.005	0.001	0.000
Wollongong	78.9	0.032	0.022	0.019	0.016	0.011	0.007	0.003	0.001
Lower Hunter									
Newcastle	44.5	0.043	0.028	0.025	0.021	0.014	0.008	0.005	0.003
Wallsend	83.9	0.039	0.031	0.027	0.022	0.018	0.010	0.005	0.002

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Table 76: Statistical summary for SO_2 - Daily 24-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	86.8	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000
Chullora	89.3	0.004	0.004	0.003	0.002	0.002	0.001	0.001	0.000
Macarthur	94.8	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000
Prospect	67.1	0.005	0.003	0.002	0.002	0.002	0.001	0.001	0.000
Richmond	94.8	0.004	0.002	0.002	0.001	0.001	0.000	0.000	0.000
Illawarra									
Albion Park South	84.1	0.013	0.010	0.008	0.004	0.003	0.001	0.000	0.000
Wollongong	79.5	0.008	0.006	0.004	0.003	0.002	0.002	0.001	0.000
Lower Hunter									
Newcastle	45.8	0.012	0.008	0.006	0.004	0.003	0.002	0.001	0.000
Wallsend	83.6	0.007	0.006	0.006	0.004	0.004	0.002	0.001	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Trend analysis

Table 77: Maximum 1-hour average concentrations for SO_2 (ppm)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Blacktown / Prospect*	0.020	0.020	0.015	0.020	0.021	0.016	0.016			0.022*
Bringelly	0.013	0.012	0.018	0.012	0.010	0.017	0.015	0.009	0.009	0.017
Chullora								0.015	0.015	0.020
Macarthur								0.015	0.010	0.015
Richmond	0.012	0.019	0.015	0.012	0.028	0.012	0.021	0.015	0.018	0.024
Illawarra										
Albion Park / Albion Park South*	0.055	0.033	0.042	0.034	0.029	0.035	0.034	0.032	0.038*	0.038*
Warrawong	0.058	0.051	0.110	0.162	0.046	0.063	0.088	0.070	0.022	
Wollongong	0.033	0.041	0.031	0.030	0.039	0.031	0.053	0.038	0.035	0.032
Lower Hunter										
Newcastle								0.037	0.034	0.043
Wallsend	0.063	0.074	0.041	0.049	0.045	0.047	0.067	0.048	0.058	0.039

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Table 78: Maximum 24-hour average concentrations for SO_2 (ppm)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Blacktown / Prospect*	0.008	0.003	0.004	0.005	0.004	0.004	0.004			0.005*
Bringelly	0.003	0.003	0.004	0.003	0.002	0.002	0.002	0.002	0.002	0.003
Chullora								0.005	0.004	0.004
Macarthur								0.003	0.003	0.004
Richmond	0.007	0.003	0.004	0.010	0.004	0.003	0.003	0.003	0.003	0.004
Illawarra										
Albion Park / Albion Park South*	0.014	0.009	0.014	0.013	0.009	0.009	0.009	0.011	0.010*	0.013*
Warrawong	0.010	0.009	0.010	0.013	0.009	0.012	0.012	0.009	0.007	
Wollongong	0.009	0.006	0.007	0.007	0.008	0.006	0.015	0.006	0.007	0.008
Lower Hunter										
Newcastle								0.007	0.009	0.012
Wallsend	0.016	0.014	0.010	0.013	0.011	0.010	0.014	0.007	0.009	0.007

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Table 79: Annual average concentrations for SO_2 (ppm)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Blacktown/ Prospect [#]	0.001	0.001	0.001	0.001	0.001	0.001	0.001			
Bringelly	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Chullora								0.001	0.001	0.001
Macarthur								0.001	0.001	0.001
Richmond	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
Illawarra										
Albion Park / Albion Park South [*]	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.007	0.001[*]	0.001[*]
Warrawong	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	
Wollongong	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lower Hunter										
Newcastle								0.002	0.001	0.001
Wallsend	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001

Data availability for the year is less then 75%.

AAQ NEPM Standard - 0.02 ppm (Annual average)

Table 80: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	84.9	0	0.020	0.013	0.011	0.009	0.007	0.004	0.003	0.002
1999[(1)]	88.8	0	0.020	0.009	0.008	0.007	0.006	0.004	0.003	0.002
2000[(1)]	85.9	0	0.015	0.011	0.010	0.008	0.006	0.004	0.003	0.002
2001[(1)]	93.9	0	0.020	0.014	0.012	0.008	0.007	0.005	0.003	0.002
2002[(1)]	93.2	0	0.021	0.013	0.010	0.008	0.006	0.004	0.003	0.002
2003[(1)]	91.3	0	0.016	0.012	0.010	0.007	0.005	0.004	0.003	0.002
2004[(1)]	39.1	0	0.016	0.012	0.012	0.010	0.008	0.005	0.004	0.002
2005[#]	0.0									
2006[#]	0.0									
2007[(2)]	67.0	0	0.022	0.016	0.013	0.009	0.006	0.004	0.002	0.001

Station closed pending relocation.

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Table 81: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	87.8	0	0.013	0.007	0.006	0.005	0.004	0.002	0.002	0.001
1999	87.8	0	0.012	0.008	0.007	0.005	0.004	0.003	0.002	0.001
2000	90.8	0	0.018	0.007	0.006	0.005	0.004	0.003	0.001	0.001
2001	94.7	0	0.012	0.010	0.008	0.006	0.004	0.003	0.002	0.001
2002	94.6	0	0.010	0.009	0.008	0.006	0.004	0.002	0.001	0.001
2003	93.0	0	0.017	0.006	0.006	0.004	0.003	0.002	0.001	0.001
2004	90.8	0	0.015	0.008	0.007	0.005	0.004	0.002	0.001	0.000
2005	91.3	0	0.009	0.007	0.006	0.004	0.003	0.002	0.001	0.000
2006	91.4	0	0.009	0.006	0.005	0.004	0.003	0.002	0.001	0.001
2007	84.2	0	0.017	0.008	0.007	0.005	0.004	0.002	0.001	0.000

Table 82: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Chullora

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	68.8	0	0.015	0.013	0.011	0.009	0.007	0.004	0.002	0.001
2006	93.9	0	0.015	0.012	0.010	0.009	0.006	0.004	0.003	0.002
2007	86.7	0	0.020	0.016	0.012	0.009	0.007	0.004	0.002	0.001

Table 83: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Macarthur

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	53.1	0	0.015	0.008	0.008	0.006	0.004	0.003	0.002	0.001
2006	93.2	0	0.010	0.007	0.006	0.005	0.004	0.002	0.001	0.001
2007	90.9	0	0.015	0.011	0.009	0.007	0.005	0.003	0.002	0.001

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Table 84: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	73.0	0	0.012	0.008	0.006	0.005	0.004	0.003	0.001	0.001
1999	90.3	0	0.019	0.018	0.018	0.007	0.005	0.003	0.002	0.001
2000	85.6	0	0.015	0.009	0.007	0.006	0.004	0.002	0.001	0.001
2001	84.7	0	0.012	0.010	0.007	0.005	0.004	0.002	0.001	0.001
2002	93.3	0	0.028	0.009	0.008	0.006	0.004	0.003	0.001	0.001
2003	93.0	0	0.012	0.010	0.008	0.006	0.004	0.003	0.001	0.001
2004	89.7	0	0.021	0.011	0.009	0.007	0.005	0.003	0.002	0.001
2005	92.8	0	0.015	0.009	0.007	0.006	0.004	0.003	0.001	0.001
2006	92.0	0	0.018	0.010	0.008	0.006	0.004	0.002	0.001	0.001
2007	91.0	0	0.024	0.007	0.007	0.005	0.004	0.002	0.001	0.000

Table 85: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Albion Park [(1)]/ Albion Park South [(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	87.7	0	0.055	0.027	0.025	0.018	0.012	0.005	0.001	0.000
1999[(1)]	90.5	0	0.033	0.025	0.024	0.017	0.013	0.005	0.001	0.000
2000[(1)]	94.2	0	0.042	0.032	0.030	0.024	0.017	0.008	0.001	0.000
2001[(1)]	93.7	0	0.034	0.027	0.024	0.018	0.013	0.008	0.001	0.000
2002[(1)]	57.4	0	0.029	0.027	0.026	0.022	0.016	0.006	0.001	0.000
2003[(1)]	93.7	0	0.035	0.025	0.021	0.015	0.012	0.005	0.001	0.000
2004[(1)]	92.9	0	0.034	0.029	0.026	0.017	0.013	0.006	0.001	0.000
2005[(1)]	4.8	0	0.032	0.031	0.031	0.030	0.028	0.006	0.001	0.000
2006[(2)]	86.7	0	0.038	0.027	0.024	0.018	0.011	0.004	0.001	0.000
2007[(2)]	83.1	0	0.038	0.032	0.030	0.018	0.013	0.005	0.001	0.000

Table 86: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Warrawong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	86.8	0	0.058	0.033	0.030	0.019	0.015	0.006	0.002	0.001
1999	89.2	0	0.051	0.036	0.027	0.019	0.013	0.006	0.002	0.001
2000	90.8	0	0.110	0.068	0.038	0.026	0.020	0.011	0.003	0.000
2001	93.1	0	0.162	0.065	0.055	0.042	0.027	0.012	0.003	0.000
2002	94.0	0	0.046	0.031	0.028	0.023	0.019	0.011	0.004	0.000
2003	93.7	0	0.063	0.048	0.040	0.020	0.016	0.009	0.002	0.000
2004	91.4	0	0.088	0.037	0.029	0.021	0.014	0.006	0.002	0.000
2005	91.8	0	0.070	0.032	0.025	0.019	0.014	0.007	0.002	0.000
2006	37.9	0	0.022	0.021	0.019	0.014	0.010	0.004	0.001	0.000
2007 [#]	0.0									

Station closed in April 2006.

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Table 87: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	91.3	0	0.033	0.027	0.022	0.017	0.013	0.007	0.004	0.002
1999	91.6	0	0.041	0.018	0.016	0.013	0.011	0.008	0.004	0.002
2000	94.3	0	0.031	0.025	0.021	0.017	0.014	0.009	0.005	0.003
2001	92.6	0	0.030	0.027	0.020	0.016	0.013	0.008	0.004	0.002
2002	91.1	0	0.039	0.030	0.025	0.019	0.015	0.009	0.005	0.002
2003	93.7	0	0.031	0.025	0.022	0.015	0.013	0.008	0.004	0.002
2004	92.8	0	0.053	0.022	0.018	0.014	0.011	0.006	0.003	0.001
2005	93.0	0	0.038	0.022	0.020	0.015	0.011	0.006	0.003	0.001
2006	94.5	0	0.035	0.019	0.018	0.015	0.012	0.007	0.004	0.001
2007	78.9	0	0.032	0.022	0.019	0.016	0.011	0.007	0.003	0.001

Table 88: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	72.6	0	0.037	0.035	0.028	0.019	0.015	0.009	0.005	0.002
2006	93.3	0	0.034	0.026	0.020	0.017	0.013	0.007	0.004	0.002
2007	44.5	0	0.043	0.028	0.025	0.021	0.014	0.008	0.005	0.003

Table 89: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	86.6	0	0.063	0.053	0.039	0.034	0.027	0.018	0.009	0.005
1999	80.4	0	0.074	0.042	0.041	0.033	0.024	0.014	0.009	0.004
2000	92.0	0	0.041	0.031	0.030	0.024	0.019	0.012	0.007	0.003
2001	86.9	0	0.049	0.035	0.030	0.025	0.021	0.013	0.008	0.003
2002	80.2	0	0.045	0.034	0.028	0.024	0.019	0.012	0.007	0.004
2003	90.3	0	0.047	0.032	0.028	0.021	0.016	0.011	0.006	0.003
2004	90.1	0	0.067	0.039	0.032	0.021	0.016	0.010	0.005	0.002
2005	93.4	0	0.048	0.032	0.026	0.021	0.016	0.009	0.005	0.002
2006	94.5	0	0.058	0.026	0.024	0.020	0.016	0.010	0.005	0.002
2007	83.9	0	0.039	0.031	0.027	0.022	0.018	0.010	0.005	0.002

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Table 90: Statistical summary for SO_2 - 24-hour average concentrations

Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	89.9	0	0.008	0.005	0.004	0.003	0.003	0.002	0.001	0.001
1999[(1)]	95.3	0	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2000[(1)]	84.2	0	0.004	0.003	0.003	0.003	0.002	0.001	0.001	0.000
2001[(1)]	98.1	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	0.001
2002[(1)]	96.4	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2003[(1)]	95.1	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2004[(1)]	40.4	0	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001
2005[#]	0.0									
2006[#]	0.0									
2007[(2)]	67.1	0	0.005	0.003	0.002	0.002	0.002	0.001	0.001	0.000

Station closed pending relocation.

Table 91: Statistical summary for SO_2 - 24-hour average concentrations

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	92.1	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000
1999	94.0	0	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.000
2000	94.8	0	0.004	0.002	0.001	0.001	0.001	0.001	0.000	0.000
2001	98.6	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2002	99.2	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2003	97.3	0	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.000
2004	94.8	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2005	95.3	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2006	95.3	0	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
2007	86.8	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000

Table 92: Statistical summary for SO_2 - 24-hour average concentrations

Station: Chullora

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	71.8	0	0.005	0.003	0.003	0.003	0.002	0.001	0.001	0.000
2006	98.4	0	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001
2007	89.3	0	0.004	0.004	0.003	0.002	0.002	0.001	0.001	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Table 93: Statistical summary for SO_2 - 24-hour average concentrations

Station: Macarthur

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	55.3	0	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000
2006	97.0	0	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000
2007	94.8	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000

Table 94: Statistical summary for SO_2 - 24-hour average concentrations

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	75.1	0	0.007	0.004	0.003	0.002	0.001	0.001	0.001	0.000
1999	95.6	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000
2000	89.3	0	0.004	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2001	88.8	0	0.010	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2002	97.5	0	0.004	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2003	97.0	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2004	92.9	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2005	96.7	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2006	95.9	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2007	94.8	0	0.004	0.002	0.002	0.001	0.001	0.000	0.000	0.000

Table 95: Statistical summary for SO_2 - 24-hour average concentrations

Station: Albion Park [(1)]/ Albion Park South [(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	94.0	0	0.014	0.010	0.008	0.004	0.003	0.001	0.000	0.000
1999[(1)]	98.6	0	0.009	0.008	0.006	0.004	0.003	0.001	0.000	0.000
2000[(1)]	98.1	0	0.014	0.009	0.008	0.006	0.004	0.002	0.000	0.000
2001[(1)]	98.1	0	0.013	0.008	0.007	0.005	0.003	0.002	0.000	0.000
2002[(1)]	60.0	0	0.009	0.008	0.007	0.006	0.004	0.001	0.000	0.000
2003[(1)]	98.9	0	0.009	0.007	0.005	0.004	0.003	0.001	0.000	0.000
2004[(1)]	97.0	0	0.009	0.007	0.006	0.004	0.003	0.001	0.000	0.000
2005[(1)]	4.9	0	0.011	0.009	0.009	0.007	0.006	0.001	0.000	0.000
2006[(2)]	89.3	0	0.010	0.008	0.007	0.004	0.003	0.001	0.000	0.000
2007[(2)]	84.1	0	0.013	0.010	0.008	0.004	0.003	0.001	0.000	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Table 96: Statistical summary for SO_2 - 24-hour average concentrations

Station: Warrawong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	92.6	0	0.011	0.007	0.005	0.004	0.003	0.001	0.000	0.000
1999	95.3	0	0.009	0.007	0.005	0.004	0.003	0.001	0.001	0.000
2000	93.7	0	0.010	0.007	0.006	0.004	0.003	0.002	0.000	0.000
2001	97.3	0	0.013	0.010	0.009	0.006	0.005	0.002	0.000	0.000
2002	98.6	0	0.009	0.006	0.006	0.005	0.003	0.002	0.001	0.000
2003	98.4	0	0.012	0.009	0.007	0.004	0.003	0.002	0.000	0.000
2004	95.4	0	0.012	0.006	0.006	0.004	0.003	0.001	0.000	0.000
2005	96.7	0	0.009	0.007	0.005	0.004	0.003	0.002	0.000	0.000
2006	39.2	0	0.007	0.006	0.004	0.003	0.002	0.001	0.000	0.000
2007 #	0.0									

Station closed in April 2006.

Table 97: Statistical summary for SO_2 - 24-hour average concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	97.3	0	0.009	0.005	0.005	0.004	0.003	0.002	0.001	0.001
1999	98.1	0	0.006	0.005	0.004	0.004	0.003	0.002	0.001	0.001
2000	99.2	0	0.008	0.006	0.005	0.004	0.003	0.002	0.001	0.001
2001	95.9	0	0.008	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2002	95.3	0	0.008	0.006	0.006	0.004	0.003	0.002	0.001	0.000
2003	98.4	0	0.006	0.005	0.004	0.003	0.003	0.001	0.001	0.000
2004	97.3	0	0.015	0.006	0.005	0.003	0.002	0.001	0.001	0.000
2005	97.5	0	0.006	0.005	0.004	0.003	0.002	0.001	0.001	0.000
2006	98.9	0	0.007	0.005	0.004	0.003	0.002	0.001	0.001	0.000
2007	79.5	0	0.008	0.006	0.004	0.003	0.002	0.002	0.001	0.000

Table 98: Statistical summary for SO_2 - 24-hour average concentrations

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	75.3	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2006	97.3	0	0.009	0.005	0.004	0.004	0.003	0.002	0.001	0.000
2007	45.8	0	0.012	0.008	0.006	0.004	0.003	0.002	0.001	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Table 99: Statistical summary for SO_2 - 24-hour average concentrations

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1998	91.0	0	0.016	0.014	0.010	0.008	0.006	0.004	0.002	0.002
1999	86.0	0	0.014	0.011	0.009	0.007	0.005	0.003	0.002	0.001
2000	94.5	0	0.010	0.009	0.007	0.006	0.004	0.003	0.002	0.001
2001	89.6	0	0.013	0.009	0.008	0.006	0.005	0.003	0.002	0.001
2002	82.2	0	0.012	0.007	0.007	0.005	0.004	0.003	0.002	0.001
2003	93.7	0	0.011	0.006	0.005	0.004	0.003	0.002	0.001	0.001
2004	92.9	0	0.014	0.007	0.006	0.004	0.003	0.002	0.001	0.001
2005	97.5	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2006	98.9	0	0.009	0.007	0.005	0.004	0.003	0.002	0.001	0.000
2007	83.6	0	0.007	0.006	0.006	0.004	0.004	0.002	0.001	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Particles as PM_{10}

Statistical summary

Table 100: Statistical summary for PM_{10} - 24-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	99.5	**50.4**	45.6	41.7	33.4	29.6	23.7	16.7	12.0
Chullora	97.5	**64.3**	39.1	37.2	33.7	29.7	23.2	19.0	13.3
Liverpool	95.6	**51.8**	40.2	38.9	35.2	29.8	23.7	17.7	12.9
Macarthur	96.4	**52.0**	38.0	35.0	29.6	25.5	19.8	14.8	10.3
Oakdale	97.0	48.2	35.3	30.8	24.7	22.2	16.3	11.3	7.2
Prospect	82.7	46.6	43.6	41.1	33.0	27.7	22.0	16.8	12.3
Richmond	98.4	44.2	35.0	33.1	27.6	23.7	18.3	13.5	10.0
Rozelle	97.5	**53.0**	37.6	35.9	30.0	26.9	21.8	17.2	13.0
Illawarra									
Albion Park South	88.5	**53.8**	39.4	37.0	32.4	27.8	20.7	13.7	8.6
Kembla Grange	99.5	**60.1**	49.9	45.7	38.4	32.9	24.3	17.6	11.9
Wollongong	95.3	**58.8**	47.6	41.6	37.1	31.9	24.6	18.4	13.0
Lower Hunter									
Beresfield	90.1	**62.0**	**53.0**	48.6	41.5	31.3	25.2	18.5	13.0
Newcastle	47.1	**58.2**	49.3	45.9	40.3	33.3	26.7	21.4	17.1
Regional									
Albury	91.2	**197.7**	**101.0**	**68.7**	43.1	31.0	22.0	15.2	11.2
Bathurst	95.1	**164.0**	45.1	38.8	32.5	26.6	19.2	13.6	9.1
Tamworth	73.7	48.9	35.5	34.0	30.0	25.9	19.7	14.4	10.2
Wagga Wagga	97.5	**105.3**	**78.3**	**72.4**	**60.3**	48.1	32.3	21.5	14.8

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Trend analysis

Table 101: Maximum 24-hour average concentrations for PM_{10} ($\mu g/m^3$)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Blacktown/Prospect*	**66.9**	37.4	36.2	**127.1**	**122.0**	**186.8**	42.6			46.6*
Bringelly	45.9	33.9	36.5	**99.4**	**120.2**	**274.7**	**60.3**	**53.9**	**72.0**	**50.4**
Chullora/Lidcombe*	38.7*	37.0*	**52.5***	**65.3***	**86.4***	**212.8**	**57.5**	49.7	**65.1**	**64.3**
Liverpool	45.7	46.0	**64.1**	**61.4**	**127.6**	**282.6**	**60.5**	**55.1**	**74.0**	**51.8**
Macarthur							**59.1**	**54.9**	**91.1**	**52.0**
Oakdale							41.3	42.6	**57.3**	48.2
Richmond	**55.6**	44.4	43.2	**119.9**	**126.4**	**194.3**	46.2	49.1	**60.9**	44.2
Rozelle						36.8	**51.4**	47.1	**52.2**	**53.0**
Illawarra										
Albion Park / Albion Park South*	**63.6**	48.7	**62.5**	**58.7**	**88.3**	**281.0**	**51.5**	41.8	**60.1***	**53.8***
Kembla Grange							**57.6**	**59.0**	**84.3**	**60.1**
Wollongong	**56.9**	40.2	**58.1**	**68.2**	**76.7**	**280.5**	48.1	**54.8**	**62.0**	**58.8**
Lower Hunter										
Beresfield	46.1	48.0	**53.6**	**81.0**	**166.4**	**88.0**	**55.7**	**53.2**	**51.7**	**62.0**
Newcastle							46.9	49.9	**51.1**	**58.2**
Regional										
Albury				28.8	**81.3**	**921.4**	**55.6**	**55.1**	**189.2**	**197.7**
Bathurst			35.2	35.6	**258.2**	**621.7**	**72.9**	44.9	**61.3**	**164.0**
Tamworth			21.1	34.6	**189.8**	**243.3**	**55.7**	**88.8**	48.0	48.9
Wagga Wagga				**69.8**	**178.2**	**837.0**	**105.9**	**163.1**	**172.9**	**105.3**

AAQ NEPM Standard – 50 $\mu g/m^3$ (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 102: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Blacktown[1]/Prospect[2]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998[1]	98.1	1	**66.9**	36.3	33.4	30.8	28.3	21.0	16.0	11.4
1999[1]	92.3	0	37.5	29.3	26.4	24.1	22.1	18.3	14.6	11.3
2000[1]	94.8	0	36.2	29.1	27.9	24.2	21.2	18.1	14.4	11.8
2001[1]	92.9	3	**127.1**	43.2	41.7	35.7	32.5	24.8	18.9	13.9
2002[1]	93.4	**11**	**122.0**	**82.4**	**64.5**	42.9	33.6	25.2	18.4	14.6
2003[1]	94.8	4	**186.8**	**52.7**	41.0	34.3	28.9	21.7	17.0	12.7
2004[1]	35.8	0	42.6	41.9	41.5	36.3	33.7	27.6	22.3	17.9
2005#										
2006#										
2007[2]	82.7	0	46.6	43.6	41.1	33.0	27.7	22.0	16.8	12.3

Station closed pending relocation.

Table 103: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	95.9	0	45.9	37.9	36.3	30.6	28.2	20.2	15.1	10.4
1999	85.5	0	33.9	29.3	27.0	24.3	22.2	18.0	14.2	11.0
2000	88.5	0	36.5	33.0	30.6	26.7	23.1	18.4	14.7	12.1
2001	96.7	5	**99.4**	**54.7**	33.6	27.3	24.4	20.2	16.2	12.6
2002	97.0	**12**	**120.2**	**73.6**	**64.4**	40.1	34.5	25.4	18.4	13.6
2003	97.0	5	**274.7**	**52.1**	40.1	33.9	28.8	21.4	16.6	12.1
2004	93.4	2	**60.3**	44.3	40.6	34.4	30.4	24.7	19.1	13.2
2005	91.8	2	**53.9**	44.3	42.5	35.6	30.3	23.8	18.2	13.8
2006	88.2	3	**72.0**	44.9	41.4	32.9	29.5	25.0	18.9	14.7
2007	99.5	1	**50.4**	45.6	41.7	33.4	29.6	23.7	16.7	12.0

Table 104: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Lidcombe[1] / Chullora[2]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998 [1]	100.0	0	38.7	32.5	30.8	28.1	23.2	17.8	13.1	10.0
1999 [1]	87.7	0	37.0	31.4	29.6	26.0	23.7	20.0	15.6	11.6
2000 [1]	94.3	1	**52.5**	38.5	34.1	29.5	25.4	20.2	16.2	12.4
2001 [1]	86.0	1	**65.3**	39.5	34.5	30.1	27.8	23.1	17.9	14.0
2002 [1]	30.7	3	**86.4**	**62.3**	47.2	35.5	29.7	20.8	16.0	13.9
2003 [2]	85.2	**10**	**212.8**	**59.6**	**55.3**	45.1	35.7	28.5	21.0	16.3
2004 [2]	90.4	2	**57.5**	48.4	45.6	38.5	33.7	27.4	21.1	16.2
2005 [2]	89.0	0	49.7	46.1	42.0	38.0	33.4	27.0	20.3	16.3
2006 [2]	97.3	4	**65.1**	43.5	37.9	34.7	30.9	26.5	21.3	16.5
2007 [2]	97.5	2	**64.3**	39.1	37.2	33.7	29.7	23.2	19.0	13.3

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 105: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	98.6	0	45.7	40.3	39.2	33.3	29.4	22.5	16.8	11.3
1999	97.3	0	46.0	34.8	32.1	27.9	24.3	20.4	15.9	11.4
2000	94.3	2	**64.1**	41.9	36.9	31.1	26.4	20.8	16.6	12.7
2001	95.3	2	**61.4**	37.1	34.9	30.2	28.2	22.6	18.2	13.3
2002	91.0	**13**	**127.6**	**76.0**	**68.5**	46.1	37.3	27.2	20.2	15.1
2003	90.1	**6**	**282.6**	**57.5**	43.9	37.0	32.5	25.5	19.6	14.8
2004	91.8	1	**60.5**	46.1	44.1	36.2	32.3	27.1	20.6	14.8
2005	96.4	2	**55.1**	45.9	43.7	36.2	32.4	26.3	20.0	15.1
2006	95.9	3	**74.0**	48.2	40.1	34.6	31.3	26.1	20.6	15.9
2007	95.6	1	**51.8**	40.2	38.9	35.2	29.8	23.7	17.7	12.9

Table 106: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Macarthur

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
2004	14.8	1	**59.1**	46.8	44.1	39.8	36.9	30.6	21.6	15.7
2005	83.8	1	**54.9**	45.3	42.4	36.0	30.5	24.6	18.2	13.6
2006	100.0	4	**91.1**	43.7	34.4	29.8	26.0	22.2	15.7	11.6
2007	96.4	1	**52.0**	38.0	35.0	29.6	25.5	19.8	14.8	10.3

Table 107: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Oakdale

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
2004	56.6	0	41.3	30.0	26.4	23.8	19.2	15.7	10.4	6.6
2005	92.9	0	42.6	36.9	32.1	27.3	22.2	16.8	12.3	8.4
2006	96.4	1	**57.3**	35.7	32.1	28.5	23.7	17.8	12.7	8.7
2007	97.0	0	48.2	35.3	30.8	24.7	22.2	16.3	11.3	7.2

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 108: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	74.8	1	**55.6**	40.0	35.2	31.4	26.4	18.5	13.6	9.4
1999	92.1	0	44.4	27.5	25.0	22.4	19.4	17.0	13.2	9.8
2000	95.4	0	43.2	33.1	30.8	25.4	23.0	17.7	13.9	10.9
2001	87.4	4	**119.9**	**61.3**	32.8	27.8	25.4	20.2	16.1	11.8
2002	94.2	**17**	**126.4**	**102.8**	**84.2**	49.1	34.9	24.5	17.1	12.2
2003	96.7	**7**	**194.3**	**66.3**	46.4	34.8	28.6	21.1	15.7	11.3
2004	96.2	0	46.2	39.9	37.6	33.5	29.7	22.6	17.5	12.2
2005	97.0	0	49.1	41.7	35.0	30.1	25.7	20.2	15.4	11.4
2006	97.0	3	**60.9**	43.5	37.2	30.8	26.9	21.4	15.9	12.0
2007	98.4	0	44.2	35.0	33.1	27.6	23.7	18.3	13.5	10.0

Table 109: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Rozelle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
2003	10.7	0	36.8	36.6	36.4	33.7	30.7	21.1	18.9	16.0
2004	92.6	1	**51.4**	42.1	39.4	33.1	30.2	24.9	19.3	13.9
2005	95.6	0	47.1	40.4	38.9	34.8	31.0	24.2	18.9	14.8
2006	94.0	1	**52.2**	40.6	37.2	33.3	29.4	24.7	19.3	15.4
2007	97.5	1	**53.0**	37.6	35.9	30.0	26.9	21.8	17.2	13.0

Table 110: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Albion Park [(1)]/ Albion Park South [(2)]

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998[(1)]	93.2	5	**63.6**	**56.6**	41.9	33.6	28.9	19.3	12.6	8.0
1999[(1)]	98.9	0	48.7	36.8	32.6	25.4	22.1	16.3	11.0	7.8
2000[(1)]	96.4	2	**62.5**	41.3	35.8	29.4	25.1	18.2	12.9	9.6
2001[(1)]	97.3	1	**58.7**	41.9	38.0	34.5	28.5	20.6	14.9	9.9
2002[(1)]	59.5	**6**	**88.3**	**65.1**	**53.1**	40.2	34.6	26.1	16.4	10.9
2003[(1)]	96.2	4	**281.0**	**50.2**	38.8	29.9	25.7	19.0	13.7	9.9
2004[(1)]	95.9	1	**51.5**	42.6	39.6	33.3	29.4	22.2	15.4	10.5
2005[(1)]	3.0	0	41.8	39.8	39.3	37.9	36.9	29.7	22.1	15.6
2006[(2)]	85.8	2	**60.1**	40.2	37.8	35.2	29.6	21.8	15.4	10.6
2007[(2)]	88.5	1	**53.8**	39.4	37.0	32.4	27.8	20.7	13.7	8.6

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 111: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Kembla Grange

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
2004	57.4	1	**57.6**	44.2	42.4	36.1	30.1	21.2	14.8	10.4
2005	97.8	4	**59.0**	49.4	45.7	38.6	33.1	23.2	17.2	12.2
2006	99.2	**9**	**84.3**	**61.6**	**52.2**	38.5	34.4	25.9	18.8	12.9
2007	99.5	3	**60.1**	49.9	45.7	38.4	32.9	24.3	17.6	11.9

Table 112: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	96.4	1	**56.9**	45.4	42.1	34.9	28.8	22.0	16.8	12.6
1999	96.4	0	40.2	35.4	32.9	28.4	25.4	20.2	15.8	12.4
2000	93.4	3	**58.1**	46.1	42.3	34.2	26.9	20.9	15.5	11.6
2001	97.5	4	**68.2**	48.0	42.6	36.7	31.3	22.6	16.5	12.2
2002	94.5	**9**	**76.7**	**61.9**	**53.0**	43.8	34.1	25.6	18.5	13.7
2003	97.8	**7**	**280.5**	**60.4**	46.7	34.3	28.6	21.5	16.7	12.4
2004	97.3	0	48.1	45.4	39.9	36.3	30.4	23.4	17.3	12.2
2005	97.3	1	**54.8**	44.0	41.3	35.4	30.0	23.5	16.7	12.7
2006	96.7	5	**62.0**	**52.1**	45.2	36.3	31.9	25.7	18.5	13.0
2007	95.3	3	**58.8**	47.6	41.6	37.1	31.9	24.6	18.4	13.0

Table 113: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Beresfield

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	99.7	0	46.1	37.5	36.1	33.1	28.8	23.3	17.1	11.9
1999	98.4	0	48.0	37.8	33.8	28.7	26.3	21.0	16.0	11.5
2000	90.4	1	**53.6**	43.1	38.3	33.8	27.1	20.5	16.2	12.8
2001	90.1	3	**81.0**	47.5	45.6	37.4	31.8	25.8	20.0	15.0
2002	82.5	**25**	**166.4**	**84.8**	**70.8**	**57.1**	47.3	33.4	21.5	16.0
2003	91.2	5	**88.0**	**53.5**	44.0	34.3	29.1	22.3	17.4	13.2
2004	87.2	1	**55.7**	47.5	43.1	38.3	33.2	24.7	19.3	13.9
2005	95.9	1	**53.2**	44.4	39.5	35.9	31.7	24.9	18.4	14.6
2006	96.4	2	**51.7**	44.8	41.8	37.0	33.5	26.9	19.1	14.7
2007	90.1	5	**62.0**	**53.0**	48.6	41.5	31.3	25.2	18.5	13.0

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 114: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
2004	19.4	0	46.9	46.0	44.6	37.3	33.3	26.6	21.9	17.1
2005	81.6	0	49.9	40.9	38.9	35.1	31.7	26.2	21.1	16.6
2006	97.3	1	**51.1**	40.8	36.7	33.9	31.2	25.7	20.2	15.8
2007	47.1	2	**58.2**	49.3	45.9	40.3	33.3	26.7	21.4	17.1

Table 115: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Albury

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
2001	31.8	0	28.8	26.1	25.3	21.8	20.2	16.8	12.2	9.4
2002	86.6	5	**81.3**	**59.0**	45.1	38.3	31.5	22.9	16.0	12.8
2003	80.8	**28**	**921.4**	**215.0**	**190.8**	**91.3**	48.4	22.7	13.9	9.7
2004	76.8	2	**55.6**	41.9	41.1	36.9	32.5	18.5	13.1	9.9
2005	90.4	3	**55.1**	46.6	39.6	35.9	30.9	20.1	14.4	10.8
2006	87.9	**15**	**189.2**	**105.3**	**73.4**	47.2	34.4	24.0	17.8	13.1
2007	91.2	**11**	**197.7**	**101.0**	**68.7**	43.1	31.0	22.0	15.2	11.2

Table 116: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Bathurst

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
2000	32.5	0	35.2	33.6	32.4	27.6	22.4	17.7	12.2	8.9
2001	30.1	0	35.6	35.3	35.0	31.3	27.5	22.7	16.5	12.3
2002	91.8	**15**	**258.2**	**83.6**	**68.8**	45.7	35.2	25.0	16.6	12.5
2003	90.4	**12**	**621.7**	**103.4**	**75.0**	34.4	26.8	17.0	12.8	8.8
2004	88.5	4	**72.9**	49.9	46.1	37.9	33.3	24.2	15.3	9.7
2005	93.2	0	44.9	38.3	36.6	30.5	25.2	18.3	12.8	8.8
2006	98.6	2	**61.3**	45.5	43.8	34.4	28.4	21.9	15.2	11.3
2007	95.1	2	**164.0**	45.1	38.8	32.5	26.6	19.2	13.6	9.1

AAQ NEPM Standard – 50 $\mu g/m^3$ (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 117: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Tamworth

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
2000	21.0	0	21.1	20.6	20.4	19.0	18.1	15.0	11.5	8.5
2001	97.3	0	34.6	25.7	24.1	22.6	20.0	16.5	13.0	9.9
2002	99.2	**9**	**189.8**	**66.2**	**51.2**	40.9	33.6	23.4	17.4	13.1
2003	92.9	**7**	**243.3**	**54.5**	48.0	34.3	25.8	19.7	15.0	11.4
2004	79.5	2	**55.7**	42.3	40.1	34.6	31.0	24.6	19.5	15.3
2005	68.2	2	**88.8**	34.7	33.1	30.1	26.6	20.3	14.7	10.6
2006	79.2	0	48.0	38.7	32.0	29.2	26.8	21.3	15.1	11.0
2007	73.7	0	48.9	35.5	34.0	30.0	25.9	19.7	14.4	10.2

Table 118: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Wagga Wagga

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
2001	31.2	2	**69.8**	45.4	37.5	31.9	28.7	22.5	16.7	12.4
2002	99.2	**35**	**178.2**	**121.6**	**94.9**	**60.6**	49.3	33.3	24.6	16.9
2003	87.4	**22**	**837.0**	**129.7**	**91.4**	**55.5**	43.0	29.1	19.0	12.5
2004	91.0	**28**	**105.9**	**69.7**	**68.4**	**60.0**	47.5	32.8	21.3	13.9
2005	90.7	**28**	**163.1**	**77.8**	**67.8**	**57.0**	46.3	30.5	19.8	14.2
2006	95.6	**36**	**172.9**	**111.5**	**83.7**	**59.6**	**50.2**	36.8	25.1	16.4
2007	97.5	**34**	**105.3**	**78.3**	**72.4**	**60.3**	48.1	32.3	21.5	14.8

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Assessment of progress towards achieving the goal

The air quality management programs and strategies put in place by the NSW Government are directed at protecting ambient air quality and public health. The Ambient Air Quality NEPM goal provides additional impetus for the implementation of these strategies and a benchmark against which programs to manage the air environment can be assessed.

Framework for Air Quality Management in the Sydney Greater Metropolitan Region

The NSW State Plan released in November 2006 includes Priority E3: Cleaner Air and Progress on Greenhouse Gas Reductions, with a target for air of meeting the national air quality goals under the Ambient Air Quality NEPM. Under the State Plan, lead agencies for each priority are required to work with partner agencies to develop and implement plans to deliver on each priority. The Department of Environment and Climate Change (DECC) is the lead agency on the air and greenhouse priority. The bringing together of different NSW Government priorities within the State Plan highlights the importance of actions that have multiple benefits, such as actions that reduce both air and greenhouse emissions and promote active transport and healthier lifestyles.

Action for Air, the NSW Government's Air Quality Management Plan for Sydney, the Lower Hunter and the Illawarra, sets out a program of measures that target the pollutants of most concern in the region – ground level ozone in summer and particles. The plan covers strategies designed to reduce emissions from industry, motor vehicles and domestic/commercial sources.

The following outlines the key mechanisms for managing ozone and particles.

Motor Vehicle and Motor Vehicle Fuels

Motor vehicle emissions are the major source of ozone precursors in the Sydney region, making up 71% of Oxides of Nitrogen (NOx) emissions and 38% of Volatile Organic Compound (VOC) emissions. In the Greater Metropolitan Region (GMR), motor vehicles are the source of 30% of NOx and 38% of VOC emissions, with industry making a more significant contribution to NOx emissions in the GMR (60%).

NSW Cleaner Vehicles and Fuels Strategy

a) Vapour recovery at service stations

Vapour recovery stage 1 (VR1) captures VOC emissions from underground storage tanks as they are filled by road tankers. Vapour recovery stage 2 (VR2) captures and recycles the VOCs that would otherwise be emitted during refuelling of vehicles at the bowser.

In November 2007 the NSW Government announced its intention to expand vapour recovery at service stations in the NSW GMR by requiring the fitment of VR2 technology at service stations in Sydney, Newcastle, Wollongong and the Central Coast regions, and expanding the geographic area where service stations are required to install VR1. VR1 will be extended to include the remainder of the Sydney region, plus the Lower Hunter, Illawarra and Central Coast regions. The proposed expansion of vapour recovery in the NSW GMR will reduce VOC emissions by over 5000 tonnes per year.

b) Low Volatility Petrol

NSW introduced a regulation to limit petrol volatility from the 2004/05 summer. The regulation is estimated to reduce motor vehicle VOC emissions in the GMR by around 3,000 tonnes every year over the summer period. A volatility limit of 62 kilopascals (average) applies in the GMR and is currently being reviewed to examine the possibility of lower limits.

c) Diesel Retrofit Program

The NSW Diesel Retrofit program was established in 2005 with a pilot project to improve the emissions performance of in-service diesel vehicles by fitting emission reduction devices to their exhausts to reduce particle emissions. The trial assessed the feasibility, costs and benefits of implementing diesel retrofit, as the basis for designing a broader program. The demonstration of the technology continued in 2006-07 with funding from the Diesel NEPM and funding negotiated from Caltex for failing to meet the Commonwealth Fuel Quality Standards on time. By the end of 2007, 200 vehicles have been retrofitted at no cost to vehicle owners.

The NSW Government has also committed $4 million to retrofitting over 500 Sydney buses operated by the State Transit Authority. The total funding of $6 million for the Diesel Retrofit program will reduce particle emissions by almost 80 tonnes and avoid approximately $19 million in future health costs. The next stage of the program is to seek a co-funding contribution from vehicle owners for the retrofit.

d) Government leading by example

The NSW Government's vehicle fleet is one of the largest in the country, containing about 25,000 vehicles. Actions taken to improve the environmental performance of the fleet have a major impact on emissions and a flow-on effect for NSW when the vehicles are sold. There are a range of programs for vehicles in government and private sector fleets, to maximise the benefits from improved vehicle standards, encourage early uptake of cleaner vehicles, and encourage better maintenance of and lower emissions from vehicles.

Under the Cleaner NSW Government Fleet Initiative, government agencies have performance targets that will see a 20% reduction in greenhouse gas emissions and a 20% improvement in overall environmental scores. 505 new low-emission buses will save over 190 tonnes per year of greenhouse gases, 7.2 tonnes per year of particles and over 170 tonnes per year of NOx. The Cleaner NSW Government Fleet initiative will save costs and reduce greenhouse gas emissions by over 55,000 tonnes over three years through increased fuel efficiency.

e) National Fuel Standards

The effective operation of the more advanced emission control technology required to meet the more stringent emissions standards depends upon the availability of fuel of an appropriate quality. The Commonwealth Government has enacted the Fuel Quality Standards Act 2000 and under this legislation has established environmental standards for petrol and diesel covering a comprehensive range of parameters which affect vehicle emissions performance.

In combination, it is expected that the new vehicle emissions and fuel standards will achieve significant emission reductions. For example in Sydney from 2002 to 2020 emissions of VOCs from the motor vehicles fleet are forecast to fall by 46%, NOx by 67%, CO by 75% and PM_{10} by 40%, though these reductions will be realised only if in-service motor vehicles perform to their design standards.

f) Smoky vehicle program

The DECC operates the Smoky Vehicle Program that identifies vehicles that emit visible smoke continuously for more than 10 seconds. Around 240 reports of smoky vehicles are received from the public each month indicating a high level of awareness in the community. Around 90 warning letters and 40 penalty infringement notices are issued per month.

Licensed Industry

Industrial emissions are a relatively small proportion of total emissions of NOx and VOCs in the Sydney region, at 15% and 11% respectively. The situation changes somewhat when considering the Greater Metropolitan Region (GMR), with industry responsible for 60% of NOx and 10% of VOC emissions. Industry emissions make up a greater proportion of particle emissions, namely 37% for the Sydney region and 62% for the GMR.

Controls on emissions to air from industrial sources are in place under NSW EPA licensing arrangements for scheduled facilities under the Protection of the Environment Operations Act. The Protection of the Environment (Clean Air) Regulation provides the regulatory framework for this licensing and specifies never-to-be exceeded concentration limits for air pollutants.

The Regulation was reviewed in 2004–05 and changes arising from the review were incorporated by amendment into the Protection of the Environment Operations (Clean Air) Regulation in 2005. These include more stringent air pollution standards for future industry, equipment that undergoes major modification, and equipment which is replaced in the Greater Metropolitan Region; phased retirement from 2008 to 2012 of standards that apply to older industry; and additional standards for air toxics when non-standard fuels are used. The phased retirement of older standards is a two-stage process and reviews the suitability of old emission standards and their ability to protect human health and the environment. The first stage of the retirement of older limits is currently underway.

In 1999 load based licensing was introduced, which retains licence specific limits but links licence fees to the amount of pollution discharged thus providing a financial incentive for licensees to achieve discharges below the required minimum performance. In the GMR, the load fee for emissions of NOx and VOCs is higher because of the sensitivity of this region and to provide greater incentive to reduce pollution. The fees for NOx and VOCs were further increased in 2007 in the Sydney basin area during summer months to provide a stronger incentive to reduce emissions of these precursors to ozone. Under the load based licensing scheme emitters can avoid fee increases by reducing the amount they pollute or by entering binding commitments to achieve improvements within four years. It is a market based approach designed to change the behaviour of industry by placing a financial cost on their emissions.

Small industrial, commercial and domestic sources

Trends in population growth and economic development are expected to increase the significance of small commercial and domestic sources of emissions as a proportion of total emissions, particularly VOCs. These industries are generally service oriented and include the following: surface coating, mobile asphalt plants, service stations, printers and dry cleaners.

The domestic sector is also a contributor to VOC emissions. Household sources include petrol lawnmowers, garden tools, solvents and paints and solid wood heaters.

In combination these “area sources” are responsible for 40% of VOC emissions in the Sydney region and 39% of VOC emissions in the GMR as a whole.

NSW has held discussions with the Commonwealth and other jurisdictions and is leading a working group to develop a national approach on reducing emissions from products such as paints and solvents.

Under the Protection of the Environment Operations Act 1997 local councils have the principal responsibility for managing emissions from commercial and domestic premises. The NSW Government has developed capacity building programs for local government, including the Air Quality Toolkit completed in 2006 and associated training for local government.

Emissions from domestic solid fuel heaters are being addressed through national initiatives to improve solid fuel heater design standards. In 2006 NSW introduced an offence under the Protection of the Environment Operations Act relating to excessive smoke emissions from residential chimneys, which local councils have authority to enforce. Local councils also have powers to manage the installation of domestic solid fuel heaters. During 2007 and 2008 DECC has been conducting woodsmoke reduction workshops for council officers as part of its ongoing commitment to help councils address local woodsmoke issues.

Conclusions

Air quality is addressed as a priority under the NSW State Plan, released in 2006. The target under the State Plan's Clean Air Priority is to meet the national air quality goals as identified in the Ambient Air Quality NEPM.

The data presented in this report demonstrate that during 2007 NSW achieved compliance with the Ambient Air Quality NEPM goals for carbon monoxide, nitrogen dioxide, sulfur dioxide and lead. Levels of these pollutants continue to be well below Ambient Air Quality NEPM standards. During 2007, NSW failed to comply with the Ambient Air Quality NEPM goals for ozone in Sydney and for fine particles (as PM_{10}) in Albury and Wagga Wagga.

Meeting the Ambient Air Quality NEPM goal for ozone will be a challenge for the major urban areas of NSW given pressures from a growing population, urban expansion and increase in motor vehicle use. However, NSW has a broad range of strategies to reduce precursor pollutants in place and being developed under *Action for Air*. These include the requirement for Stage 1 vapour controls at service stations in Sydney, mandatory limits for petrol volatility in summer and the NSW Cleaner Vehicles Action Plan as well as initiatives to assist local councils to manage precursor emissions from smaller, commercial/industrial sources and domestic sources. A regulatory framework, which restricts emissions from larger industry through licence limits and load-based fees, is in place. The regulations limiting industrial emissions were reviewed and strengthened in 2005. These measures, together with stricter motor vehicle emission standards, tighter fuel regulations, NSW Diesel NEPM programs and new actions brought forward under the NSW State Plan and *Action for Air* Review will help move NSW towards meeting the NEPM goal for ozone in the longer term.

The continued severe drought conditions experienced across south-east Australia during 2006 and extending into January 2007, have contributed to elevated fine particle levels. Even discounting bushfire and dust storm events, meeting the goal of the Ambient Air Quality NEPM for particles, measured as PM_{10}, presents a challenge for NSW. *Action for Air* includes a broad range of strategies for managing particle emissions (both PM_{10} and $PM_{2.5}$) across mobile, industry and domestic sources. These include: national vehicle emission and fuel quality standards and actions under the Diesel National Environment Protection Measure which requires jurisdictions to assess the impact of emissions from in service diesel vehicles and where necessary to implement programs to reduce them. NSW programs include the Smoky Vehicle Enforcement program; particle emissions limits for industrial combustion processes under the Protection of the Environment (Clean Air) Regulation; environmental Impact Assessment processes for new developments; and emission limits for particles from solid fuel heaters.

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Appendix A: Ambient Air Quality NEPM Monitoring in NSW

NSW Air Quality Monitoring Plan (AQMP)

Under the Ambient Air Quality NEPM, jurisdictions were required to prepare a Monitoring Plan to meet the monitoring requirements detailed in the Ambient Air Quality NEPM. The approved NSW Ambient Air Quality NEPM monitoring plan outlines the monitoring network for each of the required pollutants and is available on the Department of Environment and Climate Change website *http://www.environment.nsw.gov.au/air/nepm/index.htm*

The NSW Ambient Air Quality NEPM Monitoring Plan was approved as consistent with the Ambient Air Quality NEPM by NEPC on 29 June 2001.

Since the submission of the AQMP to NEPC operational constraints have necessitated the closure of a number of air quality monitoring stations that were designated for NEPM reporting. A review of the AQMP is currently occurring.

The Sydney region

The population of the Sydney region requires at least seven monitoring stations according to the formula in clause 14(1) of the Ambient Air Quality NEPM. Monitoring stations have been selected for the region to ensure that there is adequate coverage of the population, and that the network will capture the higher concentrations.

In the Sydney region there are currently six trend stations, two performance stations, and one campaign station. Each sub-region contains two trend stations that characterise general air quality and also frequently record individual pollutant events. This approach ensures that there is adequate coverage of the populated areas and of the broad differences in pollutant distribution within the region. The choice of stations in each region was made to optimise both population coverage and representation of the occurrences of higher pollutant concentration.

Trend stations are located in the northwest at Prospect and Richmond, in the southwest at Bringelly and Macarthur, and in the east at Chullora and Rozelle. These stations provide a good geographic spread throughout the region and capture a range of the high concentration events. However to supplement the trend monitoring network additional stations are needed to capture particular events. High concentrations of ozone are frequently recorded at Oakdale. This station is on the edge of the Sydney basin in a sparsely populated area, however ozone concentrations in this region are an important measure of progress to achieving the goal of the Ambient Air Quality NEPM.

Campaign monitoring will be undertaken in the Central Coast, in the northern part of the Sydney region. The outcome of this monitoring will determine whether there is a need to establish a trend station in this area. Installation of this monitoring station has been delayed and no final installation date has been set.

The trend station at Lidcombe was closed due to construction activity in May 2002. A new station was established nearby at Chullora in December 2002. Trend data are reported for both stations. The trend station at Wooloowaare and the performance station in the CBD were closed in August 2004.

The monitoring network for the Sydney region is shown in Figure A1 and summarised in Table A1, which lists all stations noting the parameters measured at each.

Table A1: Sydney region Ambient Air Quality NEPM monitoring network

Station	Station type (1)	Number of parameters	Ozone	Nitrogen dioxide	PM_{10}	Carbon monoxide	Sulfur dioxide
Bringelly	T	4	X	X	X		X
Central Coast (2)	C	4	X	X	X		X
Chullora (3)	T	5	X	X	X	X	X
Liverpool (4)	C	5	X	X	X	X	
Macarthur	T	5	X	X	X	X	X
Oakdale	P	2	X		X		
Prospect	T	5	X	X	X	X	X
Richmond	T	4	X	X	X		X
Rozelle	T	4	X	X	X	X	
St Marys	P	1	X				

(1) P denotes performance; T denotes trend; C denotes campaign.

(2) To be established.

(3) Replaced the Lidcombe trend station.

(4) Data from the Liverpool station will be reported at least until the Macarthur station is fully established.

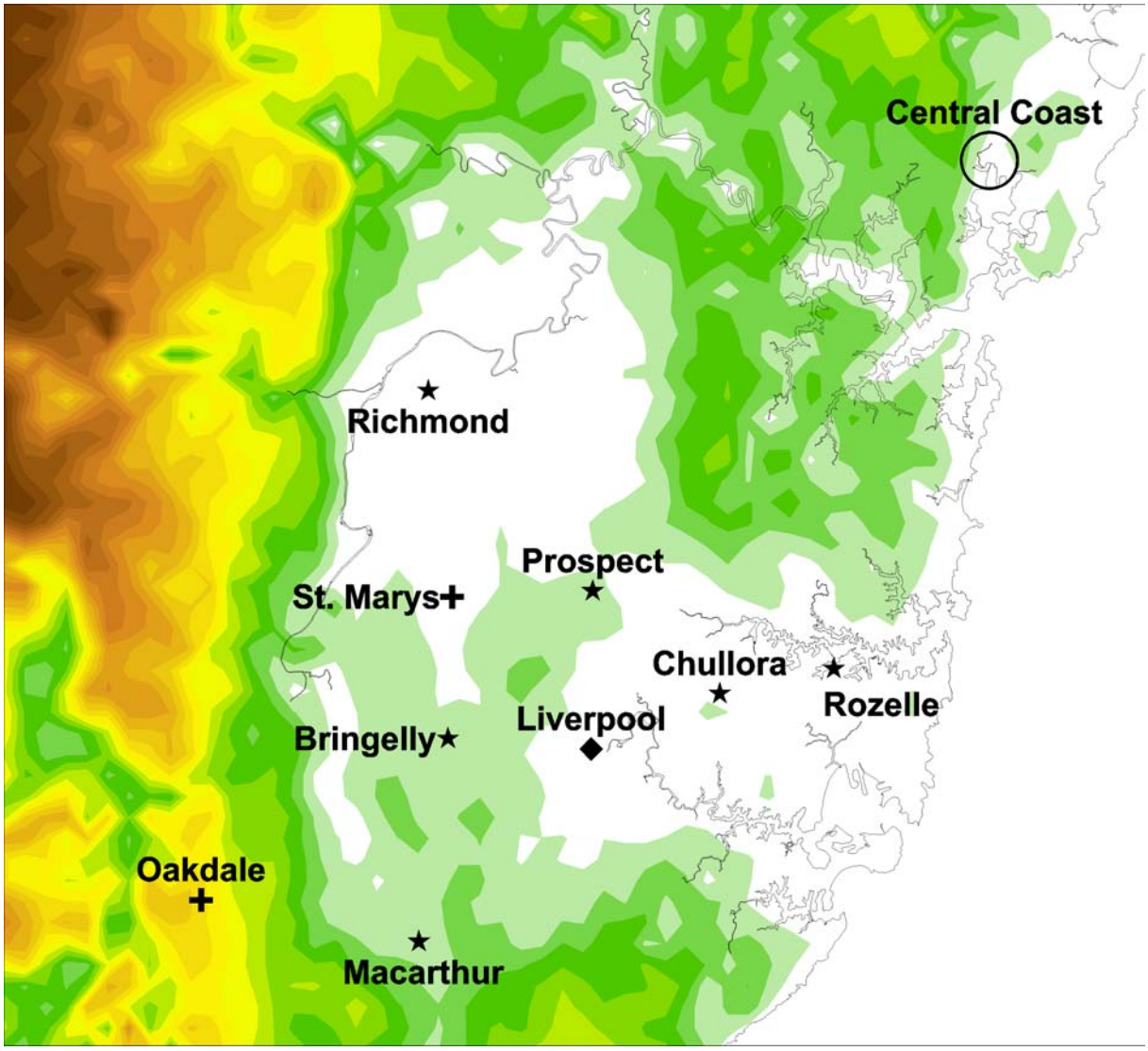


Figure A1: Ambient Air Quality NEPM Monitoring in the Sydney region (AMG co-ordinates)

★ trend station; ✚ performance station; ◆ campaign station; ○ proposed station;

The Lower Hunter region

The population criterion of section 14(2) of the Ambient Air Quality NEPM requires at least two monitoring sites in the Lower Hunter region. The region contains two major population centres, Newcastle and Maitland. Current monitoring has focussed on Newcastle and its environs. The installation of the planned trend station in the Maitland area has been delayed. Until this site is established, data from the existing stations at Wallsend and Beresfield will be reported. Together these stations characterise the general air quality to which the urban population of the Lower Hunter is exposed.

The monitoring network for the Lower Hunter is shown in Figure A2 and summarised in Table A2, which notes the parameters to be reported from each station.

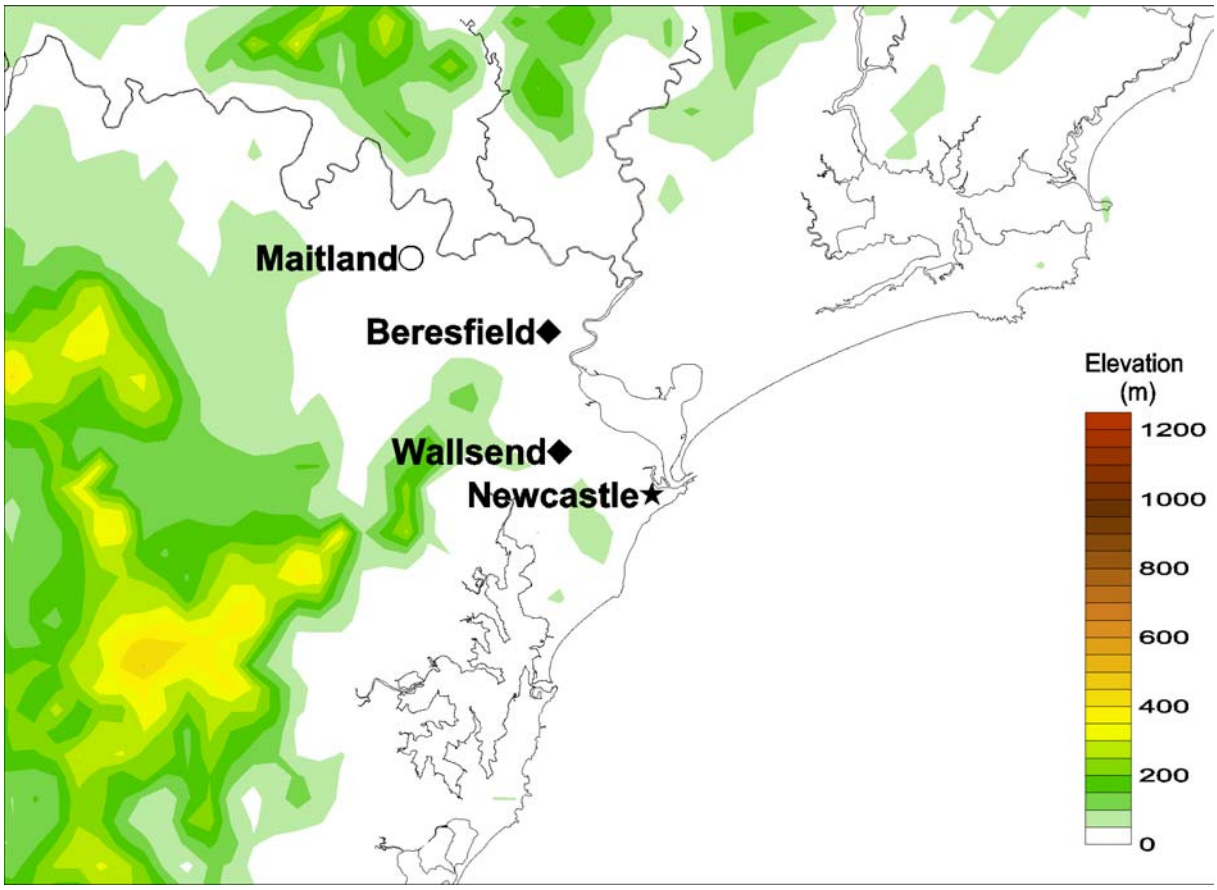


Figure A2: Ambient Air Quality NEPM Monitoring in the Lower Hunter region

★ trend station; ◆ campaign station; ○ proposed station;

Table A2: Lower Hunter region Ambient Air Quality NEPM monitoring network

Station	Station Type (1)	Number of parameters	Ozone	Nitrogen dioxide	PM_{10}	Carbon monoxide	Sulfur dioxide
Newcastle	T	5	X	X	X	X	X
Maitland (2)	T	4	X	X	X		X
Beresfield (3)	C	1			X		
Wallsend (3)	C	3	X	X			X

(1) P denotes performance; T denotes trend, C denotes campaign.

(2) Station to be established.

(3) Data from Beresfield and Wallsend will be reported at least until the Maitland station is established.

The Illawarra region

In the Illawarra, the presence of industrial sources in the region, the occurrence of emissions transport from Sydney, and the complexity of the region together result in a need for a greater monitoring effort than that indicated purely on the basis of population. Accordingly, the general air quality to which the urban population is exposed will be characterised by monitoring all pollutants of interest at the trend station at Wollongong and the performance station at Albion Park. An additional station represents the local conditions at Kembla Grange. The Warrawong station was closed in April 2006.

Ambient Air Quality NEPM screening guidelines allow for carbon monoxide to be monitored at fewer stations. Carbon monoxide is monitored only at the Wollongong trend station.

The monitoring network for the Illawarra Region is shown in Figure A3 and summarised in Table A3, which notes the parameters to be reported from each station.

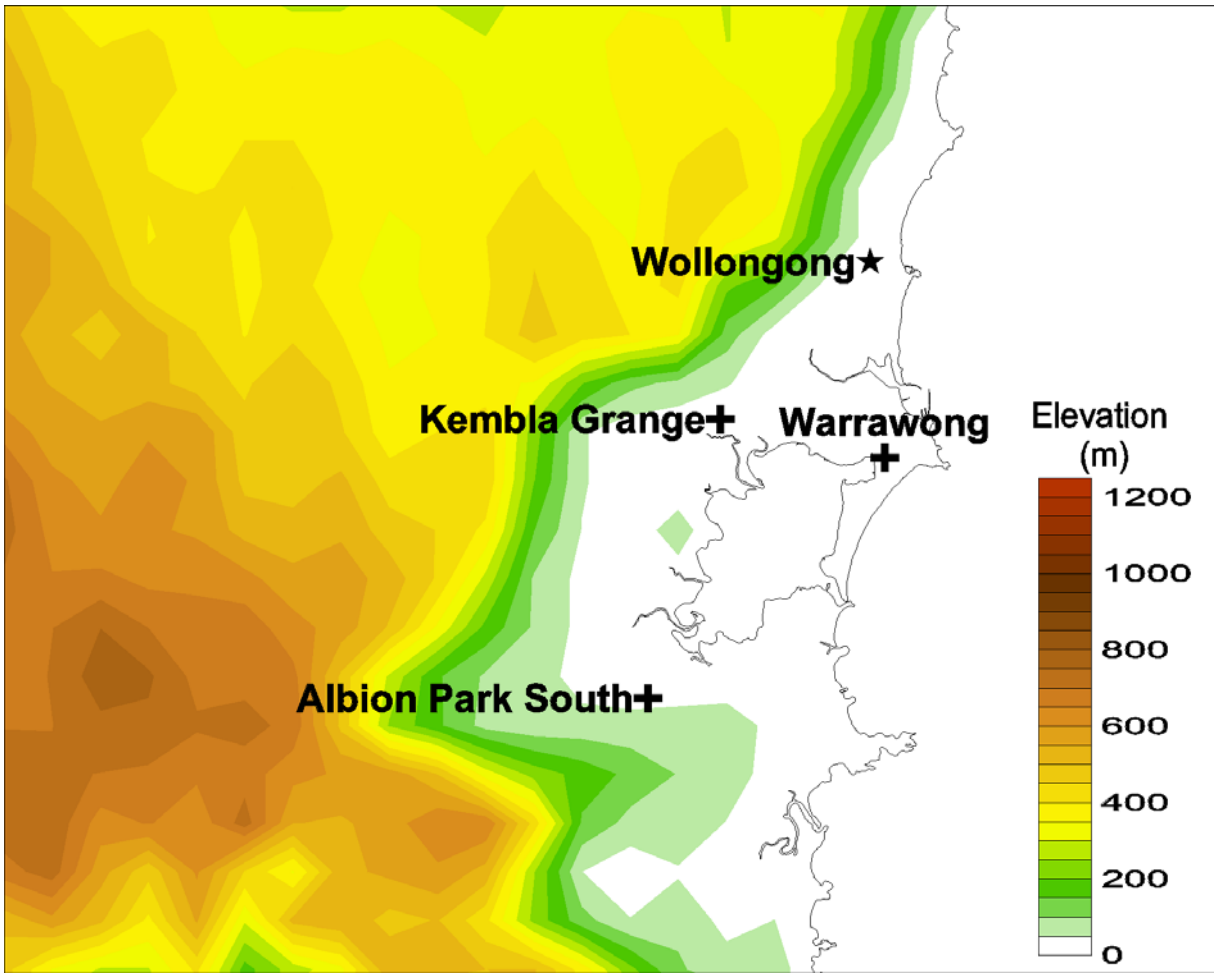


Figure A3: Ambient Air Quality NEPM Monitoring in the Illawarra region

★ trend station; ✚ performance station;

Table A3: Illawarra region Ambient Air Quality NEPM monitoring network

Station	Station type (1)	Number of parameters	Ozone	Nitrogen dioxide	PM_{10}	Carbon monoxide	Sulfur dioxide
Albion Park South	P	4	X	X	X		X
Kembla Grange	P	2	X		X		
Warrawong (2)	P	1					X
Wollongong	T	5	X	X	X	X	X

(1) P denotes performance; T denotes trend; C denotes campaign.

(2) Closed in April 2006.

Other regions

The NSW Ambient Air Quality NEPM Monitoring Plan provides for monitoring at several regional centres of NSW. Ambient Air Quality NEPM screening guidelines allow for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide and lead not to be monitored at these rural population centres.

Several regional centres are located on the tablelands where smoke from wood fires may be of concern during winter. As there is the potential for exceedences of the Ambient Air Quality NEPM goal for particles, the DECC has begun campaign monitoring at Albury, Bathurst, Tamworth and Wagga Wagga. On completion of these campaigns the data will be evaluated against the screening procedures. A decision will be made whether it is necessary to establish further campaign stations at Dubbo, Lismore, and Orange as originally proposed.

Table A4: Rural NSW Ambient Air Quality NEPM monitoring network

Station	Station type (1)	Number of parameters	PM_{10}
Albury	C	1	X
Bathurst	C	1	X
Dubbo (2)	C	1	X
Lismore (2)	C	1	X
Orange (2)	C	1	X
Tamworth	C	1	X
Wagga Wagga	C	1	X

(1) C denotes campaign monitoring.

(2) Monitoring subject to results from initial campaign monitoring.

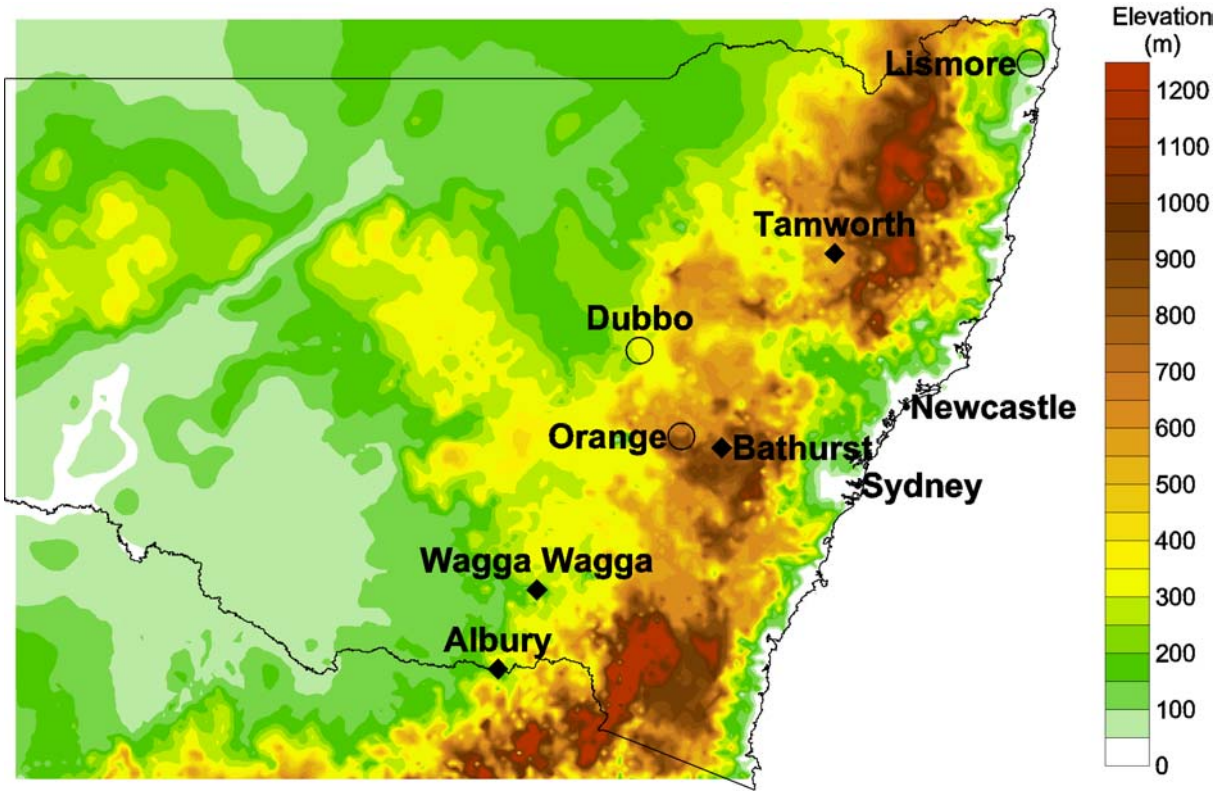


Figure A4: Ambient Air Quality NEPM Monitoring in rural New South Wales

◆ campaign station; ○ proposed station;

Station siting and exposure

All stations within the network meet all of the Ambient Air Quality NEPM siting and exposure criteria with the exceptions of Liverpool, Rozelle, Tamworth, and Wagga Wagga.

Table A5: Stations not complying with all siting and exposure criteria

Station	Siting criteria not met	Comments
Liverpool	Clear sky angle <120°.	Trees have grown since establishment of station.
Rozelle	Clear sky angle <120°. Less than 20m from trees.	Trees have grown since establishment of station.
Tamworth	Less than 20m from trees.	Best location in urban area specifically targeted for monitoring.
Wagga Wagga	Less than 20m from trees.	Street trees within about 15 m of station

Population exposure

Under the NSW Ambient Air Quality NEPM Monitoring Plan, monitoring stations have been distributed to provide a reasonable coverage of the population while capturing the spatial variability of pollution events. The monitoring network covers a population of about 4 million in the greater metropolitan area of the Sydney, Lower Hunter and Illawarra regions. The current monitoring in regional NSW covers an additional population of about 140 000. Information about the characteristics of individual monitoring stations and exposed population is given in the NSW Monitoring Plan, available on the DECC website *http://www.environment.nsw.gov.au/air/nepm/index.htm*

Table A6: Population exposure

Station	Exposed population
Sydney Region	
Bringelly	Trend station in a rural area in the southwest of the Sydney basin.
Chullora	Trend station in a mixed residential and commercial area. Replaced the Lidcombe trend station, which had operated since 1970.
Macarthur	Trend station representing residential areas in the southwest of the Sydney basin.
Oakdale	Rural area on the SW edge of the Sydney basin - upper bound station for ozone.
Prospect	Trend station in a largely residential area in the northwest sub-region.
Richmond	Trend station representing the residential area in the north of the Hawkesbury basin.
Rozelle	Trend station within the Parramatta River valley. Existing long-term station.
St Marys	Upper bound station for ozone in a residential area.
Central Coast (1)	Trend station representing residential areas of the Central Coast.
Lower Hunter	
Beresfield	Campaign station in a semi-rural area used as a proxy for the Maitland station.
Maitland (2)	Trend station representing residential area.
Newcastle	Trend station within the main population centre.
Wallsend	Campaign station in a residential area used as a proxy for the yet-to-be-established Maitland station.
Illawarra	
Albion Park South	Performance station in a semi-rural area in the south of the region.
Kembla Grange	Upper bound station in a residential area to the west of Lake Illawarra.
Warrawong	Upper bound station in an industrial-residential area.
Wollongong	Trend station in the main population/commercial centre.
Rural Population centres	
Tamworth	Rural township campaign station established 2000.
Bathurst	Rural township campaign station established 2000.
Wagga Wagga	Rural township campaign station established 2001.
Albury	Rural township campaign station established 2000.
Dubbo (3)	Rural township campaign station.
Orange (3)	Rural township campaign station.
Lismore (3)	Rural township campaign station.

(1) Station to be established.

(2) Station to be established. Data reported from Beresfield and Wallsend in the interim.

(3) Future campaign stations are subject to evaluation of initial campaign monitoring.

Pollutant screening criteria

Clause 14(2) of NEPM allows for fewer performance monitoring stations where it can be demonstrated that pollutant levels are reasonably expected to be consistently lower than the NEPM standards. These screening criteria have been used for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and lead, at several regions in NSW. More detailed information regarding screening of pollutants for specific regions is given in the NSW Monitoring Plan, available on the DECC website *http://www.environment.nsw.gov.au/air/nepm/index.htm*

Monitoring methods

The NSW network is comprised of instruments that are in accordance with the relevant Australian standard. It will be noted that, in the case of PM_{10}, the Tapered Element Oscillating Microbalance (TEOM) method is used for NEPM monitoring and reporting. PM_{10} data from the TEOM are presented as measured and unadjusted.

Table A7: Instruments used in NSW for NEPM monitoring

Pollutant	Standard	Title	Method used
Carbon monoxide	AS3580.7.1-1992	Ambient Air - Determination of Carbon Monoxide - Direct Reading Instrument Method	Gas Filter Correlation / Non Dispersive Infra-Red
Nitrogen dioxide	AS3580.5.1-1993	Ambient Air - Determination of Oxides of Nitrogen - Chemiluminescence Method	Gas Phase Chemi-luminescence
Photochemical oxidant (ozone)	AS3580.6.1-1990	Ambient Air - Determination of Ozone - Direct Reading Instrument Method	Non Dispersive Ultra-violet
Sulfur dioxide	AS3580.4.1-1990	Ambient Air - Determination of Sulfur Dioxide - Direct Reading Instrument Method	Pulsed Fluorescence
Lead	AS2800-1985	Ambient Air - Determination of Particulate Lead-High Volume Sampler - Gravimetric Method	Atomic Absorption
Particles as PM_{10}	AS 3580.9.8-2001	Determination of Suspended particulate matter - PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser.	Tapered Element Oscillating Microbalance (TEOM)

NATA accreditation

As required under Clause 12 of the Ambient Air Quality NEPM, the DECC is accredited by the National Association of Testing Authorities (NATA) for the measurement of all Ambient Air Quality NEPM parameters. The biennial reassessment of the Air Quality Monitoring Laboratory and associated monitoring stations by NATA was completed in early 2007 and accreditation has been continued.

Appendix B: Fine particles as $PM_{2.5}$

In May 2003 NEPC announced a variation to the Ambient Air Quality NEPM. The purpose of the Variation was to include in the Ambient Air Quality NEPM, Advisory Reporting Standards (ARS) for particles as $PM_{2.5}$ and protocols for monitoring and reporting $PM_{2.5}$. The standards introduced are 25µg/m^3 for a daily (24-hour) average, and 8µg/m^3 for an annual average.

Below are presented data measuring particles as $PM_{2.5}$ from NSW during 2007. Also included are historical trend data from 1998 onwards (where available).

$PM_{2.5}$ monitoring

The advisory reporting standard requires $PM_{2.5}$ monitoring to be conducted at NEPM performance monitoring stations that have been specified for particles as PM_{10}. At present PM_{10} and $PM_{2.5}$ monitoring is performed concurrently at five of the eighteen stations currently specified as NEPM monitoring stations for PM_{10} - Chullora, Liverpool, Richmond, Beresfield and Wollongong. PM_{10} and $PM_{2.5}$ monitoring is also performed at the Earlwood and Wallsend stations which are not designated as NEPM monitoring stations for PM_{10}.

The DECC has operated Tapered Element Oscillating Microbalance (TEOM) continuous fine particle monitors sampling $PM_{2.5}$ since 1996. Currently there is no Australian standard method for monitoring $PM_{2.5}$ using TEOM. The advisory reporting standard allows the use of TEOM monitors for $PM_{2.5}$ measurement, although it is stated that values obtained from this method "cannot be used for comparison with the advisory reporting standards until the outcomes of the $PM_{2.5}$ Equivalence Program have been formally included in the Principal Measure." This report only presents data obtained by TEOM monitors. These data are compared to the advisory reporting standard purely for **interest only**.

$PM_{2.5}$ Equivalence Program

In the absence of an Australian Standard method for $PM_{2.5}$ monitoring the variation to the Ambient Air Quality NEPM identifies the need for consistent data collection. The *Technical Paper on monitoring of particles for PM2.5* provides advice on $PM_{2.5}$ monitoring and proposes an equivalence program to assess the accuracy of and precision of $PM_{2.5}$ measurement methods with regard to the USEPA Federal Reference Method.

The DECC is contributing to this program by running co-located $PM_{2.5}$ samplers at the Chullora and Richmond monitoring stations. Alongside the PARTISOL and RAAS FRMs these stations operate instruments using a number of measurement techniques such as BAM, TEOM and TEOM/FDMS. Only data from the TEOM monitors are reported here.

The TEOM $PM_{2.5}$ monitors used by the DECC have been operated along similar lines to the TEOM PM_{10} monitors and in accordance with *AS3580.9.8 (Determination of suspended particulate matter - PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser)*. The internal software of the TEOM is configured to make linear adjustments of mass measurement. For PM_{10} the adjustment is based on empirical results designed to achieve comparable results to the USEPA PM_{10} reference methods. This adjustment is of the form:

$$Y = A + Bx$$

For PM_{10} : $A = 3.0$, $B = 1.03$

Historically all TEOM monitors used by the DECC have used this adjustment, including when the instruments are used for $PM_{2.5}$ measurements. At the commencement of the $PM_{2.5}$ equivalence program the TEOM monitors at Chullora and Richmond were configured such that the coefficients for linear adjustments were A=0 and B=1. TEOM monitors at other stations operate using the PM_{10} coefficients. After the results of the equivalence program are finalised data from all TEOM instruments will be adjusted with the appropriate coefficients.

In this report only data that is scaled (A=3, B=1.03) is presented. Data from the Chullora and Richmond stations will be made available when the results of the Equivalence Program are released.

Station siting, exposure and population exposure

Figure B1 shows the location of the $PM_{2.5}$ monitoring stations in NSW. *Table B2* gives a brief description of the stations where $PM_{2.5}$ monitoring is conducted.

The Beresfield, Chullora, Richmond, Wallsend and Wollongong stations meet all of the Ambient Air Quality NEPM siting and exposure criteria. The Earlwood and Liverpool stations do not meet these criteria. Particulars of non-compliance with siting criteria for each of these stations are given below in *Table B1*.

Information about the characteristics of individual monitoring stations and exposed population are given in the NSW Monitoring Plan, available on the DECC website *http://www.environment.nsw.gov.au/air/nepm/index.htm*

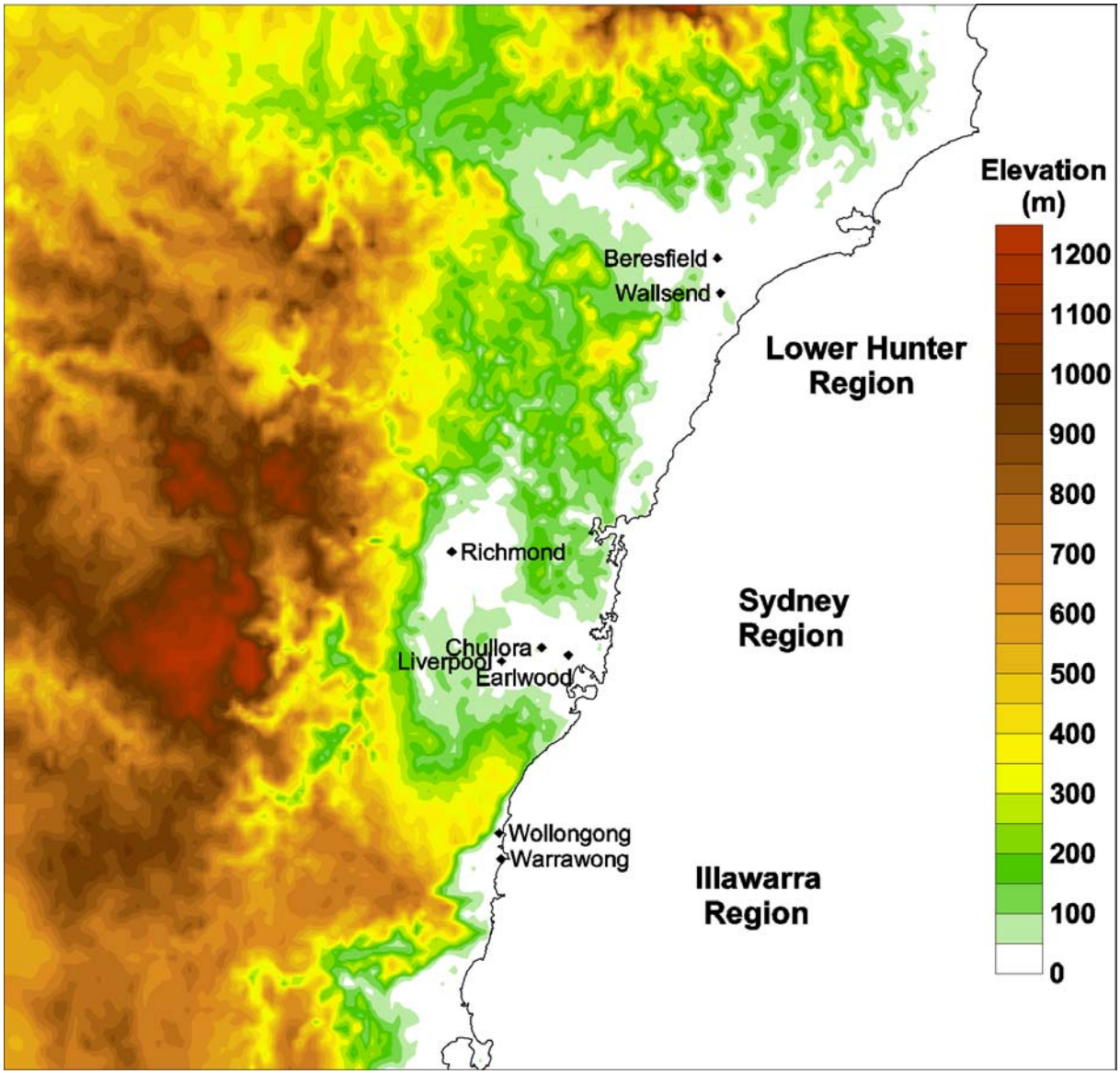
Table B1: Stations not complying with all siting and exposure criteria

Station	Siting criteria not met	Comments
Earlwood	Clear sky angle <120°. Less than 20m from trees.	Trees have grown since establishment of station.
Liverpool	Clear sky angle <120°.	Trees have grown since establishment of station.

Table B2: Population exposure

Station	Exposed population
Sydney Region	
Chullora	Trend station in a mixed residential and commercial area. Replaced the Lidcombe trend station, which had operated since 1970.
Earlwood	Non-NEPM station in a residential area within the Cooks River valley.
Liverpool	Campaign station in an urban area of SW Sydney.
Richmond	Trend station representing the residential area in the north of the Hawkesbury basin.
Lower Hunter	
Beresfield	Performance station in a semi-rural area used as a proxy for the Maitland station.
Wallsend	Non-NEPM (for PM_{10}) station in a residential area.
Illawarra	
Wollongong	Trend station in the main population/commercial centre.

Figure B1: $PM_{2.5}$ monitoring in NSW



Warrawong monitoring station closed in April 2006.

Data analysis

The variation to the Ambient Air Quality NEPM (2003) states that values obtained using the TEOM method for $PM_{2.5}$ "cannot be used for comparison with the advisory reporting standards until the outcomes of the $PM_{2.5}$ Equivalence Program have been formally included in the Principal Measure."

This report only presents data obtained by TEOM monitors. These data are compared to the advisory reporting standard for $PM_{2.5}$ purely for interest.

Table B3: Summary of $PM_{2.5}$ concentrations in NSW (2007)

Advisory Reporting Standard
25 µg/m^3 (24-hour average)
8 µg/m^3 (Annual average)

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of Exceed-ences (days)	Annual mean (µg/m^3)
	Q1	Q2	Q3	Q4	Annual		
Sydney							
Earlwood	94.4	100.0	97.8	94.6	96.7	0	**9.1**
Liverpool	97.8	97.8	88.0	96.7	95.1	1	**10.4**
Illawarra							
Wollongong	100.0	97.8	98.9	96.7	98.4	1	**9.1**
Lower Hunter							
Beresfield	97.8	92.3	68.5	85.9	86.0	1	**9.5**
Wallsend	96.7	90.1	90.2	92.4	92.3	0	**9.0**

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

In 2007, all regions in NSW exceeded the AAQ NEPM 24 hour and annual average advisory reporting standard for $PM_{2.5}$. Readings in excess of the 24-hour reporting standard were recorded at Liverpool, Wollongong and Beresfield. All monitoring stations failed to comply with the annual average advisory reporting goal. Liverpool recorded the highest annual average of 10.4µg/m^3.

Table B4: Summary for $PM_{2.5}$ – Maximum 24-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Earlwood	96.7	353	23.2	21-Apr	21.5	20-Apr
Liverpool	95.1	347	**27.0**	21-Apr	24.6	20-Apr
Illawarra						
Wollongong	98.4	359	**26.3**	20-Apr	23.1	21-Apr
Lower Hunter						
Beresfield	86.0	314	**26.2**	03-Oct	21.2	22-Jan
Wallsend	92.3	337	21.9	03-Oct	19.4	22-Jan

AAQ NEPM advisory reporting standard – 25 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table B5: Days when $PM_{2.5}$ 24-hour Ambient Air Quality NEPM standard exceeded

Date	Stations where standard exceeded	Comments(#)
20-Apr-2007	Wollongong	
21-Apr-2007	Liverpool	
03-Oct-2007	Beresfield	

Table B6: Statistical summary for $PM_{2.5}$ - Daily 24-hour average concentrations (2007)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Earlwood	96.7	23.2	19.7	18.7	15.3	13.8	11.1	8.4	6.3
Liverpool	95.1	**27.0**	22.2	21.6	18.5	15.6	12.6	9.8	7.4
Illawarra									
Wollongong	98.4	**26.3**	22.0	19.7	16.5	14.3	10.8	8.3	6.3
Lower Hunter									
Beresfield	86.0	**26.2**	20.0	19.1	17.3	14.6	11.5	8.8	6.6
Wallsend	92.3	21.9	18.5	17.8	15.8	13.3	10.6	8.2	6.4

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Trend data

Annual averages and annual maximum 24-hour averages for all stations are given below.

Table B7: Maximum 24-hour average concentrations for $PM_{2.5}$ (µg/m^3)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Earlwood	**33.4**	**27.6**	**35.4**	**81.7**	**56.1**	**39.4**	24.4	**31.2**	**33.1**	23.2
Liverpool	**26.5**	**25.4**	**45.1**	**118.6**	**89.2**	**50.1**	**41.8**	**34.9**	**51.5**	**27.0**
Illawarra										
Warrawong	**27.0**	19.9	**32.6**	23.2	**89.6**	**160.3**	**26.8**	**27.4**	18.6	
Wollongong	18.8	19.4	**31.1**	**53.4**	**93.8**	**112.5**	**26.7**	**25.2**	**30.7**	**26.3**
Lower Hunter										
Beresfield	18.5	21.4	**34.1**	**66.4**	**50.4**	**40.9**	**31.7**	22.1	**29.6**	**26.2**
Wallsend	**38.1**	21.9	**61.5**	**56.4**	**59.6**	**34.1**	**26.9**	21.3	**30.5**	21.9

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Table B8: Annual average concentrations for $PM_{2.5}$ (µg/m^3)

Region/ Performance monitoring Station	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sydney										
Earlwood	**10.3**	**10.2**	**10.3**	**11.6**	**12.8**	**11.0**	**10.8**	**10.3**	**10.1**	**9.1**
Liverpool	**10.1**	**9.6**	**10.4**	**11.8**	**15.2**	**13.6**	**12.5**	**11.6**	**12.2**	**10.4**
Illawarra										
Warrawong	**8.8**	**8.3**	**9.1**	**9.9**	**12.7**	**12.0**	**11.4**	**10.6**	**9.2**	
Wollongong	7.7	8.0	**8.3**	**9.4**	**11.5**	**10.5**	**9.8**	**9.5**	**9.5**	**9.1**
Lower Hunter										
Beresfield	**8.2**	**8.8**	**8.8**	**12.4**	**13.6**	**9.4**	**11.0**	**10.0**	**10.0**	**9.5**
Wallsend	**8.5**	**8.0**	**8.4**	**10.2**	**11.3**	**9.8**	**9.9**	**9.7**	**9.6**	**9.0**

AAQ NEPM advisory reporting standard - 8µg/m^3 (annual average)

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table B9: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Earlwood

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	95.6	**7**	**33.4**	**25.8**	24.4	19.0	16.9	12.7	9.0	6.9
1999	93.4	**4**	**27.6**	**25.2**	21.1	18.4	16.2	12.7	9.1	6.9
2000	84.7	**3**	**35.4**	21.6	19.9	18.2	16.8	12.1	9.3	7.2
2001	93.7	**8**	**81.7**	**50.2**	**25.1**	20.6	18.1	13.1	9.7	7.6
2002	98.9	**15**	**56.1**	**51.1**	**29.3**	23.6	20.7	15.2	10.9	8.1
2003	98.6	**9**	**39.4**	**30.5**	**26.5**	19.6	17.3	12.9	9.6	7.5
2004	96.2	0	24.4	22.2	21.3	18.6	16.5	13.3	10.0	7.5
2005	98.9	**2**	**31.2**	23.6	22.4	17.4	15.6	12.4	9.3	7.5
2006	98.6	**3**	**33.1**	19.6	18.5	16.6	14.9	11.7	9.6	7.5
2007	96.7	0	23.2	19.7	18.7	15.3	13.8	11.1	8.4	6.3

Table B10: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	85.5	1	**26.5**	22.3	21.2	19.2	17.0	12.7	9.6	6.4
1999	98.6	1	**25.4**	20.1	18.6	17.1	14.8	12.1	9.0	6.8
2000	97.8	**5**	**45.1**	**25.3**	22.7	17.7	15.3	12.1	9.5	7.4
2001	97.8	**6**	**118.6**	**53.1**	21.9	19.4	17.1	13.4	10.2	7.6
2002	96.7	**39**	**89.2**	**44.4**	**39.3**	**29.8**	**25.3**	17.9	12.9	9.4
2003	65.5	**12**	**50.1**	**37.3**	**30.3**	24.6	20.6	16.6	12.2	9.6
2004	85.0	**10**	**41.8**	**29.2**	**25.8**	20.8	19.3	15.1	11.7	8.5
2005	91.0	**7**	**34.9**	**27.5**	23.9	20.7	18.3	14.3	10.7	8.1
2006	98.6	**3**	**51.5**	24.1	21.3	19.3	17.4	14.1	11.5	9.0
2007	95.1	1	**27.0**	22.2	21.6	18.5	15.6	12.6	9.8	7.4

AAQ NEPM advisory reporting standard - 25$\mu g/m^3$ (24-hour average)

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table B11: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Warrawong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	97.3	1	**27.0**	20.3	19.2	17.0	13.2	10.5	8.1	6.2
1999	97.5	0	19.9	16.2	15.6	14.0	12.6	9.6	7.8	6.2
2000	97.5	**3**	**32.6**	20.6	18.7	15.3	13.3	10.5	8.3	6.7
2001	94.2	0	23.2	21.5	20.6	17.6	15.1	12.0	8.9	6.7
2002	96.7	**18**	**89.6**	**40.3**	**31.4**	24.4	21.1	15.2	10.5	8.0
2003	98.4	**8**	**160.3**	**27.3**	24.9	20.6	17.6	14.1	10.5	8.1
2004	94.0	**2**	**26.8**	23.6	22.1	20.7	17.9	14.2	10.4	8.0
2005	94.8	**3**	**27.4**	23.3	21.6	19.1	16.5	13.0	9.7	7.5
2006	40.5	0	18.6	17.8	16.9	15.4	13.7	11.3	9.1	6.4
2007 #	0.0									

Station closed in April 2006.

Table B12: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	83.6	0	18.8	16.4	14.8	12.6	11.4	9.1	7.3	5.7
1999	98.6	0	19.4	16.1	14.9	12.5	11.4	9.3	7.5	6.1
2000	100.0	1	**31.1**	18.9	17.2	15.1	12.4	9.6	7.6	6.2
2001	96.2	**2**	**53.4**	20.6	19.3	17.0	14.9	11.0	8.2	6.4
2002	95.9	**18**	**93.8**	**40.2**	**30.1**	24.5	18.4	13.5	9.3	7.2
2003	96.7	**7**	**112.5**	**32.4**	23.6	18.3	15.9	11.9	9.3	7.2
2004	97.3	**2**	**26.7**	21.7	20.6	16.9	15.8	12.2	9.1	6.7
2005	97.8	1	**25.2**	21.1	19.3	16.5	15.4	11.2	8.7	6.9
2006	100.0	**2**	**30.7**	19.7	17.7	15.8	14.3	11.6	8.9	6.7
2007	98.4	1	**26.3**	22.0	19.7	16.5	14.3	10.8	8.3	6.3

Table B13: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Beresfield

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	81.9	0	18.5	16.3	15.6	14.1	12.8	10.1	7.8	5.7
1999	95.9	0	21.4	17.6	17.0	15.7	13.7	10.8	8.0	6.2
2000	85.2	**2**	**34.1**	22.5	19.7	15.4	13.4	10.1	7.8	6.4
2001	69.0	**9**	**66.4**	**33.1**	**25.5**	21.1	18.9	15.0	11.3	8.3
2002	95.1	**26**	**50.4**	**45.6**	**39.8**	**29.3**	21.4	15.8	11.3	8.8
2003	90.7	**5**	**40.9**	**27.4**	22.4	16.6	14.1	10.8	8.2	6.2
2004	90.2	1	**31.7**	23.6	23.0	19.9	16.5	12.9	10.3	7.8
2005	93.7	0	22.1	20.7	19.5	18.4	15.7	12.0	9.1	7.2
2006	98.9	**2**	**29.6**	19.4	18.3	16.7	14.5	11.7	9.0	7.4
2007	86.0	1	**26.2**	20.0	19.1	17.3	14.6	11.5	8.8	6.6

AAQ NEPM advisory reporting standard - 25$\mu g/m^3$ (24-hour average)

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table B14: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m3)	Percentiles (ug/m3)						
				99th	98th	95th	90th	75th	50th	25th
1998	95.6	1	**38.1**	17.5	16.9	15.4	13.6	10.4	7.9	5.9
1999	88.8	0	21.9	15.0	14.0	12.7	11.6	9.5	7.6	5.9
2000	88.5	1	**61.5**	17.4	15.7	14.5	13.1	9.8	7.3	6.1
2001	94.8	**7**	**56.4**	**30.1**	23.8	18.1	15.5	11.6	8.6	7.1
2002	85.8	**13**	**59.6**	**37.0**	**31.5**	22.8	17.3	12.9	9.3	7.3
2003	88.5	**3**	**34.1**	24.9	20.8	16.4	14.7	11.7	8.8	7.0
2004	87.4	1	**26.9**	20.1	18.3	16.4	14.3	11.6	9.0	7.3
2005	95.9	0	21.3	19.6	18.8	16.4	14.3	11.5	9.0	7.2
2006	99.2	**2**	**30.5**	18.7	17.5	15.6	13.8	11.2	9.0	7.2
2007	92.3	0	21.9	18.5	17.8	15.8	13.3	10.6	8.2	6.4

AAQ NEPM advisory reporting standard - 25μg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Appendix C: Calculating data availability

Throughout this report data availability rates are presented as either percentages of available data, or as days available. These two rates are calculated using different methods. When presented as a percentage, the value is the number of averaging periods where data is valid, divided by the total number of averaging periods in the year. When presented as number of valid days, this value represents the number of days during the year when at least seventy-five percent of averaging periods during the day are valid.

For example the carbon monoxide standard is based on eight hour rolling averages. A valid hour (the end point of an eight hour average) is the average, over the preceding eight hours, of the valid one-hour averages, when at least six of those hours hold valid data. A valid day has at least eighteen valid hours. If we hypothesize that on each day throughout the year we had *exactly* eighteen valid hours, then annual data availability would be seventy-five percent. The number of valid days would be 365.

For the gaseous pollutants, carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide, the NSW DECC undertakes daily an automated instrument calibration check. This occurs during the early hours of the morning, and sample data obtained during the calibration check is considered as invalid data. Hence for these pollutants the maximum number of valid one-hour averages in a day is twenty-three. All calculations for data availability given in this report *include* the invalid calibration hour (i.e. calculations assume that there are twenty-four *possible* valid hours in a day). Therefore for these pollutants the maximum that the annual one-hour data availability can be is 95.8 %.

For a pollutant that is reported against more than one standard, data availability rates may not be the same for each standard. For instance when measuring ozone, one hour of each day is lost during instrument calibration checks. This affects the data availability rates when reporting against the one hour standard but does not affect data availability rates when reporting against the four hour standard. The maximum data availability rates are thus 95.8% and 100% respectively.

For compliance reporting on standards with averaging periods less than twenty-four hours, peak daily values are given regardless of the number of valid hours in that day. For reporting of statistics, such as percentiles of daily maxima, on standards with averaging periods less than twenty-four hours, only days that have at least seventy-five percent of valid hours are used.