

**NATIONAL ENVIRONMENT PROTECTION  
(AMBIENT AIR QUALITY) MEASURE**

**NEW SOUTH WALES  
ANNUAL COMPLIANCE REPORT  
2012**



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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
EPA	Environment Protection Authority
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 <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Oxides of nitrogen
O <sub>3</sub>	Ozone
OEH	Office of Environment and Heritage (NSW)
Pb	Lead
PM <sub>2.5</sub>	Particulate Matter with aerodynamic diameter of 2.5 microns or less
PM <sub>10</sub>	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 <sub>2</sub>	Sulfur dioxide
TEOM	Tapered Element Oscillating Microbalance
USEPA	United States Environmental Protection Agency
µg/m <sup>3</sup>	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 – compounds that vaporise, that is become a gas, at normal atmospheric temperatures

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## Overview

This report, required under clause 18 of the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM), presents the results of air quality monitoring in New South Wales for the 2012 calendar year and assesses them against the requirements of the AAQ NEPM. These data are also routinely available on the NSW Office of Environment and Heritage (OEH) public website (<http://www.environment.nsw.gov.au/AQMS/search.htm>).

The AAQ NEPM establishes:

- requirements for monitoring air quality,
- air quality standards that are levels of specified pollutants against which air quality can be assessed,
- a goal that the air quality standards are met by 2008 to the extent specified in the NEPM. Recognizing that certain events can impact on air quality, the NEPM specifies a maximum number of days on which it is permissible to exceed the standard.

Monitoring in the AAQ NEPM monitoring network (a sub-set of OEH's total ambient air quality monitoring network) was performed in accordance with the New South Wales AAQ Monitoring Plan, AAQ NEPM Technical Papers and OEH's NATA accreditation.

Ambient air quality monitoring at the designated NEPM monitoring stations in NSW during 2012 showed no exceedences of the AAQ NEPM standards for carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>). Monitoring for lead ceased in 2004 due to extremely low ambient concentrations.

Exceedences of the AAQ NEPM standards *only* occurred for:

- 4-hour ozone in Sydney on 1 calendar day, at two south west Sydney sites, co-incident with the first significant heat wave recorded during the spring season.
- 24-hour particles (as PM<sub>10</sub>) throughout the network for a total of 11 calendar days, with 6 days attributed to hazard reduction burns and bushfires, and 3 to regional scale dust events.

Fine particles (as PM<sub>2.5</sub>) in 2012 were measured largely using the non-adjusted continuous TEOM data. However, a staged replacement of TEOM with BAM was also undertaken throughout the year. Concentrations in excess of the 24-hour advisory reporting standard for PM<sub>2.5</sub> was recorded on two days at Richmond during hazard reduction burns. Concentration in excess of the 1-year PM<sub>2.5</sub> advisory reporting standard was recorded at Liverpool, which was one of the first sites within the network to be equipped with a BAM. The BAM method treats samples differently to TEOM; it is understood that the less harsh heating by BAM enables the measurement of volatile components adsorbed onto particulates.

In 2012, NSW again felt the influence of La Nina and had several significant rain and flooding events and thunderstorms. The state wide average rainfall (261 mm) exceeded the historical average (171 mm) and was one of the wettest on record for New South Wales. Summer 2011-12 was the coldest for NSW since 1983-4, and had the 4<sup>th</sup> coldest mean temperature since records began in 1950. These weather conditions helped to keep the number of exceedences of the PM<sub>10</sub> particle standard as well as the 1-hour and 4-hour ozone standards in NSW to a low level.

## Section A – Monitoring summary

### Current AAQ NEPM Monitoring network

The NSW Ambient Air Quality NEPM Monitoring Plan<sup>1</sup> 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, which contain over 60% of the NSW population. Campaign monitoring is also performed at a number of rural population centers.

The AAQ NEPM monitoring network is only part of an overall 40-station air monitoring network operated by the Office of Environment and Heritage (OEH). The AAQ NEPM 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 concentrations.

The NSW OEH characterises the air quality to which the general population is exposed in a region by monitoring all air pollutants of interest at 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 are monitored to ensure that all major pollutant events are captured and reported (*performance* stations). *Campaign monitoring* is also undertaken in regional centres at Albury, Wagga Wagga North, Bathurst and Tamworth.

In total, the AAQ NEPM network in NSW currently monitors pollutants at 23 stations – the majority of pollutants at 8 *trend* stations (T), selected individual pollutants at 5 additional *performance* stations (P), and selected pollutants on a *campaign* basis at a further 10 stations (C) in Sydney, Central coast, the Lower Hunter and provincial cities (see Table 1 and Figures 1 and 2).

In addition, the NSW OEH also maintains a number of air quality monitoring stations that are not designated for NEPM reporting, and some stations designated as 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<sub>10</sub> are also measured at this station. Data from stations designated as non-NEPM stations for a particular pollutant are not presented in this report.

### New sites and site closures

Two additional sites were established during 2012 – one at Wyong on the NSW central coast in September and another at Camden in the south-west region of Sydney in October.

The Macarthur site was shut down in July 2012 due to redevelopment of the area for housing and moved approximately 1 km to the north-east, to a site in Campbelltown TAFE designated as Campbelltown West. Monitoring at the new Campbelltown West site commenced in August 2012.

Although not part of the AAQ NEPM network, the Industry-funded *Upper Hunter Air Quality Monitoring Network* was completed in February 2012. The final network configuration consists of sites at Singleton, Muswellbrook, Singleton North West, Muswellbrook North West, Camberwell, Wybong, Merriwa, Maison Dieu, Aberdeen, Bulga, Mount Thorley, Singleton South, Jerrys Plains and Warkworth. Data from this network are currently published separately and not included in this report.

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<sup>1</sup> See details on the OEH site here: <http://www.environment.nsw.gov.au/air/nepm/index.htm>

**Table 1: NSW Ambient Air Quality NEPM monitoring network**

Station	Station type <sup>(1)</sup>	Year established	Number of parameters	Ozone	Nitrogen dioxide	PM <sub>10</sub>	PM <sub>2.5</sub>	Carbon monoxide	Sulfur dioxide
<b>Sydney</b>									
Blacktown <sup>(6)</sup>	T	1992 – 2004	5	X	X	X		X	X
Bringelly	T	1992	4	X	X	X			X
Chullora <sup>(3) (8)</sup>	T	2003	6	X	X	X	X	X	X
Earlwood	C	1998	1				X		
Liverpool	C	1990	5	X	X	X	X	X	
Macarthur	T	2003-2012	5	X	X	X		X	X
Campbelltown West	T	2012	5	X	X	X		X	X
Camden <sup>(2)</sup>	P	2012	5	X	X	X	X	X	
Oakdale	P	1996	2	X		X			
Prospect <sup>(6)</sup>	T	2007	5	X	X	X		X	X
Richmond <sup>(8)</sup>	T	1992	5	X	X	X	X		X
Rozelle	T	1978	4	X	X	X		X	
St Marys	P	1992	1	X					
<b>Central Coast</b>									
Wyong <sup>(2)</sup>	C	2012	6	X	X	X	X	X	X
<b>Lower Hunter</b>									
Newcastle	T	1992	5	X	X	X		X	X
Maitland <sup>(9)</sup>	T	To be established	4	X	X	X			X
Beresfield <sup>(4)</sup>	C	1993	2			X	X		
Wallsend <sup>(4)</sup>	C	1992	4	X	X		X		X
<b>Illawarra</b>									
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	P	1993 - 2006	1						X
Wollongong	T	1993	6	X	X	X	X	X	X
<b>Regional NSW</b>									
Albury	C	2000	1			X			
Bathurst <sup>(7)</sup>	C	2000	2	X		X			
Dubbo <sup>(5)</sup>	C	Dependent on campaign monitoring results	1			X			
Lismore <sup>(5)</sup>	C		1			X			
Orange <sup>(5)</sup>	C		1			X			
Tamworth	C	2000	1			X			
Wagga Wagga	C	2001-2011	1			X			
Wagga Wagga North	C	2011	1			X			

1 P denotes performance; T denotes trend; C denotes campaign

2 New stations opened in September-October 2012

3 Replaced the Lidcombe trend station

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

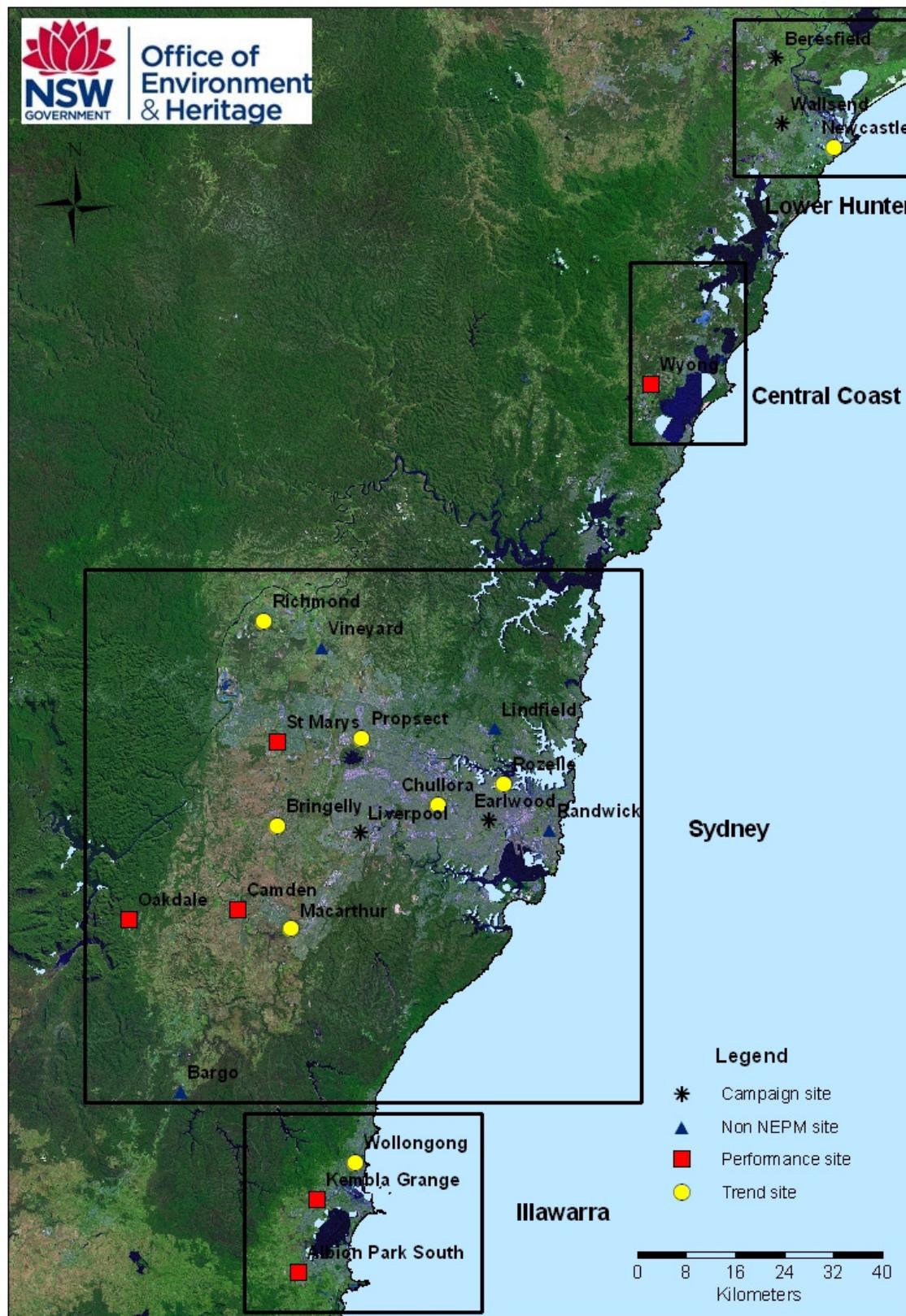
5 Monitoring subject to results from initial campaign monitoring

6 Prospect station replaced Blacktown station from 2007

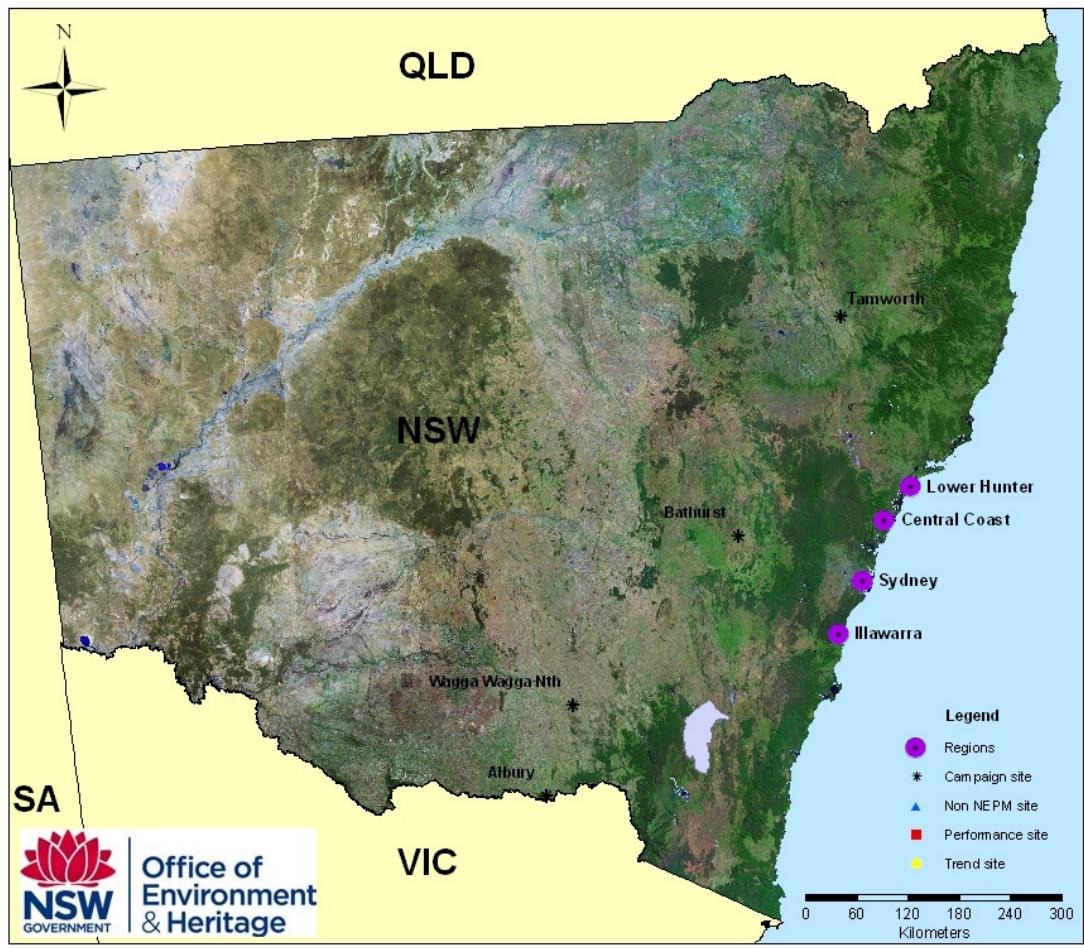
7 Bathurst ozone analyzer removed in August 2007 due to the completion of the campaign

8 Both FRM and TEOM PM<sub>2.5</sub> monitoring was conducted at this site

9 Under development



**Figure 1** Ambient Air Quality Monitoring stations in the Sydney, Illawarra, and Central Coast and Lower Hunter regions



**Figure 2** Ambient Air Quality Monitoring in regional New South Wales

## 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 Earlwood, Liverpool, Rozelle, and Tamworth, (see Table 2 for further details).

**Table 2: 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.
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.

## Monitoring methods

The NSW network is comprised of instruments that are in accordance with the relevant Australian standard (See Table 3 for further details). It will be noted that, in the case of PM<sub>10</sub>, the Tapered Element Oscillating Microbalance (TEOM) method is used for NEPM monitoring and reporting. PM<sub>10</sub> data from the TEOM are presented as measured and unadjusted for temperature. For PM<sub>2.5</sub>, a combination of TEOM and Beta Attenuation Monitors (BAMs) were used.

**Table 3: Instruments used in NSW for NEPM monitoring**

Pollutant	Standard	Title	Method used
Carbon monoxide	AS3580.7.1-2011	Ambient Air - Determination of Carbon Monoxide - Direct Reading Instrument Method	Gas Filter Correlation /Infra-Red
Nitrogen dioxide	AS3580.5.1-2011	Ambient Air - Determination of Oxides of Nitrogen - Chemiluminescence Method	Gas Phase Chemiluminescence
Photochemical oxidant (ozone)	AS3580.6.1-2011	Ambient Air - Determination of Ozone - Direct Reading Instrument Method	Non Dispersive Ultraviolet
Sulfur dioxide	AS3580.4.1-2008	Ambient Air - Determination of Sulfur Dioxide - Direct Reading Instrument Method	Pulsed Fluorescence
Lead <sup>+</sup>	AS2800 - 1985	Ambient Air - Determination of Particulate Lead-High Volume Sampler - Gravimetric Method	Atomic Absorption
Particles as PM <sub>10</sub>	AS3580.9.8-2008	Determination of Suspended Particulate Matter - PM <sub>10</sub> continuous direct mass method using a TEOM	Tapered Element Oscillating Microbalance (TEOM)
Particles as PM <sub>2.5</sub>	AS3580.9.8-2008*	Technical Paper on Monitoring for Particles as PM <sub>2.5</sub>	Tapered Element Oscillating Microbalance (TEOM)* Beta Attenuation Monitor (BAM)** FRM Partisol <sup>#</sup> FRM Reference Ambient Air Sampler (RAAS) <sup>#</sup>

\* No longer measured in New South Wales

\* Modified for use in the PM<sub>2.5</sub> Equivalence Program according to the NEPM Technical Paper

\*\* During 2012, Federal Equivalent Method BAM PM<sub>2.5</sub> monitors were deployed at some sites to replace TEOM monitors.

# Both the Partisol and RAAS instruments are considered Federal Reference Methods (FRM)

## NATA accreditation

As required under Clause 12 of the Ambient Air Quality NEPM, the OEH 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 late 2012 and accreditation has been continued.

## 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 AAQ 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 Ambient Air Quality NEPM Monitoring Plan, available on the OEH website (<http://www.environment.nsw.gov.au/air/nepm/index.htm>).

## Section B – Assessment of compliance with standards and goals

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

The **standards** against which air quality is assessed are concentrations in parts per million (ppm) or micrograms per cubic metre ( $\mu\text{g}/\text{m}^3$ ), as per column 3 of Table 4.

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 per year, for each standard (column 4 in Table 4). 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<sub>2.5</sub> (see Table 4). The goal for PM<sub>2.5</sub> is to collect sufficient data to facilitate a review of the PM<sub>2.5</sub> standards.

**Table 4: NEPM Standards and Goals specified in Schedule 2 of the AAQ NEPM**

Pollutant	Averaging period	AAQ NEPM Standard maximum concentration	AAQ NEPM Goal (maximum number of allowable exceedences)
Carbon monoxide	8 hour rolling average	9.0 ppm	1 day a year
Nitrogen dioxide	1 hour average	0.120 ppm	1 day a year
	1 year average	0.030 ppm	None
Photochemical oxidants – as ozone	1 hour average	0.100 ppm	1 day a year
	4 hour rolling average	0.080 ppm	1 day a year
Sulfur dioxide	1 hour average	0.200 ppm	1 day a year
	1 day average	0.080 ppm	1 day a year
	1 year average	0.020 ppm	None
Particles as PM <sub>10</sub>	1 day average	50.0 $\mu\text{g}/\text{m}^3$	5 days a year
Lead	1 day average	0.50 $\mu\text{g}/\text{m}^3$	None
Particles as PM <sub>2.5</sub> <sup>#</sup>	1 day average	25.0 $\mu\text{g}/\text{m}^3$	Gather sufficient data nationally to facilitate a review of Advisory Reporting Standard
	1 year average	8.0 $\mu\text{g}/\text{m}^3$	

<sup>#</sup> Reporting standard only.

Tables 5-10a summarize compliance with the AAQ NEPM standards and goals. The following are given for each pollutant monitored at each monitoring station:

- data availability rate (quarterly and annual),
- the annual mean (where an annual standard exists) and,
- an assessment of compliance, including the number of days when standards were exceeded.

*The categories MET, NOT MET and ND are used to indicate assessment of compliance*

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 2012.

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 meet the 75% requirement.

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

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](#).

#### *Calculation and reporting methods*

Calculation and reporting methods used comply with requirements detailed in the *NEPC Peer Review Committee Technical paper No 8: Annual Reports* (NEPC 2002). Daily averages are calculated using hours 1 to 24 as detailed in the *NEPM Technical Paper No.5, "Data Collection and Handling"*.

There may be minor differences in the trend data included in this year's report compared to reports prior to 2008 due to the way the NSW OEH's new air quality database performs its internal calculations, especially in relation to percentiles.

PM<sub>10</sub> TEOM data have undergone an internal correction factor for USEPA equivalency but without subsequent treatment or temperature adjustment.

PM<sub>2.5</sub> measurements were made using TEOMs and Beta Attenuation Monitors or BAMs; the latter is a Federal Equivalent Method. TEOM PM<sub>2.5</sub> data do not include the internal correction for USEPA PM<sub>10</sub> equivalency or any subsequent treatment or adjustment for temperature.

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 24 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 losses during 2012*

There was one occurrence in 2012 at Albion Park South when the data availability rate was lower than that prescribed for the Ambient Air Quality NEPM goals. This was attributed to on-going problems with the nitrogen oxides analyser during March, leading to a quarterly data availability rate of 61%; however, the site did meet the requirement of 75% for the full year.

The other notable data deficiencies were for Campbelltown West site and Macarthur; the former was commissioned on 22<sup>nd</sup> Aug to replace the latter which was shut down on 24<sup>th</sup> July, with no data during the intervening period.

## Carbon monoxide

**Table 5: 2012 compliance summary for CO in New South Wales**

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
<b>Sydney</b>							
Chullora	97.6	99.1	98.6	95.7	97.7	0	Met
Liverpool	92.9	99.2	98.1	99.4	97.4	0	Met
Macarthur	95.2	100.0	25.5	-	55.0	0	ND
Campbelltown W <sup>(1)</sup>	-	-	42.5	97.6	35.0	0	ND
Camden <sup>(2)</sup>	-	-	-	80.6	21.1	0	ND
Prospect	99.5	98	98.8	90.8	96.8	0	Met
Rozelle	96.8	96.2	100.0	94.7	96.9	0	Met
<b>Illawarra</b>							
Wollongong	100.0	98.4	96.3	91.4	96.5	0	Met
<b>Central coast</b>							
Wyong <sup>(3)</sup>	-	-	-	76.9	20.1	0	ND
<b>Lower Hunter</b>							
Newcastle	99.7	81.5	96.5	99.5	94.3	0	Met

ND Not demonstrated.

**Bold** font indicates values that exceed the AAQ NEPM standard

(1) Campbelltown West commissioned on 22<sup>nd</sup> August to replace Macarthur, which was shut down on 24<sup>th</sup> July. No data was collected during the intervening period in Q3.

(2) Camden AQM station established on 26/9/2012

(3) Wyong AQM station established on 12/10/2012

During 2012 no exceedences of the carbon monoxide standard were recorded in NSW. Compliance with the Ambient Air Quality NEPM goal was demonstrated at all sites in the Sydney, Illawarra and Lower Hunter regions.

## Nitrogen dioxide

**Table 6: 2012 compliance summary for NO<sub>2</sub> in New South Wales**

AAQ NEPM standard  
0.120 ppm (1-hour average)  
0.030 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	1-year
<b>Sydney</b>									
Bringelly	74.8	95.3	92.8	95.7	89.7	0	0.005	Met	Met
Chullora	94.7	95.2	93.5	90.9	93.6	0	0.013	Met	Met
Liverpool	85.2	92.9	90.0	92.3	90.1	0	0.009	Met	Met
Macarthur	90.8	94.8	24.0	-	52.4	0	0.008	ND	ND
Campbelltown W <sup>(1)</sup>	-	-	41.2	93.7	33.7	0	0.011	ND	ND
Camden <sup>(2)</sup>	-	-	-	79.4	20.0	0	0.005	ND	ND
Prospect	95.2	93.1	94.9	87.5	92.7	0	0.010	Met	Met
Richmond	95.1	93.4	91.0	92.7	93.1	0	0.005	Met	Met
Rozelle	90.2	90.9	95.7	91.5	92.1	0	0.012	Met	Met
<b>Illawarra</b>									
Albion Park Sth	61.0*	93.8	95.5	94.1	86.1	0	0.004	ND	ND
Wollongong	95.7	95.5	86.8	84.2	90.5	0	0.009	Met	Met
<b>Central coast</b>									
Wyong <sup>(3)</sup>	-	-	-	75.0	18.9	0	0.004	ND	ND
<b>Lower Hunter</b>									
Newcastle	95.4	86.8	92.6	95.4	92.6	0	0.008	Met	Met
Wallsend	95.6	95.4	93.9	91.6	94.1	0	0.008	Met	Met

\* Data was invalidated for the entire month of March due to on-going instrumentation problems.

ND Not demonstrated.

**Bold** font indicates values that exceed the AAQ NEPM standard

(1) Campbelltown West commissioned on 22<sup>nd</sup> August to replace Macarthur, which was shut down on 24<sup>th</sup> July. No data was collected during the intervening period in Q3.

(2) Camden AQM station established on 26/9/2012

(3) Wyong AQM station established on 12/10/2012

No exceedences of the nitrogen dioxide 1-hour and annual standards were recorded in NSW during 2012. Compliance with the Ambient Air Quality NEPM goal was met at all sites in Sydney, Illawarra and Lower Hunter regions.

## Ozone

**Table 7: 2012 compliance summary for O<sub>3</sub> in New South Wales**

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
<b>Sydney</b>									
Bringelly	87.7	94.4	94.4	95.7	93.1	0	0	Met	Met
Chullora	94.6	95.3	95.0	92.0	94.2	0	0	Met	Met
Liverpool	83.6	95.1	95.2	95.5	92.4	0	0	Met	Met
Macarthur <sup>(1)</sup>	91.3	95.6	24.2	-	52.8	0	0	ND	ND
Campbelltown W <sup>(1)</sup>	-	-	41.2	87.9	32.3	0	0	ND	ND
Camden <sup>(2)</sup>	-	-	-	80.8	20.3	0	1	ND	ND
Oakdale	95.3	91.8	90.4	93.5	92.8	0	1	Met	Met
Prospect	95.2	91.6	92.3	88.2	91.8	0	0	Met	Met
Richmond	95.1	92.5	91.1	92.9	92.9	0	0	Met	Met
Rozelle	95.1	94.8	95.7	93.7	94.8	0	0	Met	Met
St Marys	91.3	92.8	95.2	93.9	93.3	0	0	Met	Met
<b>Illawarra</b>									
Albion Park Sth	91.3	95.5	94.3	94.1	93.8	0	0	Met	Met
Kembla Grange	95.7	92.9	94.6	94.0	94.3	0	0	Met	Met
Wollongong	95.7	95.6	93.4	94.8	94.9	0	0	Met	Met
<b>Central coast</b>									
Wyong <sup>(3)</sup>	-	-	-	76.9	19.3	0	0	ND	ND
<b>Lower Hunter</b>									
Newcastle	95.3	92.7	93.8	95.4	94.3	0	0	Met	Met
Wallsend	95.6	95.3	93.5	94.6	94.8	0	0	Met	Met

ND Not demonstrated.

**Bold** font indicates values that exceed the AAQ NEPM standard

(1) Campbelltown West commissioned on 22<sup>nd</sup> August to replace Macarthur, which was shut down on 24<sup>th</sup> July. No data was collected during the intervening period in Q3.

(2) Camden AQM station established on 26/9/2012

(3) Wyong AQM station established on 12/10/2012

All the sites in the Sydney, Illawarra and Lower Hunter regions demonstrated compliance with the 1-hour and 4-hour standards and NEPM goals for ozone during 2012. The 4-hour standard for ozone was exceeded once in the Sydney region (Oakdale), but this south west site demonstrated compliance with the Ambient Air Quality NEPM goal.

## Sulfur dioxide

**Table 8: 2012 compliance summary for SO<sub>2</sub> in New South Wales**

AAQ NEPM standards  
 0.200 ppm (1-hour average)  
 0.080 ppm (24-hour average)  
 0.020 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
<b>Sydney</b>											
Bringelly	94.4	95.4	93.8	94.7	94.6	0	0	0.000	Met	Met	Met
Chullora	94.7	94.5	93.2	92.0	93.6	0	0	0.001	Met	Met	Met
Macarthur	91.4	95.7	24.2	-	52.8	0	0	0.000	ND	ND	ND
Campbelltown W <sup>(1)</sup>	-	-	41.2	93.8	33.8	0	0	0.000	ND	ND	ND
Prospect	95.1	87.5	94.9	87.6	91.3	0	0	0.001	Met	Met	Met
Richmond	95.2	55.0	90.3	92.9	83.4	0	0	0.000	Met	Met	Met
<b>Illawarra</b>											
Albion Park Sth	91.3	89.1	95.4	94.1	92.5	0	0	0.000	Met	Met	Met
Wollongong	95.8	95.6	93.4	94.8	94.9	0	0	0.001	Met	Met	Met
<b>Central coast</b>											
Wyong <sup>(2)</sup>	-	-	-	76.9	19.3	0	0	0.001	ND	ND	ND
<b>Lower Hunter</b>											
Newcastle	90.7	92.6	93.6	95.4	93.1	0	0	0.002	Met	Met	Met
Wallsend	95.6	95.4	94.8	94.6	95.1	0	0	0.001	Met	Met	Met

ND Not demonstrated.

**Bold** font indicates values that exceed the AAQ NEPM standard

(1) Campbelltown West commissioned on 22<sup>nd</sup> August to replace Macarthur, which was shut down on 24<sup>th</sup> July. No data was collected during the intervening period in Q3.

(2) Wyong AQM station established on 12/10/2012

The 1-hour, 24-hour and annual standards for sulfur dioxide were not exceeded in NSW during 2012. Compliance with the Ambient Air Quality NEPM goal was met throughout the Sydney, Lower Hunter and Illawarra regions.

## Particles as PM<sub>10</sub>

**Table 9: 2012 compliance summary for PM<sub>10</sub> in New South Wales**

Region/ Performance monitoring Station		Data availability rates (% of days)					Number of exceedences (days)	Performance against the standards and goal
		Q1	Q2	Q3	Q4	Annual		
<b>Sydney</b>								
Bringelly	99.5	99.5	99.5	99.5	99.5	99.5	0	Met
Chullora	99.7	99.4	99.5	96.8	98.9	98.9	1	Met
Liverpool	89.0	99.0	99.1	99.4	96.6	96.6	0	Met
Macarthur	95.5	99.9	25.3	-	55.2	55.2	0	ND
Campbelltown W <sup>(1)</sup>	-	-	43.2	97.3	35.1	35.1	0	ND
Camden <sup>(2)</sup>	-	-	-	77.5	19.1	19.1	0	ND
Oakdale	98.3	99.9	99.5	98.8	99.1	99.1	0	Met
Prospect	90.0	94.8	98.0	96.0	94.7	94.7	0	Met
Richmond	97.6	98.6	95.5	95.2	96.7	96.7	3	Met
Rozelle	99.7	99.6	99.8	98.7	99.5	99.5	0	Met
<b>Illawarra</b>								
Albion Park Sth	99.6	96.2	99.8	97.7	98.3	98.3	0	Met
Kembla Grange	98.4	98.4	99.0	97.9	98.4	98.4	3	Met
Wollongong	99.4	99.7	98.3	98.5	99.0	99.0	0	Met
<b>Central coast</b>								
Wyong <sup>(3)</sup>	-	-	-	81.3	19.9	19.9	0	ND
<b>Lower Hunter</b>								
Beresfield	98.4	97.2	99.1	99.4	98.5	98.5	1	Met
Newcastle	99.2	97.1	99.1	99.2	98.7	98.7	0	Met
<b>Regional</b>								
Albury	97.3	80.9	94.9	99.9	93.3	93.3	1	Met
Bathurst	99.1	99.0	99.7	98.9	99.2	99.2	2	Met
Tamworth	99.8	98.9	100.0	98.9	99.4	99.4	1	Met
Wagga Wagga Nth	98.1	99.3	98.9	98.9	98.8	98.8	1	Met

ND Not demonstrated.

**Bold** font indicates values that exceed the AAQ NEPM standard

(1) Campbelltown West commissioned on 22<sup>nd</sup> August to replace Macarthur, which was shut down on 24<sup>th</sup> July. No data was collected during the intervening period in Q3.

(2) Camden AQM station established on 26/9/2012

(3) Wyong AQM station established on 12/10/2012

The Ambient Air Quality NEPM goal for 24-hour PM<sub>10</sub> was met at all Sydney, Illawarra, Lower Hunter, and regional NSW sites during 2012. That is, while the standard was exceeded, none of the sites had above five exceedences.

## Particles as PM<sub>2.5</sub>

**Table 10: Summary of PM<sub>2.5</sub> concentrations in NSW (2012) – TEOM\* and BAM methods**

Region/ Performance monitoring station	Data availability rates (% of hours)						Days above ARS	Advisory Reporting Standard 25.0 µg/m <sup>3</sup> (24-hour average) 8.0 µg/m <sup>3</sup> (Annual average)	Annual mean (µg/m <sup>3</sup> )
	Q1	Q2	Q3	Q4	Annual				
<b>Sydney</b>									
Chullora <sup>(8)</sup>	100.0	100.0	100.0	90.2	97.6	0		6.1	
Earlwood <sup>(9)</sup>	100.0	100.0	100.0	95.7	98.9	0		5.6	
Liverpool <sup>(2)</sup>	87.9	69.2	100.0	85.9	85.8	0		<b>8.5</b>	
Richmond <sup>(3)</sup>	97.8	90.1	94.6	94.6	94.3	2		5.3	
Camden <sup>(5)</sup>	-	-	-	81.7	20.8	0		7.8	
<b>Illawarra</b>									
Wollongong <sup>(7)</sup>	100.0	100.0	96.7	95.7	98.1	0		4.6	
<b>Central Coast</b>									
Wyong <sup>(4)</sup>	-	-	-	75.6	19.7	0		7.3	
<b>Lower Hunter</b>									
Beresfield <sup>(1)</sup>	74.7	100.0	98.9	100.0	93.4	0		7.9	
Wallsend <sup>(6)</sup>	100.0	100.0	100.0	97.8	99.5	0		5.1	

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data uses USEPA factors of A=1.00 and B=0

<sup>(1)</sup> TEOM replaced with BAM 21/2/2012

<sup>(2)</sup> TEOM replaced with BAM 2/3/2012

<sup>(3)</sup> TEOM replaced with BAM 7/9/2012

<sup>(4)</sup> Site commissioned on 26/9/12, using BAM for PM<sub>2.5</sub>.

<sup>(5)</sup> Site commissioned on 12/10/12, using BAM for PM<sub>2.5</sub>.

<sup>(6)</sup> TEOM replaced with BAM 29/11/2012

<sup>(7)</sup> TEOM replaced with BAM 5/12/2012

<sup>(8)</sup> TEOM replaced with BAM 14/12/2012

<sup>(9)</sup> TEOM replaced with BAM 19/12/2012

In 2012, all of the Sydney, Lower Hunter and Illawarra sites, except for Liverpool, complied with the advisory reporting standard with an annual average below 8.0 µg/m<sup>3</sup>. Richmond reported two days above the 24-hour average of 25µg/m<sup>3</sup>, at the start of the hazard reduction burn period.

During 2012, a decision was made to replace the continuous TEOM PM<sub>2.5</sub> monitors with the USEPA Equivalent method Beta Attenuation Monitors (BAM). This was a staged rollout starting with Beresfield on 21/2/2012 and finalised with the replacement at Earlwood on 15/12/2012.

**Table 10A: Summary of PM<sub>2.5</sub> concentrations in NSW (2012) – FRM method**

Region/ Performance monitoring station	Data availability rates * (%)					Days above ARS	Advisory Reporting Standard 25.0 µg/m <sup>3</sup> (24-hour average) 8.0 µg/m <sup>3</sup> (Annual average)	Annual mean (µg/m <sup>3</sup> )
	Q1	Q2	Q3	Q4	Annual			
<b>Sydney</b> Chullora	75	78.6	10.7	0	41.1	0		NA

\* Please note that the data availability rates are based on a one-day-in-three sampling regime.

NA - as a result of technical problems and problems with parts availability, an annual average was not able to be calculated

## 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<sup>3</sup> with many 24-hour average samples below the minimum detection limit for lead of 0.007µg/m<sup>3</sup> 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<sup>3</sup> 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 Office of Environment and Heritage began phasing out ambient lead monitoring for the AAQ NEPM during 2004. All lead monitoring ceased from 1<sup>st</sup> January 2005.

A report summarising the case for a cessation of lead monitoring was approved by NEPC.

## Section C – Analysis of air quality

### Data availability rates

*Data availability rates are presented as either percentage of valid data, or as number of valid days*

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 (or quarter, as appropriate).

When presented as the number of valid days, it represents the number of days during the year when at least 75% of averaging periods during the day are valid. A valid day has at least 18 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 gaseous pollutants, the calibration hour is included in calculating data availability rates*

The NSW OEH undertakes a daily automated instrument calibration checks for carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide during early morning, and data obtained during the calibration check is considered invalid. Hence for these pollutants the maximum number of valid 1-hour averages in a day is twenty-three. However, 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 the gaseous pollutants, the maximum annual 1-hour data availability can be 96 % only.

*Each reporting period (e.g. quarter) and NEPM standard averaging period has at least 75% data availability rate*

For example, the carbon monoxide NEPM standard is based on 8-hour rolling averages. A valid hour is calculated as the average of the valid 1-hour averages over the preceding eight hours, when at least six of those hours (75%) hold valid data.

*For pollutants reported against more than one Ambient Air Quality NEPM standard, data availability rates may not be the same for each standard*

For instance when measuring ozone, an hour of each day is lost during calibration checks. This affects data availability rates when reporting against the 1-hour standard for the associated hour, but may not affect data availability rates for reporting against the 4-hour standard. Thus the maximum data availability rate is only 96% for the 1-hour standard, but can be 100% for the 4-hour standard.

*As a NEPM requirement for standards with averaging periods less than 24 hours, the daily maxima are reported regardless of the number of valid hours on the day*

As example, the highest 1-hr daily average for NO<sub>2</sub> during a given year at a site may have occurred on a day that the 75% data requirement was not met. In reporting percentile distributions of the annual 1-hr maxima for the site however, at least 75% of valid hours must be available for the associated day. If not, the day with the subsequent highest 1-hr daily average from the year's dataset that meets the 75% data requirement will be used.

## Carbon monoxide

**Table 11: Summary for CO - Daily maximum rolling 8-hour average concentrations (2012)**

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2 <sup>nd</sup> Highest Value	2 <sup>nd</sup> Highest Date
<b>Sydney</b>	Chullora	97.7	354	2.0	21/06/2012 02:00	1.9
	Liverpool	97.4	352	1.9	15/06/2012 02:00	1.9
	Macarthur	55.0	199	0.7	25/05/2012 02:00	0.6
	Campbelltown W	35.2	128	0.6	13/10/2012 02:00	0.6
	Camden	21.1	77	0.3	01/11/2012 12:00	0.3
	Prospect	96.8	347	1.8	21/06/2012 02:00	1.8
	Rozelle	96.9	346	2.2	15/06/2012 03:00	2.2
<b>Central coast</b>	Wyong	20.1	72	0.4	13/12/2012 02:00	0.4
	Wollongong	96.5	344	1.2	09/07/2012 23:00	1.2
<b>Lower Hunter</b>	Newcastle	94.3	339	1.3	14/06/2012 24:00	1.3

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

Carbon monoxide levels in all regions were significantly below the Ambient Air Quality NEPM standard. The highest recorded value in the state was 2.2 ppm (Rozelle), only 24% of the NEPM standard.

## Nitrogen dioxide

**Table 12: Summary for NO<sub>2</sub> - Daily maximum 1-hour average concentrations (2012)**

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2 <sup>nd</sup> Highest Value	2 <sup>nd</sup> Highest Date
<b>Sydney</b>	Bringelly	89.7	342	0.038	27/09/2012 19:00	0.029
	Chullora	93.6	357	0.059	01/12/2012 21:00	0.056
	Liverpool	90.1	341	0.046	03/10/2012 20:00	0.043
	Macarthur	52.2	199	0.038	10/01/2012 20:00	0.034
	Campbelltown W	33.9	128	0.049	25/10/2012 20:00	0.047
	Camden	20.0	76	0.022	14/12/2012 16:00	0.022
	Prospect	92.7	352	0.050	03/10/2012 21:00	0.046
	Richmond	93.1	354	0.046	30/06/2012 13:00	0.044
	Rozelle	92.1	351	0.062	01/12/2012 19:00	0.055
	<b>Central coast</b>					
	Wyong	18.9	70	0.029	25/10/2012 22:00	0.022
<b>Illawarra</b>	Albion Park Sth	86.1	327	0.037	23/09/2012 18:00	0.036
	Wollongong	90.5	332	0.049	25/10/2012 20:00	0.047
<b>Lower Hunter</b>	Newcastle	92.6	355	0.038	28/09/2012 21:00	0.036
	Wallsend	94.1	359	0.034	04/09/2012 20:00	0.033

AAQ NEPM Standard - 0.120 ppm (1-hour average)

Within NSW, levels of nitrogen dioxide are well below the NEPM standard. The highest recorded 1-hour average value in the state was 0.059 ppm (49 percent of the standard) at the Chullora station. The highest annual average of 0.013ppm (43 percent of the standard) was also recorded at Chullora.

## Ozone

**Table 13: Summary for O<sub>3</sub> - Daily maximum 1-hour average concentrations (2012)**

Region/ Performance monitoring station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2 <sup>nd</sup> Highest Value	2 <sup>nd</sup> Highest Date
<b>Sydney</b>						
Bringelly	93.0	353	0.088	06/11/2012 13:00	0.078	04/01/2012 13:00
Chullora	94.2	359	0.080	04/01/2012 13:00	0.075	25/11/2012 13:00
Liverpool	92.4	352	0.079	25/11/2012 14:00	0.075	30/11/2012 13:00
Macarthur	52.6	200	0.079	03/01/2012 15:00	0.075	08/01/2012 16:00
Campbelltown W	32.5	123	0.080	30/11/2012 16:00	0.079	06/11/2012 14:00
Camden	20.3	77	0.095	06/11/2012 14:00	0.090	30/11/2012 15:00
Oakdale	92.7	352	0.089	30/11/2012 15:00	0.088	06/11/2012 15:00
Prospect	91.8	347	0.080	25/11/2012 15:00	0.078	30/11/2012 13:00
Richmond	92.9	353	0.085	25/11/2012 16:00	0.076	26/11/2012 14:00
Rozelle	94.8	362	0.069	25/11/2012 11:00	0.059	04/10/2012 14:00
St Marys	93.3	350	0.085	25/11/2012 15:00	0.084	14/12/2012 16:00
<b>Central coast</b>						
Wyong	19.3	73	0.078	01/12/2012 15:00	0.069	25/11/2012 16:00
<b>Illawarra</b>						
Albion Park Sth	93.8	358	0.067	25/11/2012 17:00	0.064	05/02/2012 14:00
Kembla Grange	94.3	358	0.068	25/11/2012 17:00	0.065	05/02/2012 14:00
Wollongong	94.9	363	0.065	25/11/2012 15:00	0.064	09/11/2012 15:00
<b>Lower Hunter</b>						
Newcastle	94.3	362	0.071	04/01/2012 12:00	0.069	20/10/2012 14:00
Wallsend	94.7	364	0.080	04/01/2012 13:00	0.069	20/10/2012 14:00

AAQ NEPM Standard - 0.100 ppm (1-hour average)

**Table 14: Summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentrations (2012)**

Region/ Performance monitoring station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2 <sup>nd</sup> Highest Value	2 <sup>nd</sup> Highest Date
<b>Sydney</b>						
Bringelly	97.0	353	0.072	30/11/2012 15:00	0.072	06/11/2012 15:00
Chullora	98.1	359	0.068	01/12/2012 17:00	0.065	25/11/2012 14:00
Liverpool	96.1	352	0.071	25/11/2012 16:00	0.068	30/11/2012 14:00
Macarthur	54.7	200	0.073	03/01/2012 16:00	0.063	08/01/2012 18:00
Campbelltown W	33.8	122	0.071	30/11/2012 16:00	0.068	29/11/2012 16:00
Camden	21.2	77	<b>0.084</b>	30/11/2012 16:00	0.073	06/11/2012 16:00
Oakdale	96.7	352	<b>0.081</b>	30/11/2012 17:00	0.078	06/11/2012 16:00
Prospect	95.6	345	0.073	06/11/2012 15:00	0.070	30/11/2012 14:00
Richmond	96.6	353	0.070	25/11/2012 18:00	0.069	26/11/2012 15:00
Rozelle	98.6	362	0.054	04/10/2012 16:00	0.053	01/12/2012 15:00
St Marys	97.2	350	0.072	25/11/2012 17:00	0.070	06/11/2012 15:00
<b>Central coast</b>						
Wyong	20.1	74	0.066	01/12/2012 16:00	0.065	25/11/2012 16:00
<b>Illawarra</b>						
Albion Park Sth	97.8	357	0.064	25/11/2012 18:00	0.055	31/10/2012 17:00
Kembla Grange	98.4	358	0.061	25/11/2012 17:00	0.054	16/12/2012 15:00
Wollongong	98.9	363	0.061	25/11/2012 16:00	0.061	09/11/2012 17:00
<b>Lower Hunter</b>						
Newcastle	97.8	361	0.057	20/10/2012 16:00	0.052	18/02/2012 16:00
Wallsend	98.7	362	0.070	04/01/2012 15:00	0.058	01/12/2012 16:00

AAQ NEPM Standard - 0.080 ppm (rolling 4-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

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 Sydney region, emissions of ozone precursors (NOx and VOCs) are sufficient to generate concentrations of ozone well above the Ambient Air Quality NEPM standards (EPA 2003).

During 2012, the 4-hour average NEPM ozone standard was exceeded on the same calendar day (30 Nov) at two sites (Oakdale (0.081 ppm) and Camden (0.084 ppm)). However, compliance was achieved with the NEPM goal. No other exceedences of the 1-hour or 4-hour standards occurred at either of the Sydney, Illawarra and Lower Hunter region sites, i.e., all sites met the NEPM goals.

The above-noted exceedences of the 4-hour standard occurred during the spring season, following the hottest November day (29<sup>th</sup>) when the first significant heat wave was recorded across the country. Temperatures reached record highs for this time of year, particularly in southern inland New South Wales where Oakdale and Camden are located.

Besides the one exceedence day (30 Nov) observed at two south west Sydney sites, the overall absence of ozone exceedences especially during summer 2011-12 was a marked difference in trend compared to previous years. Photochemical conditions conducive to smog formation were absent during summer 2011-12, likely due to the following reasons:

- Summer 2011-12 was the coldest for NSW since 1983-4, with average temperature 1.1 °C below the historical average. It also had the 4<sup>th</sup> coldest mean temperature since records began in 1950.

- Several significant rain and flooding events and thunderstorms impacted NSW during summer 2011-12, and the state wide average rainfall (261 mm) exceeded the historical average (171 mm).

**Table 15: Days when O<sub>3</sub> 1-hour Ambient Air Quality NEPM standard exceeded**

Date	Stations where standard exceeded (and hour number/s where concentration exceeded standard)	Comments <sup>(#)</sup>
Nil		

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

**Table 16: Days when O<sub>3</sub> 4-hour Ambient Air Quality NEPM standard exceeded**

Date	Stations where standard exceeded (and hour number/s where concentration exceeded standard)	Comments <sup>(#)</sup>
30 Nov 2012	Camden (16-17); Oakdale (17-18)	High temperatures due to heat waves

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

## Sulfur dioxide

**Table 17: Summary for SO<sub>2</sub> - Daily maximum 1-hour average concentrations (2012)**

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2 <sup>nd</sup> Highest Value	2 <sup>nd</sup> Highest Date
<b>Sydney</b>						
Bringelly	94.6	360	0.015	02/01/2012 09:00	0.005	18/09/2012 17:00
Chullora	93.6	355	0.025	02/05/2012 13:00	0.022	11/05/2012 15:00
Macarthur	52.6	200	0.006	08/01/2012 16:00	0.006	24/02/2012 10:00
Campbelltown W	33.9	128	0.008	05/11/2012 10:00	0.006	17/10/2012 01:00
Prospect	91.3	346	0.012	05/02/2012 24:00	0.009	27/02/2012 14:00
Richmond	83.4	316	0.013	10/02/2012 12:00	0.009	13/12/2012 22:00
<b>Central coast</b>						
Wyong	19.3	73	0.030	14/12/2012 09:00	0.026	05/11/2012 18:00
<b>Illawarra</b>						
Albion Park Sth	92.5	353	0.027	05/11/2012 10:00	0.020	23/09/2012 18:00
Wollongong	94.9	363	0.017	08/03/2012 01:00	0.016	06/02/2012 06:00
<b>Lower Hunter</b>						
Newcastle	93.1	357	0.034	05/09/2012 21:00	0.031	29/03/2012 09:00
Wallsend	95.1	365	0.035	16/09/2012 10:00	0.025	26/11/2012 10:00

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Table 18: Summary for SO<sub>2</sub> - Maximum 24-hour average concentrations (2012)**

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2 <sup>nd</sup> Highest Value	2 <sup>nd</sup> Highest Date
<b>Sydney</b>						
Bringelly	98.4	360	0.002	25/11/2012	0.002	28/08/2012
Chullora	97.0	355	0.004	02/05/2012	0.003	11/05/2012
Macarthur	54.6	200	0.002	27/02/2012	0.002	16/03/2012
Campbelltown W	35.0	128	0.002	28/08/2012	0.002	30/11/2012
Prospect	94.5	346	0.003	03/01/2012	0.003	28/08/2012
Richmond	86.3	316	0.002	15/03/2012	0.002	20/09/2012
<b>Central coast</b>						
Wyong	19.9	73	0.004	14/12/2012	0.003	08/12/2012
<b>Illawarra</b>						
Albion Park Sth	96.4	353	0.010	05/11/2012	0.007	30/11/2012
Wollongong	99.2	363	0.005	25/12/2012	0.004	09/12/2012
<b>Lower Hunter</b>						
Newcastle	97.5	357	0.007	20/06/2012	0.007	11/05/2012
Wallsend	99.7	365	0.005	20/06/2012	0.005	11/08/2012

AAQ NEPM Standard – 0.080 ppm (24-hour average)

SO<sub>2</sub> levels were significantly below the 1-hour, 24-hour and annual NEPM standards. Wallsend recorded the highest 1-hour value with 0.035 ppm (18% of the standard). The highest 24-hour average was recorded at Albion Park Sth, 0.010 ppm (13% of the standard). The highest annual average of 0.002 ppm, which is just 10% of the standard, was measured at Newcastle.

## Particles as PM<sub>10</sub>

**Table 19: Summary for PM<sub>10</sub> – Maximum 24-hour average concentrations (2012)**

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Highest Value	Highest Date	6 <sup>th</sup> Highest Value	6 <sup>th</sup> Highest Date
<b>Sydney</b>						
Bringelly	100.0	366	40.1	29/08/2012	33.0	26/11/2012
Chullora	98.6	361	<b>52.4</b>	23/08/2012	36.0	06/09/2012
Liverpool	97.0	355	42.5	18/10/2012	38.1	26/10/2012
Macarthur	54.6	200	33.9	05/01/2012	23.2	06/02/2012
Campbelltown W	35.2	129	39.3	26/10/2012	30.9	05/10/2012
Camden	19.1	70	35.6	26/10/2012	29.6	01/11/2012
Oakdale	98.9	362	38.9	07/04/2012	30.1	26/11/2012
Prospect	94.3	345	38.7	26/10/2012	34.2	19/05/2012
Richmond	95.9	351	<b>99.2</b>	29/08/2012	35.8	22/11/2012
Rozelle	99.5	364	40.7	25/10/2012	32.6	19/10/2012
<b>Central coast</b>						
Wyong	20.0	73	37.4	26/10/2012	30.7	17/10/2012
<b>Illawarra</b>						
Albion Park Sth	98.4	360	43.9	25/10/2012	33.1	29/08/2012
Kembla Grange	98.4	360	<b>57.2</b>	25/06/2012	43.2	06/09/2012
Wollongong	98.6	361	47.5	25/10/2012	36.7	04/01/2012
<b>Lower Hunter</b>						
Beresfield	99.2	363	<b>50.8</b>	06/09/2012	46.2	05/10/2012
Newcastle	98.9	362	48.7	25/10/2012	42.2	11/09/2012
<b>Regional</b>						
Albury	92.1	337	<b>54.4</b>	06/04/2012	36.9	03/10/2012
Bathurst	99.5	364	<b>55.5</b>	08/12/2012	29.1	26/11/2012
Tamworth	98.9	362	<b>55.1</b>	25/10/2012	40.2	17/08/2012
Wagga Wagga Nth	98.4	360	<b>67.2</b>	07/04/2012	43.4	05/04/2012

AAQ NEPM Standard – 50.0 µg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

The PM<sub>10</sub> 24-hour Ambient Air Quality NEPM standard exceeded on eleven distinct calendar days during 2012 (Table 20). However, all the sites had fewer than the five exceedance days allowed for compliance with the NEPM goal.

In Sydney, exceedences of the PM<sub>10</sub> 24-hour standard occurred on 3 days of the year, with the first exceedance day (23 Aug) observed at Chullora and Richmond during the hazard reduction burn season. The highest concentration of 99.2 µg/m<sup>3</sup> was recorded 29-30 August at Richmond, also during hazard reduction burns.

In the Illawarra region, the standard was exceeded on 3 days of the year, all at Kembla Grange site. No records were found of bushfires or dust related events during 25-26 Jun 2012, when the highest PM<sub>10</sub> 24-hour average was recorded. However, concurrent spikes at Wollongong for this period suggest a local scale dust or smoke event. The third exceedance at Kembla Grange occurred at the start of the hazard reduction burn period (17 Aug).

In the Lower Hunter region, the PM<sub>10</sub> 24-hour standard was exceeded on one day (6 Sep) at Beresfield, during hazard reduction burns.

Four exceedance days occurred at regional NSW sites during 2012. Two of these days were observed at Albury, Wagga Wagga Nth, and Bathurst, co-inciding with a regional dust event (6-7 Apr). One exceedance day was observed at Tamworth during the bushfire season (25 Oct) and another at Bathurst during a dust haze in northern NSW.

**Table 20: Calendar days when PM<sub>10</sub> 24-hour Ambient Air Quality NEPM standard exceeded**

Date	Stations where standard exceeded	Comments(#)
6 April 2012	Albury	Regional dust event
7 April 2012	Wagga Wagga Nth, Bathurst	Regional dust event
25 Jun 2012	Kembla Grange	Local scale event possible
26 Jun 2012	Kembla Grange	Local scale event possible
17 Aug 2012	Kembla Grange	Hazard reduction burn
23 Aug 2012	Chullora, Richmond	Hazard reduction burn
29 Aug 2012	Richmond	Hazard reduction burn
30 Aug 2012	Richmond	Hazard reduction burn
6 Sep 2012	Beresfield	Hazard reduction burn
25 Oct 2012	Tamworth	Bush fire season
8 Dec 2012	Bathurst	Dust haze

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

The Environment Protection Authority continues to work towards reducing emissions of anthropogenically-produced particles. The NSW Government has outlined its commitments to improving air quality in NSW under Goal 22 in its forward plan for NSW - [NSW 2021](#).

## Particles as PM<sub>2.5</sub>

**Table 21: Summary for PM<sub>2.5</sub> – Maximum 24-hour average concentrations (2012) – continuous TEOM\* and BAM methods**

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values ( $\mu\text{g}/\text{m}^3$ )			
			Highest Value	Highest Date	2 <sup>nd</sup> Highest Value	2 <sup>nd</sup> Highest Date
<b>Sydney</b>	Chullora <sup>(8)</sup>	97.5	357	23.7	05/12/2012	23.4
	Earlwood <sup>(9)</sup>	98.9	362	20.7	10/09/2012	18.1
	Liverpool <sup>(2)</sup>	85.8	314	24.9	19/05/2012	23.6
	Richmond <sup>(3)</sup>	94.3	345	<b>116.7</b>	29/08/2012	<b>47.3</b>
	Camden <sup>(5)</sup>	20.8	76	19.5	26/11/2012	11.9
<b>Central Coast</b>	Wyong <sup>(4)</sup>	19.7	72	14.7	25/10/2012	12.0
	Wollongong <sup>(7)</sup>	98.1	359	15.6	20/10/2012	13.6
<b>Lower Hunter</b>	Beresfield <sup>(1)</sup>	93.4	342	22.4	12/09/2012	21.9
	Wallsend <sup>(6)</sup>	99.5	364	16.2	28/09/2012	14.7

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data uses USEPA factors of A=1.00 and B=0

<sup>(1)</sup> TEOM replaced with BAM 21/2/2012

<sup>(2)</sup> TEOM replaced with BAM 2/3/2012

<sup>(3)</sup> TEOM replaced with BAM 7/9/2012

<sup>(4)</sup> Site commissioned on 26/9/12, using BAM for PM<sub>2.5</sub>.

<sup>(5)</sup> Site commissioned on 12/10/12, using BAM for PM<sub>2.5</sub>.

<sup>(6)</sup> TEOM replaced with BAM 29/11/2012

<sup>(7)</sup> TEOM replaced with BAM 5/12/2012

<sup>(8)</sup> TEOM replaced with BAM 14/12/2012

<sup>(9)</sup> TEOM replaced with BAM 19/12/2012

All regions and sites in NSW recorded concentrations below the AAQ NEPM 24-hour average advisory reporting standard for PM<sub>2.5</sub> except for Richmond, which had the highest 24-hour averages of 116.7  $\mu\text{g}/\text{m}^3$  and 47.3  $\mu\text{g}/\text{m}^3$ . These exceedances occurred on the 29<sup>th</sup> and 30<sup>th</sup> Aug 2012 respectively, during a hazard reduction burn.

**Table 21A: Summary for PM<sub>2.5</sub> – Maximum 24-hour average concentrations (2012) – FRM method**

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values ( $\mu\text{g}/\text{m}^3$ )			
			Highest Value	Highest Date	2 <sup>nd</sup> Highest Value	2 <sup>nd</sup> Highest Date
<b>Sydney</b>	Chullora	38.0	46	14.6	17/5/2012	10.4

\* data availability rates are based on a one-day-in-three sampling regime.

**Table 22: Days above the 24-hour PM<sub>2.5</sub> Ambient Air Quality NEPM advisory reporting standard**

Date	Stations where advisory reporting standard exceeded	Comments <sup>(#)</sup>
29 Aug 2012	Richmond	Hazard reduction burn
30 Aug 2012	Richmond	Hazard reduction burn

## Assessment of progress towards achieving the goal

The NSW Government has outlined its commitments to improving air quality in NSW under Goal 22 in its forward plan for NSW - [NSW 2021](#).

In NSW, the Office of Environment and Heritage (OEH) operates the NSW air quality monitoring network. The NSW Environment Protection Authority (EPA) implements air quality management policies, programs, and strategies to protect and improve ambient air quality and public health. The EPA also licenses scheduled industry activities, implements environmental regulatory requirements and conducts compliance and enforcement programs. OEH and the EPA work together to reduce impacts of emissions from human activities that cause pollution, particularly in the form of particles and ground-level ozone. The Ambient Air Quality NEPM goal is a driver for these strategies and a benchmark against which progress in managing air quality can be assessed.

## Expansion of NSW Air Monitoring Network

In 2011, thirteen new industry funded air quality monitoring stations became operational in the Upper Hunter. A fourteenth site became operational in early 2012 completing the Upper Hunter monitoring network expansion. A separate publicly accessible Upper Hunter web page combining pollution readings and wind speed and direction data was also established. Hunter air quality monitoring sites were established to monitor regional level air quality and are not NEPM sites for the purposes of NEPM reporting.

Two new multi-parameter air quality monitoring stations at Wyong and Camden became operational in December 2012 bringing the NSW network total to 40 stations.

## Air Quality Management in the Sydney Greater Metropolitan Region and Regional NSW

OEH and the EPA deliver a number of policies, programs and strategies that target the pollutants of most concern in NSW – ground level ozone (and its precursors) in the greater metropolitan region in summer and particles in the greater metropolitan region and in some regional centres year round. These efforts are designed to reduce air emissions from industry, motor vehicles and commercial and domestic sources. Industry emissions of oxides of nitrogen and sulfur dioxide are also a focus for action in some regional locations.

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

### Air Emissions Inventory Update

In October 2012 the EPA released an update to the Greater Metropolitan Regions Air Emissions Inventory for the 2008 calendar year. Published every five years, the inventory is a detailed snapshot of major sources of air pollution. It lists over 1000 substances released to the atmosphere by natural and human-made sources within the Greater Metropolitan Region (GMR). Significant human-made sources of air pollution typically include EPA-licensed coal mines and power stations, diesel fuelled equipment used at mines and quarries, domestic wood heaters, service stations and registered buses, cars and trucks.

The inventory is used to track changes in air emissions and evaluate the effectiveness of existing air quality programs (e.g. requirements of the Clean Air Regulation for EPA-licensed industry and service stations), identify new cost effective approaches for improving air quality (e.g. the Dust Stop program for coal mines) and to fulfil NSW State of the Environment (SoE) and National Pollutant Inventory (NPI) reporting obligations. The inventory data is a critical input to a number of scientific studies.

### **Motor Vehicle and Motor Vehicle Fuels**

As motor vehicles are one of the main sources of air pollution in Sydney (producing approximately 62% of human-made NOx and 24% of human-made volatile organic compound (VOC) emissions), the EPA has implemented a range of policies to address motor vehicle and motor vehicle fuel related emissions.

**Stage 1 vapour recovery** (VR1) captures VOC emissions expelled from underground petrol storage tanks as they are filled by road tankers. Regulatory changes made in 2009 extended VR1 to all parts of Sydney, Illawarra, Lower Hunter and Central Coast areas. The requirements commenced in July 2010 for new and modified service stations and will apply to all but the smallest existing service stations from 2014.

**Stage 2 vapour recovery** (VR2) captures VOC emissions expelled from vehicle petrol tanks during refuelling at petrol bowsers. VR2 is being implemented on a staged basis, starting in July 2010 for new and modified service stations. VR2 equipment is required to be installed at the largest service stations in Sydney, Newcastle, Wollongong and the Central Coast by 2014, and at all but the smallest existing service stations in Sydney by 2017.

Once fully implemented, these vapour recovery initiatives are expected to reduce VOC emissions in the Greater Metropolitan region by approximately 5000 tonnes per year.

**The Summer Low Volatility Petrol Program** limits summer petrol volatility in NSW to 62 kiloPascals (kPa) – a measure of vapour pressure – as a key means of managing ozone formation in the Sydney region over the summer period from 15 November to 15 March each year. Petrol refiners, importers and blenders must test and report to the EPA on batch volatility. The petrol volatility limits reduce VOC emissions in the Sydney region by approximately 4,500 tonnes each summer.

**The Clean Machine Pilot Program** reduces diesel exhaust emissions through greater uptake and use of cleaner 'non-road' diesel engines, such as cranes, forklifts, generators, and heavy earth moving equipment such as excavators and bulldozers. The Program establishes industry partnerships to foster changed procurement practices, adopt improved worksite practices and promote the retrofitting of old high use machines with diesel particulate filters. The EPA offers a subsidy to assist the retrofit of diesel plant and equipment engines. At the end of 2012, more than 20 organisations, including a number of local councils and private businesses, were partners to the program and 65 non-road diesel machines had been retrofitted with partial diesel particulate filters.

### **Commercial and domestic emissions**

A number of NSW programs focus on the domestic and commercial sectors as these are significant contributors to air pollution in NSW.

**Woodsmoke reduction** As part of its ongoing work to reduce wood smoke, in 2012 the EPA developed and implemented a number of initiatives. [The options for wood smoke control in New South Wales](#) discussion paper released for public comment in October 2012 outlines potential new wood smoke control measures and an 'opt in' framework which local councils could choose to apply in areas with potentially high population exposure. This method of tailoring wood smoke options provides councils with the extra tools and greater flexibility to target locations where the health benefits would be greatest.

Concurrently the EPA launched the [Wood smoke reduction program](#), a comprehensive two-year program to assist NSW local councils raise awareness about the health impacts of wood smoke, the benefits of correct wood heater operation and help their communities shift away from polluting wood heaters to cleaner forms of heating. The EPA invited all NSW councils and regional organisations of councils to submit expressions of interest to participate in the 2013 winter season program.

These projects complement previous EPA initiatives for [reducing wood smoke emissions](#), which include periodic audits of woodheaters sold at retailers to assess compliance with the relevant Australian Standard (AS/NZS4013:1999) and education campaigns for local council officers. The EPA has also been working with the Commonwealth and other jurisdictions towards the national measures for wood heaters management as part of developing the National Plan for Clean Air.

**Aerosols and solvents** In 2011 the EPA prepared a study to gather information on the aerosol and solvent market in Australia, prepare VOC emission inventories for these sources and review overseas approaches to their management. The EPA commenced consultation with key stakeholders on the findings of the study in November 2011. In 2012 the EPA continued working with key stakeholders including Accord Australasia Limited (the national industry association for the Australasian hygiene, cosmetic and specialty products industry) to refine information on product formulations and VOC emissions. This work will continue in 2013.

### **National Plan for Clean Air**

The Council of Australian Governments (COAG) identified air quality as a *Priority Issue of National Significance* and agreed in 2011 that a National Plan for Clean Air would be developed by the end of 2014. NSW EPA, as Chair of a national Air Thematic Oversight Group tasked with developing the National Plan for Clean Air, plays a leading role in the Plan's development.

The Plan seeks to maximise the health benefits to the Australian community using least cost measures. It also responds to the review of the National Environment Protection (Ambient Air Quality) Measure. The Plan is being undertaken in two stages with the first stage focusing on particles, the pollutant of greatest health concern.

Key Stage 1 projects initiated in 2012 include:

- Evaluation of options for an exposure reduction framework, which aims for a general reduction of background pollutant concentrations in large urban areas.
- A Health Risk Assessment of the impacts of four key ambient air pollutants (particulate matter, ozone, nitrogen dioxide and sulfur dioxide) in Australia, and identification of potential new air quality standards for particles.
- Economic analysis of the costs and benefits of potential new particles standards, including the costs and emissions reduction potential of a range of possible particle abatement measures.
- Evaluation of national regulatory options for regulating emissions from products and equipment.

National projects to reduce emissions from wood heaters, non-road spark ignition engines and non-road diesel engines continue to be progressed.

### **Industry emissions**

The *Protection of the Environment Operations Act 1997* and the *Protection of the Environment Operations (Clean Air) Regulation 2010* provide the framework for managing air pollution from major industry.

**Regulatory Controls on Industry Emissions Standards** In NSW, under the Protection of the Environment Operations (Clean Air) Regulation 2010, licensed industrial plant producing air emissions is divided into Groups based on the date the plant began operating. On 1 January 2012 to ensure retirement or upgrading of older more polluting plant, the regulation required all EPA licensed

industrial plant producing air emissions, and categorised as Group 2 (commencing operation before 1979) unless specifically exempted, to meet the stricter emissions limits applicable to Group 5 Plant (commencing operation on or after 1 August 1997 and before 1 September 2005).

**Particle emissions from coal mines** In 2012 following an environmental best practice review of NSW coal mines (see: [International best practice measures to prevent and/or minimise emissions of particulate matter from coal mining](#)), the EPA implemented the Dust Stop program to reduce dust from coal mining activities. Under the program enforceable Pollution Reduction Programs (PRPs) have been attached to environment protection licences for all open cut coal mines in NSW. These PRPs required each NSW coal mine to assess its operations against best practice and identify feasible improvements to reduce dust emissions. By the end of 2012, all coal mines had reported to the EPA.

### **Managing air quality in the Upper Hunter and regional NSW**

The EPA operates air programs throughout NSW where there are significant pollution sources and community impacts, including in areas such as the Upper Hunter which are not subject to monitoring and reporting under the Air NEPM. In 2012, the EPA established a high-level *Interagency Taskforce on Air Quality in the Hunter* to set dust emission reduction targets for the Hunter and oversee particle reduction measures, with dust from coal mines as its first priority.

There are a number of potential contributors to air pollution in rural and regional NSW, including dust storms, agricultural burning, woodsmoke, bushfires and hazard reduction burning. OEH and the EPA continue to work with stakeholders to provide the community with information about possible sources of particle pollution and how to manage pollution impacts.

## Section D – Data analysis

The following section provides a *basic statistical summary*, using percentiles, for each station and for each Ambient Air Quality NEPM standard. Percentiles for daily maximum values are presented, using only valid days in calculating these statistics.

For stations having two years or more of data, *trend data*, in the form of annual maxima, 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 is at least 15% at that station.

### Carbon monoxide

#### Statistical summary

**Table 23: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations (2012)**

Region/ Performance monitoring station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
<b>Sydney</b>									
Chullora	97.7	2.0	1.6	1.2	1.1	0.9	0.6	0.5	0.4
Liverpool	97.4	1.9	1.7	1.6	1.3	1.1	0.7	0.5	0.4
Macarthur	55.0	0.7	0.6	0.6	0.5	0.5	0.4	0.3	0.3
Campbelltown W	35.2	0.6	0.6	0.5	0.5	0.3	0.1	0.0	0.0
Camden	21.0	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1
Prospect	96.8	1.8	1.7	1.4	1.0	0.8	0.6	0.4	0.3
Rozelle	96.9	2.2	1.3	1.2	1.0	0.8	0.6	0.5	0.4
<b>Illawarra</b>									
Wollongong	96.5	1.2	1.1	1.0	0.8	0.7	0.5	0.4	0.3
<b>Central coast</b>									
Wyong	20.1	0.4	0.4	0.4	0.3	0.2	0.2	0.1	0.1
<b>Lower Hunter</b>									
Newcastle	94.3	1.3	1.3	1.1	0.8	0.6	0.3	0.1	0.0

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

## Trend analysis

**Table 24: Daily maximum rolling 8-hour average concentrations for CO (ppm)**

Region/ Performance monitoring Station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Blacktown*/Prospect	2.5*	1.6*			2.0	1.5	2.3	1.9	1.7	1.8
Chullora		3.4	2.8	2.3	1.8	1.6	2.6	2.3	1.5	2.0
Liverpool	5.5	3.0	2.8	2.1	2.0	2.4	2.2	2.1	2.4	1.9
Macarthur			1.0	1.8	1.8	0.9	0.8	0.9	1.1	0.7
Campbelltown W										0.6
Camden										0.3
Rozelle	2.2	2.2	2.1	2.0	1.8	1.5	2.3	1.8	1.4	2.2
<b>Illawarra</b>										
Wollongong	2.1	2.1	2.5	1.5	1.5	1.3	1.3	1.5	1.2	1.2
<b>Central coast</b>										
Wyong										0.4
<b>Lower Hunter</b>										
Newcastle	2.8	2.4	1.9	2.2	1.7	2.0	1.9	1.4	1.5	1.3

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

**Table 25: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations**  
**Station: Blacktown<sup>(1)</sup>/Prospect<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2003 <sup>(1)</sup>	93.6	0	2.5	2.2	1.9	1.3	0.9	0.4	0.1	0.0
2004 <sup>(1)</sup>	40.9	0	1.6	1.5	1.4	1.2	0.9	0.4	0.1	0.0
2005 <sup>#</sup>										
2006 <sup>#</sup>										
2007 <sup>(2)</sup>	78.5	0	2.0	1.7	1.5	1.3	1.1	0.6	0.3	0.2
2008 <sup>(2)</sup>	91.7	0	1.5	1.3	1.2	1.0	0.9	0.6	0.3	0.1
2009 <sup>(2)</sup>	97.5	0	2.3	2.1	1.8	1.3	1.1	0.7	0.5	0.3
2010 <sup>(2)</sup>	95.8	0	1.9	1.7	1.4	1.2	1.0	0.7	0.5	0.4
2011 <sup>(2)</sup>	95.6	0	1.7	1.5	1.4	1.1	1.0	0.6	0.4	0.3
2012 <sup>(2)</sup>	96.8	0	1.8	1.7	1.4	1.0	0.8	0.6	0.4	0.3

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

# Station closed pending relocation.

**Table 26: 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)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003											
2004	84.8	0	3.4	2.2	1.9	1.7	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	1.6	1.4	1.2	1.0	0.7	0.4	0.3	
2007	90.7	0	1.8	1.6	1.4	1.2	1.0	0.5	0.3	0.2	
2008	92.9	0	1.6	1.3	1.2	1.0	0.8	0.5	0.3	0.2	
2009	96.1	0	2.6	2.2	1.6	1.3	1.0	0.7	0.4	0.3	
2010	98.0	0	2.3	1.8	1.5	1.2	0.9	0.7	0.5	0.4	
2011	98.3	0	1.5	1.4	1.3	1.2	1.0	0.6	0.4	0.3	
2012	97.7	0	2.0	1.6	1.2	1.1	0.9	0.6	0.5	0.4	

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

**Table 27: 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)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	93.4	0	5.5	3.3	3.0	2.3	1.7	1.0	0.6	0.4	
2004	88.9	0	3.0	2.9	2.6	2.1	1.7	0.9	0.6	0.4	
2005	91.9	0	2.8	2.4	2.3	1.9	1.6	0.9	0.5	0.3	
2006	96.4	0	2.1	1.8	1.7	1.5	1.3	0.9	0.5	0.3	
2007	94.7	0	2.0	1.9	1.7	1.3	1.1	0.7	0.4	0.2	
2008	88.0	0	2.4	2.1	1.8	1.6	1.3	0.7	0.4	0.2	
2009	92.4	0	2.2	1.9	1.7	1.5	1.2	0.8	0.5	0.3	
2010	98.6	0	2.1	1.9	1.7	1.4	1.1	0.7	0.5	0.4	
2011	97.9	0	2.4	2.1	1.8	1.5	1.2	0.7	0.5	0.4	
2012	97.4	0	1.9	1.7	1.6	1.3	1.1	0.7	0.5	0.4	

**Table 28: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations**  
**Station: Macarthur<sup>(1)</sup>/Campbelltown West<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2005	55.2	0	1.0	0.9	0.8	0.7	0.5	0.4	0.3	0.2	
2006	98.2	0	1.8	1.6	1.5	0.6	0.4	0.3	0.2	0.2	
2007	94.0	0	1.8	1.7	1.1	0.6	0.5	0.4	0.3	0.2	
2008	97.3	0	0.9	0.6	0.6	0.5	0.4	0.3	0.2	0.1	
2009	95.1	0	0.8	0.8	0.7	0.6	0.6	0.4	0.4	0.2	
2010	96.1	0	0.9	0.8	0.8	0.6	0.5	0.4	0.4	0.3	
2011	95.3	0	1.1	0.8	0.7	0.6	0.5	0.4	0.3	0.3	
2012 <sup>(1)</sup>	55.0	0	0.7	0.6	0.6	0.5	0.5	0.4	0.3	0.3	
2012 <sup>(2)</sup>	35.2	0	0.6	0.6	0.5	0.5	0.3	0.1	0.0	0.0	

**Table 29: 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)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	93.1	0	2.2	1.8	1.5	1.3	1.0	0.7	0.4	0.3	
2004	94.0	0	2.2	1.9	1.7	1.4	1.1	0.7	0.4	0.3	
2005	97.3	0	2.1	1.8	1.6	1.3	1.0	0.6	0.4	0.2	
2006	96.6	0	2.0	1.6	1.4	1.2	0.9	0.6	0.4	0.3	
2007	96.1	0	1.8	1.7	1.3	0.9	0.8	0.5	0.3	0.2	
2008	94.4	0	1.5	1.3	1.2	1.1	0.9	0.5	0.3	0.2	
2009	95.6	0	2.3	1.5	1.4	1.2	1.0	0.7	0.5	0.4	
2010	93.6	0	1.8	1.5	1.4	1.1	0.9	0.7	0.5	0.4	
2011	96.6	0	1.4	1.2	1.1	0.9	0.8	0.5	0.4	0.3	
2012	96.9	0	2.2	1.3	1.2	1.0	0.8	0.6	0.5	0.4	

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

**Table 30: 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)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	96.4	0	2.1	1.9	1.5	1.3	1.0	0.7	0.5	0.3	
2004	97.3	0	2.1	1.6	1.5	1.2	1.0	0.7	0.5	0.3	
2005	96.8	0	2.5	1.8	1.5	1.2	1.1	0.7	0.5	0.3	
2006	98.6	0	1.5	1.3	1.2	1.0	0.9	0.6	0.4	0.3	
2007	90.7	0	1.5	1.3	1.1	1.0	0.8	0.6	0.4	0.2	
2008	94.0	0	1.3	0.9	0.9	0.8	0.7	0.5	0.3	0.2	
2009	82.1	0	1.3	1.1	1.1	1.0	0.8	0.5	0.4	0.2	
2010	98.4	0	1.5	1.2	1.1	0.9	0.8	0.6	0.5	0.4	
2011	97.2	0	1.2	1.1	1.0	0.9	0.7	0.6	0.4	0.3	
2012	96.5	0	1.2	1.1	1.0	0.8	0.7	0.5	0.4	0.3	

**Table 31: 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)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	93.0	0	2.8	2.5	2.0	1.6	1.1	0.6	0.3	0.2	
2004	97.0	0	2.4	2.0	1.7	1.3	1.1	0.6	0.4	0.2	
2005	95.8	0	1.9	1.7	1.6	1.3	0.9	0.4	0.3	0.2	
2006	94.7	0	2.2	1.6	1.5	1.0	0.8	0.4	0.3	0.2	
2007	43.4	0	1.7	1.6	1.5	1.1	0.8	0.5	0.2	0.1	
2008	96.1	0	2.0	1.5	1.4	1.2	1.0	0.6	0.4	0.3	
2009	84.3	0	1.9	1.6	1.4	1.1	0.9	0.6	0.4	0.3	
2010	87.5	0	1.4	1.2	1.1	0.9	0.6	0.4	0.3	0.2	
2011	98.8	0	1.5	1.2	1.0	0.7	0.5	0.3	0.1	0.1	
2012	94.3	0	1.3	1.3	1.1	0.8	0.6	0.3	0.1	0.0	

## Nitrogen dioxide

### Statistical summary

**Table 32: Statistical summary for NO<sub>2</sub> - Daily maximum 1-hour average concentrations (2012)**

Region/ Performance monitoring station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
<b>Sydney</b>									
Bringelly	89.7	0.038	0.027	0.025	0.022	0.018	0.015	0.011	0.007
Chullora	93.6	0.059	0.049	0.047	0.041	0.037	0.030	0.024	0.019
Liverpool	90.1	0.046	0.039	0.036	0.032	0.030	0.025	0.020	0.014
Macarthur	52.2	0.038	0.034	0.033	0.031	0.027	0.023	0.018	0.013
Campbelltown W	47.1	0.043	0.042	0.038	0.035	0.031	0.025	0.020	0.015
Camden	20.0	0.022	0.022	0.022	0.020	0.017	0.012	0.009	0.007
Prospect	92.7	0.050	0.043	0.037	0.034	0.030	0.026	0.021	0.015
Richmond	93.1	0.046	0.042	0.028	0.021	0.019	0.015	0.011	0.007
Rozelle	92.1	0.062	0.049	0.046	0.038	0.034	0.028	0.022	0.017
<b>Illawarra</b>									
Albion Park Sth	86.1	0.037	0.034	0.028	0.023	0.020	0.014	0.008	0.004
Wollongong	90.5	0.049	0.040	0.039	0.034	0.030	0.025	0.018	0.013
<b>Central coast</b>									
Wyong	18.9	0.029	0.028	0.025	0.023	0.018	0.015	0.012	0.009
<b>Lower Hunter</b>									
Newcastle	92.6	0.038	0.035	0.033	0.031	0.029	0.025	0.018	0.011
Wallsend	94.1	0.034	0.030	0.029	0.027	0.025	0.021	0.016	0.012

AAQ NEPM Standard - 0.120 ppm (1-hour average)

## Trend analysis

Table 33: Maximum 1-hour average concentrations for NO<sub>2</sub> (ppm)

Region/ Performance Monitoring Station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Blacktown*/Prospect	0.055*	0.048*			0.049	0.048	0.051	0.043	0.039	0.050
Bringelly	0.043	0.041	0.045	0.040	0.044	0.033	0.034	0.037	0.029	0.038
Chullora	0.066	0.056	0.064	0.066	0.049	0.044	0.052	0.057	0.051	0.059
Liverpool	0.064	0.060	0.063	0.053	0.053	0.046	0.053	0.053	0.046	0.046
Macarthur		0.052	0.081	0.066	0.047	0.044	0.048	0.042	0.045	0.038
Campbelltown W										0.043
Camden										0.022
Richmond	0.036	0.037	0.036	0.043	0.029	0.027	0.030	0.033	0.029	0.046
Rozelle	0.052	0.064	0.052	0.057	0.050	0.040	0.049	0.049	0.050	0.062
<b>Illawarra</b>										
Albion Park*/Albion Park Sth	0.048*	0.044*	0.044	0.051	0.045	0.029	0.052	0.041	0.040	0.037
Wollongong	0.049	0.044	0.058	0.050	0.043	0.046	0.048	0.052	0.043	0.049
<b>Central coast</b>										
Wyong										0.029
<b>Lower Hunter</b>										
Newcastle	0.039	0.044	0.041	0.042	0.032	0.033	0.043	0.038	0.038	0.038
Wallsend	0.050	0.041	0.038	0.037	0.035	0.031	0.040	0.038	0.037	0.034

AAQ NEPM Standard - 0.120 ppm (1-hour average)

Table 34: Annual average concentrations for NO<sub>2</sub> (ppm)

Region/ Performance Monitoring Station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Blacktown*/Prospect	0.013*	0.013*			0.012	0.010	0.011	0.012	0.010	0.010
Bringelly	0.007	0.006	0.006	0.006	0.006	0.005	0.004	0.005	0.005	0.005
Chullora	0.016	0.016	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.013
Liverpool	0.013	0.013	0.013	0.013	0.012	0.011	0.010	0.011	0.010	0.009
Macarthur		0.009	0.012	0.011	0.011	0.010	0.009	0.009	0.008	0.008
Campbelltown W										0.011
Camden										0.005
Richmond	0.007	0.007	0.006	0.006	0.006	0.005	0.005	0.005	0.005	0.005
Rozelle	0.014	0.014	0.013	0.013	0.012	0.011	0.011	0.011	0.011	0.012
<b>Illawarra</b>										
Albion Park*/Albion Park Sth	0.005*	0.004*	0.004*	0.005	0.004	0.004	0.003	0.003	0.002	0.004
Wollongong	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.009	0.008	0.009
<b>Central coast</b>										
Wyong										0.004
<b>Lower Hunter</b>										
Newcastle	0.008	0.009	0.009	0.008	0.007	0.007	0.008	0.008	0.007	0.008
Wallsend	0.008	0.008	0.008	0.009	0.008	0.007	0.008	0.009	0.008	0.008

AAQ NEPM Standard - 0.030 ppm (Annual average)

**Table 35: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Blacktown<sup>(1)</sup>/Prospect<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	89.8	0	0.055	0.049	0.047	0.038	0.035	0.030	0.025	0.020	
2004 <sup>(1)</sup>	39.3	0	0.048	0.045	0.043	0.038	0.035	0.030	0.024	0.019	
2005 <sup>#</sup>											
2006 <sup>#</sup>											
2007 <sup>(2)</sup>	64.7	0	0.049	0.044	0.042	0.037	0.034	0.029	0.025	0.020	
2008 <sup>(2)</sup>	59.5	0	0.048	0.037	0.036	0.034	0.031	0.026	0.019	0.015	
2009 <sup>(2)</sup>	84.6	0	0.051	0.040	0.039	0.035	0.032	0.027	0.022	0.017	
2010 <sup>(2)</sup>	82.0	0	0.043	0.039	0.038	0.033	0.031	0.027	0.023	0.017	
2011 <sup>(2)</sup>	94.6	0	0.039	0.038	0.035	0.032	0.029	0.025	0.020	0.015	
2012 <sup>(2)</sup>	92.7	0	0.050	0.043	0.037	0.034	0.030	0.026	0.021	0.015	

# Station closed pending relocation

AAQ NEPM Standard - 0.120 ppm (1-hour average)

**Table 36: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Bringelly**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	87.1	0	0.043	0.032	0.029	0.022	0.020	0.017	0.013	0.010	
2004	90.8	0	0.041	0.033	0.029	0.025	0.022	0.017	0.013	0.010	
2005	91.5	0	0.045	0.033	0.030	0.026	0.022	0.018	0.013	0.009	
2006	92.0	0	0.040	0.036	0.032	0.026	0.022	0.018	0.014	0.010	
2007	92.2	0	0.044	0.033	0.029	0.024	0.022	0.016	0.012	0.009	
2008	86.3	0	0.033	0.027	0.024	0.020	0.018	0.014	0.011	0.007	
2009	77.9	0	0.034	0.027	0.025	0.022	0.018	0.013	0.010	0.006	
2010	87.4	0	0.037	0.029	0.027	0.022	0.019	0.015	0.011	0.009	
2011	87.4	0	0.029	0.024	0.023	0.019	0.017	0.013	0.010	0.007	
2012	89.7	0	0.038	0.027	0.025	0.022	0.018	0.015	0.011	0.007	

**Table 37: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Chullora**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	76.0	0	0.066	0.055	0.050	0.043	0.038	0.033	0.027	0.022	
2004	84.3	0	0.056	0.052	0.051	0.044	0.041	0.034	0.028	0.023	
2005	92.5	0	0.064	0.048	0.044	0.040	0.037	0.030	0.026	0.020	
2006	91.7	0	0.066	0.052	0.046	0.041	0.037	0.031	0.025	0.019	
2007	90.3	0	0.049	0.047	0.045	0.038	0.035	0.029	0.024	0.017	
2008	88.9	0	0.044	0.041	0.040	0.037	0.034	0.029	0.024	0.018	
2009	90.5	0	0.052	0.044	0.041	0.036	0.033	0.028	0.023	0.018	
2010	86.5	0	0.057	0.042	0.040	0.036	0.032	0.028	0.023	0.017	
2011	93.2	0	0.051	0.046	0.043	0.037	0.034	0.029	0.024	0.018	
2012	93.6	0	0.059	0.049	0.047	0.041	0.037	0.030	0.024	0.019	

AAQ NEPM Standard - 0.120 ppm (1-hour average)

**Table 38: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Liverpool**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	89.2	0	0.064	0.048	0.044	0.039	0.034	0.028	0.024	0.020	
2004	93.2	0	0.060	0.050	0.049	0.042	0.036	0.030	0.025	0.020	
2005	92.0	0	0.063	0.051	0.045	0.039	0.034	0.029	0.024	0.020	
2006	92.7	0	0.053	0.049	0.047	0.041	0.035	0.029	0.024	0.018	
2007	90.5	0	0.053	0.046	0.039	0.035	0.032	0.028	0.023	0.017	
2008	84.7	0	0.046	0.040	0.037	0.033	0.030	0.027	0.021	0.016	
2009	85.3	0	0.053	0.044	0.042	0.034	0.030	0.025	0.020	0.015	
2010	92.0	0	0.053	0.044	0.041	0.035	0.030	0.026	0.022	0.017	
2011	92.0	0	0.046	0.039	0.038	0.032	0.030	0.025	0.020	0.015	
2012	90.1	0	0.046	0.039	0.036	0.032	0.030	0.025	0.020	0.014	

**Table 39: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Macarthur<sup>(1)</sup>/Campbelltown West<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2004	16.2	0	0.052	0.052	0.051	0.039	0.032	0.024	0.020	0.016	
2005	91.9	0	0.081	0.053	0.048	0.042	0.035	0.030	0.024	0.019	
2006	93.9	0	0.066	0.049	0.048	0.043	0.036	0.030	0.024	0.018	
2007	90.2	0	0.047	0.043	0.041	0.037	0.033	0.028	0.023	0.018	
2008	89.0	0	0.044	0.041	0.039	0.035	0.032	0.026	0.021	0.016	
2009	91.0	0	0.048	0.044	0.040	0.035	0.031	0.025	0.020	0.016	
2010	90.4	0	0.042	0.039	0.036	0.032	0.029	0.025	0.020	0.015	
2011	92.9	0	0.045	0.039	0.037	0.033	0.029	0.024	0.019	0.014	
2012 <sup>(1)</sup>	52.2	0	0.038	0.034	0.033	0.031	0.027	0.023	0.018	0.013	
2012 <sup>(2)</sup>	33.9	0	0.049	0.048	0.043	0.041	0.038	0.029	0.024	0.019	

**Table 40: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Richmond**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	93.0	0	0.036	0.032	0.029	0.026	0.024	0.020	0.016	0.012	
2004	88.4	0	0.037	0.035	0.033	0.030	0.026	0.021	0.015	0.011	
2005	90.1	0	0.036	0.032	0.030	0.027	0.025	0.020	0.014	0.010	
2006	91.4	0	0.043	0.036	0.033	0.027	0.024	0.020	0.015	0.011	
2007	89.1	0	0.029	0.028	0.026	0.023	0.021	0.016	0.012	0.009	
2008	86.9	0	0.027	0.024	0.023	0.021	0.019	0.015	0.011	0.008	
2009	91.4	0	0.030	0.027	0.026	0.023	0.020	0.016	0.012	0.009	
2010	87.9	0	0.033	0.025	0.024	0.021	0.020	0.015	0.012	0.008	
2011	94.4	0	0.029	0.026	0.024	0.021	0.019	0.015	0.011	0.008	
2012	93.1	0	0.046	0.042	0.028	0.021	0.019	0.015	0.011	0.007	

AAQ NEPM Standard - 0.120 ppm (1-hour average)

**Table 41: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Rozelle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	88.6	0	0.052	0.047	0.047	0.042	0.038	0.032	0.026	0.019	
2004	89.2	0	0.064	0.054	0.047	0.043	0.037	0.031	0.025	0.019	
2005	91.2	0	0.052	0.047	0.044	0.040	0.035	0.031	0.023	0.017	
2006	92.9	0	0.057	0.050	0.044	0.038	0.035	0.030	0.025	0.017	
2007	89.2	0	0.050	0.043	0.040	0.038	0.033	0.028	0.023	0.015	
2008	79.1	0	0.040	0.037	0.036	0.033	0.031	0.027	0.022	0.015	
2009	86.1	0	0.049	0.039	0.036	0.033	0.031	0.026	0.021	0.015	
2010	79.6	0	0.049	0.039	0.037	0.034	0.031	0.028	0.022	0.015	
2011	90.9	0	0.050	0.043	0.041	0.035	0.031	0.028	0.022	0.014	
2012	92.1	0	0.062	0.049	0.046	0.038	0.034	0.028	0.022	0.017	

**Table 42: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Albion Park<sup>(1)</sup>/Albion Park Sth<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	90.0	0	0.048	0.040	0.036	0.030	0.023	0.017	0.011	0.006	
2004 <sup>(1)</sup>	91.4	0	0.044	0.036	0.035	0.026	0.021	0.016	0.010	0.006	
2005 <sup>(1)</sup>	4.8	0	0.035	0.035	0.035	0.034	0.031	0.011	0.005	0.004	
2006 <sup>(2)</sup>	78.9	0	0.051	0.042	0.034	0.027	0.022	0.016	0.011	0.007	
2007 <sup>(2)</sup>	93.0	0	0.045	0.034	0.031	0.027	0.021	0.015	0.010	0.006	
2008 <sup>(2)</sup>	55.9	0	0.029	0.026	0.025	0.021	0.018	0.014	0.009	0.004	
2009 <sup>(2)</sup>	91.3	0	0.052	0.038	0.033	0.024	0.022	0.014	0.009	0.004	
2010 <sup>(2)</sup>	87.5	0	0.041	0.030	0.027	0.023	0.019	0.013	0.008	0.004	
2011 <sup>(2)</sup>	89.1	0	0.040	0.030	0.027	0.021	0.016	0.012	0.007	0.003	
2012 <sup>(2)</sup>	86.1	0	0.037	0.034	0.028	0.023	0.020	0.014	0.008	0.004	

**Table 43: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Wollongong**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	93.3	0	0.049	0.041	0.037	0.035	0.032	0.027	0.021	0.017	
2004	92.2	0	0.044	0.041	0.038	0.034	0.030	0.026	0.020	0.015	
2005	88.6	0	0.058	0.043	0.039	0.032	0.029	0.025	0.019	0.014	
2006	87.8	0	0.050	0.045	0.040	0.035	0.031	0.025	0.020	0.015	
2007	89.6	0	0.043	0.038	0.037	0.032	0.029	0.025	0.020	0.014	
2008	83.1	0	0.046	0.037	0.036	0.033	0.030	0.026	0.020	0.014	
2009	70.1	0	0.048	0.044	0.037	0.034	0.030	0.025	0.019	0.013	
2010	87.1	0	0.052	0.042	0.037	0.033	0.028	0.024	0.020	0.015	
2011	90.8	0	0.043	0.039	0.037	0.031	0.029	0.024	0.019	0.013	
2012	90.5	0	0.049	0.040	0.039	0.034	0.030	0.025	0.018	0.013	

AAQ NEPM Standard - 0.120 ppm (1-hour average)

**Table 44: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Newcastle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
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	0.038	0.035	0.032	0.029	0.025	0.020	0.012	
2005	89.7	0	0.041	0.035	0.033	0.031	0.029	0.025	0.018	0.011	
2006	89.2	0	0.042	0.035	0.033	0.031	0.028	0.024	0.018	0.010	
2007	40.6	0	0.032	0.031	0.029	0.026	0.025	0.021	0.015	0.009	
2008	82.8	0	0.033	0.030	0.029	0.027	0.026	0.021	0.016	0.010	
2009	89.5	0	0.043	0.037	0.032	0.029	0.027	0.022	0.016	0.010	
2010	85.9	0	0.038	0.032	0.031	0.029	0.028	0.023	0.017	0.011	
2011	90.7	0	0.038	0.034	0.033	0.029	0.027	0.023	0.017	0.010	
2012	92.6	0	0.038	0.035	0.033	0.031	0.029	0.025	0.018	0.011	

**Table 45: Statistical summary for NO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Wallsend**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	85.9	0	0.050	0.037	0.035	0.029	0.027	0.021	0.016	0.012	
2004	92.2	0	0.041	0.035	0.033	0.029	0.027	0.023	0.017	0.012	
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	0.030	0.027	0.023	0.018	0.013	
2007	93.9	0	0.035	0.032	0.031	0.029	0.026	0.022	0.016	0.011	
2008	87.1	0	0.031	0.029	0.028	0.026	0.023	0.020	0.015	0.010	
2009	83.8	0	0.040	0.033	0.031	0.027	0.025	0.021	0.016	0.011	
2010	86.1	0	0.038	0.033	0.032	0.028	0.026	0.022	0.017	0.012	
2011	90.7	0	0.037	0.032	0.029	0.027	0.026	0.021	0.016	0.011	
2012	94.1	0	0.034	0.030	0.029	0.027	0.025	0.021	0.016	0.012	

# Ozone

## Statistical summary

**Table 46: Statistical summary for O<sub>3</sub> - Daily maximum 1-hour average concentrations (2012)**

Region/ Performance monitoring station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
<b>Sydney</b>									
Bringelly	93.0	0.088	0.075	0.072	0.060	0.049	0.040	0.030	0.026
Chullora	94.2	0.080	0.065	0.055	0.047	0.040	0.031	0.026	0.021
Liverpool	92.4	0.079	0.068	0.065	0.054	0.047	0.035	0.028	0.022
Macarthur	52.6	0.079	0.074	0.068	0.057	0.047	0.034	0.028	0.025
Campbelltown W	53.6	0.080	0.079	0.076	0.066	0.056	0.040	0.035	0.029
Camden	20.3	0.095	0.094	0.091	0.078	0.068	0.053	0.041	0.031
Oakdale	92.7	0.089	0.078	0.072	0.056	0.048	0.039	0.030	0.027
Prospect	91.8	0.080	0.076	0.069	0.061	0.050	0.039	0.028	0.023
Richmond	92.9	0.085	0.070	0.065	0.056	0.047	0.039	0.031	0.026
Rozelle	94.8	0.069	0.057	0.052	0.045	0.042	0.034	0.029	0.024
St Marys	93.3	0.085	0.074	0.069	0.058	0.049	0.038	0.030	0.025
<b>Central coast</b>									
Wyong	19.3	0.078	0.077	0.071	0.060	0.056	0.041	0.032	0.028
<b>Illawarra</b>									
Albion Park Sth	93.8	0.067	0.058	0.051	0.044	0.041	0.032	0.029	0.025
Kembla Grange	94.3	0.068	0.057	0.052	0.045	0.041	0.032	0.029	0.025
Wollongong	94.9	0.065	0.062	0.054	0.047	0.039	0.031	0.027	0.024
<b>Lower Hunter</b>									
Newcastle	94.3	0.071	0.057	0.052	0.046	0.041	0.033	0.028	0.024
Wallsend	94.7	0.080	0.064	0.055	0.050	0.043	0.034	0.028	0.023

AAQ NEPM Standard - 0.100 ppm (1-hour average)

**Table 47: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentrations (2012)**

Region/ Performance monitoring station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
<b>Sydney</b>									
Bringelly	97.0	0.072	0.066	0.062	0.054	0.046	0.037	0.029	0.025
Chullora	98.1	0.068	0.058	0.049	0.041	0.037	0.028	0.024	0.020
Liverpool	96.1	0.071	0.062	0.055	0.048	0.043	0.033	0.026	0.021
Macarthur	54.7	0.073	0.062	0.059	0.052	0.043	0.031	0.027	0.023
Campbelltown W	33.8	0.071	0.069	0.065	0.061	0.051	0.038	0.033	0.028
Camden	21.0	<b>0.084</b>	<b>0.083</b>	0.074	0.069	0.059	0.048	0.038	0.029
Oakdale	96.7	<b>0.081</b>	0.071	0.060	0.050	0.045	0.036	0.029	0.026
Prospect	95.6	0.073	0.064	0.061	0.053	0.045	0.036	0.027	0.022
Richmond	96.6	0.070	0.061	0.056	0.050	0.044	0.036	0.030	0.025
Rozelle	98.6	0.054	0.049	0.047	0.042	0.037	0.032	0.028	0.023
St Marys	97.2	0.072	0.065	0.061	0.053	0.045	0.035	0.029	0.024
<b>Central coast</b>									
Wyong	20.0	0.066	0.066	0.065	0.057	0.050	0.039	0.031	0.027
<b>Illawarra</b>									
Albion Park Sth	97.8	0.064	0.051	0.047	0.041	0.037	0.031	0.028	0.024
Kembla Grange	98.4	0.061	0.051	0.047	0.041	0.037	0.031	0.027	0.024
Wollongong	98.9	0.061	0.055	0.050	0.042	0.038	0.030	0.026	0.023
<b>Lower Hunter</b>									
Newcastle	97.8	0.057	0.049	0.048	0.043	0.039	0.032	0.027	0.022
Wallsend	98.7	0.070	0.056	0.051	0.046	0.041	0.033	0.027	0.022

AAQ NEPM Standard - 0.080 ppm (rolling 4-hour average)

## Trend analysis

Table 48: Maximum 1-hour average concentrations for O<sub>3</sub> (ppm)

Region/ Performance monitoring station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Blacktown*/Prospect	<b>0.181*</b>	<b>0.123*</b>	#	#	0.089	<b>0.107</b>	<b>0.126</b>	<b>0.104</b>	<b>0.126</b>	0.080
Bringelly	<b>0.155</b>	<b>0.122</b>	<b>0.112</b>	<b>0.119</b>	<b>0.111</b>	0.093	<b>0.120</b>	<b>0.104</b>	<b>0.125</b>	0.088
Chullora	<b>0.084</b>	<b>0.105</b>	0.086	<b>0.117</b>	0.088	0.080	<b>0.154</b>	0.083	<b>0.114</b>	0.080
Liverpool	<b>0.151</b>	<b>0.113</b>	<b>0.149</b>	0.128	<b>0.116</b>	0.098	<b>0.151</b>	0.091	<b>0.103</b>	0.079
Macarthur		0.099	<b>0.142</b>	0.128	<b>0.121</b>	0.085	<b>0.116</b>	<b>0.119</b>	<b>0.131</b>	0.079
Campbelltown W										0.080
Camden										0.095
Oakdale	<b>0.102</b>	<b>0.124</b>	<b>0.130</b>	0.109	<b>0.142</b>	0.093	<b>0.128</b>	0.099	<b>0.126</b>	0.089
Richmond	<b>0.148</b>	0.096	<b>0.125</b>	0.108	<b>0.134</b>	0.078	<b>0.102</b>	0.089	<b>0.116</b>	0.085
Rozelle	<b>0.083</b>	0.094	0.081	0.093	0.088	0.056	0.083	0.073	0.093	0.069
St Marys	0.093	<b>0.142</b>	<b>0.113</b>	<b>0.124</b>	<b>0.123</b>	0.096	<b>0.132</b>	0.095	<b>0.136</b>	0.085
<b>Illawarra</b>										
Albion Park*/Albion Park Sth	<b>0.130*</b>	<b>0.112*</b>	0.067*	0.096	0.092	0.062	<b>0.102</b>	0.093	<b>0.118</b>	0.067
Kembla Grange	<b>0.113</b>	<b>0.120</b>	0.091	0.093	0.093	0.072	<b>0.103</b>	0.081	<b>0.121</b>	0.068
Wollongong	0.097	<b>0.103</b>	<b>0.102</b>	0.096	0.077	0.067	0.083	0.082	0.084	0.065
<b>Lower Hunter</b>										
Newcastle	0.079	<b>0.112</b>	0.078	0.068	0.053	0.064	0.073	0.086	0.066	0.071
Wallsend	0.077	<b>0.103</b>	0.094	0.086	0.070	0.057	0.086	0.067	0.071	0.080
<b>Central coast</b>										
Wyong										0.078
<b>Regional</b>										
Bathurst	0.056	0.092	0.056	0.075	0.068					

AAQ NEPM Standard - 0.100 ppm (1-hour average)

# Station closed pending relocation

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 49: Maximum rolling 4-hour average concentrations for O<sub>3</sub> (ppm)**

Region/ Performance monitoring station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Blacktown*/Prospect	<b>0.157*</b>	<b>0.107*</b>			<b>0.085</b>	<b>0.096</b>	<b>0.100</b>	<b>0.097</b>	<b>0.114</b>	0.073
Bringelly	<b>0.133</b>	<b>0.110</b>	<b>0.102</b>	<b>0.110</b>	<b>0.095</b>	0.078	<b>0.108</b>	<b>0.089</b>	<b>0.118</b>	0.072
Chullora	0.077	<b>0.086</b>	0.080	<b>0.104</b>	0.074	0.074	<b>0.112</b>	0.072	<b>0.096</b>	0.068
Liverpool	<b>0.132</b>	<b>0.092</b>	<b>0.121</b>	<b>0.124</b>	<b>0.094</b>	<b>0.089</b>	<b>0.103</b>	<b>0.081</b>	<b>0.095</b>	0.071
Macarthur		<b>0.084</b>	<b>0.126</b>	<b>0.117</b>	<b>0.101</b>	0.070	<b>0.097</b>	<b>0.103</b>	<b>0.122</b>	0.073
Campbelltown W										0.071
Camden										<b>0.084</b>
Oakdale	<b>0.089</b>	<b>0.099</b>	<b>0.106</b>	<b>0.085</b>	<b>0.116</b>	0.075	<b>0.108</b>	<b>0.088</b>	<b>0.098</b>	<b>0.081</b>
Richmond	<b>0.138</b>	<b>0.088</b>	<b>0.100</b>	<b>0.095</b>	<b>0.121</b>	0.067	<b>0.090</b>	<b>0.082</b>	<b>0.088</b>	0.070
Rozelle	0.070	<b>0.087</b>	0.065	<b>0.082</b>	0.075	0.048	0.073	0.067	0.080	0.054
St Marys	<b>0.091</b>	<b>0.128</b>	<b>0.091</b>	<b>0.109</b>	<b>0.105</b>	<b>0.082</b>	<b>0.106</b>	<b>0.083</b>	<b>0.121</b>	0.072
<b>Central coast</b>										
Wyong										0.066
<b>Illawarra</b>										
Albion Park*/ Albion Park Sth	<b>0.111</b>	<b>0.092</b>	0.063	0.077	0.080	0.055	<b>0.083</b>	0.073	<b>0.099</b>	0.064
Kembla Grange	<b>0.107</b>	<b>0.100</b>	<b>0.084</b>	<b>0.081</b>	<b>0.082</b>	0.066	<b>0.090</b>	0.078	<b>0.105</b>	0.061
Wollongong	0.080	<b>0.090</b>	<b>0.099</b>	<b>0.086</b>	0.073	0.063	0.074	0.073	0.078	0.061
<b>Lower Hunter</b>										
Newcastle	0.061	0.073	0.070	0.064	0.047	0.058	0.067	0.076	0.063	0.057
Wallsend	0.059	0.078	0.074	0.066	0.068	0.054	0.076	0.063	0.059	0.070
<b>Regional</b>										
Bathurst	0.053	0.067	0.054	0.071	0.066					

AAQ NEPM Standard - 0.080 ppm (rolling 4-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 50: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Blacktown<sup>(1)</sup>/Prospect<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	90.3	<b>3</b>	<b>0.181</b>	0.089	0.080	0.061	0.051	0.037	0.029	0.024	
2004 <sup>(1)</sup>	39.5	<b>2</b>	<b>0.123</b>	<b>0.103</b>	0.091	0.084	0.068	0.050	0.036	0.028	
2005 <sup>#</sup>											
2006 <sup>#</sup>											
2007 <sup>(2)</sup>	73.3	0	0.089	0.069	0.066	0.061	0.052	0.039	0.030	0.024	
2008 <sup>(2)</sup>	89.5	1	<b>0.107</b>	0.084	0.063	0.052	0.045	0.035	0.027	0.023	
2009 <sup>(2)</sup>	93.3	<b>3</b>	<b>0.126</b>	0.099	0.086	0.070	0.061	0.041	0.032	0.026	
2010 <sup>(2)</sup>	88.7	<b>2</b>	<b>0.104</b>	0.082	0.072	0.062	0.050	0.038	0.030	0.023	
2011 <sup>(2)</sup>	95.2	1	<b>0.126</b>	0.086	0.068	0.057	0.046	0.034	0.028	0.023	
2012 <sup>(2)</sup>	91.8	0	0.080	0.076	0.069	0.061	0.050	0.039	0.028	0.023	

AAQ NEPM Standard - 0.100 ppm (1-hour average)

# Station closed pending relocation

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 51: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Bringelly**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	91.3	<b>3</b>	<b>0.155</b>	0.099	0.078	0.066	0.056	0.041	0.032	0.028	
2004	91.1	<b>6</b>	<b>0.122</b>	<b>0.105</b>	0.095	0.074	0.060	0.044	0.033	0.029	
2005	88.4	<b>3</b>	<b>0.112</b>	0.091	0.081	0.066	0.057	0.043	0.034	0.029	
2006	92.1	<b>6</b>	<b>0.119</b>	<b>0.107</b>	0.095	0.071	0.057	0.044	0.033	0.027	
2007	92.1	<b>4</b>	<b>0.111</b>	<b>0.103</b>	0.079	0.069	0.058	0.044	0.033	0.028	
2008	89.8	0	0.093	0.083	0.071	0.055	0.051	0.039	0.030	0.026	
2009	90.8	<b>4</b>	<b>0.120</b>	<b>0.102</b>	0.089	0.072	0.062	0.041	0.030	0.026	
2010	89.2	<b>2</b>	<b>0.104</b>	0.081	0.075	0.061	0.052	0.040	0.031	0.026	
2011	88.5	<b>2</b>	<b>0.125</b>	0.087	0.080	0.065	0.055	0.038	0.030	0.026	
2012	93.0	0	0.088	0.075	0.072	0.060	0.049	0.040	0.030	0.026	

**Table 52: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Chullora**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	80.6	0	0.084	0.067	0.064	0.046	0.040	0.034	0.028	0.023	
2004	87.2	1	<b>0.105</b>	0.091	0.075	0.063	0.051	0.038	0.030	0.026	
2005	92.0	0	0.086	0.078	0.067	0.058	0.048	0.037	0.030	0.025	
2006	94.3	1	<b>0.117</b>	0.078	0.073	0.058	0.049	0.036	0.030	0.024	
2007	93.0	0	0.088	0.069	0.064	0.054	0.044	0.036	0.029	0.024	
2008	93.9	0	0.080	0.064	0.057	0.049	0.042	0.032	0.027	0.022	
2009	92.7	2	<b>0.154</b>	0.089	0.077	0.061	0.050	0.035	0.027	0.023	
2010	93.1	0	0.083	0.067	0.062	0.050	0.043	0.031	0.026	0.023	
2011	94.2	1	<b>0.114</b>	0.073	0.061	0.052	0.043	0.032	0.025	0.021	
2012	94.2	0	0.080	0.065	0.055	0.047	0.040	0.031	0.026	0.021	

AAQ NEPM Standard - 0.100 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 53: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Liverpool**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	93.3	4	<b>0.151</b>	<b>0.105</b>	0.074	0.055	0.047	0.035	0.029	0.024	
2004	84.0	3	<b>0.113</b>	0.100	0.086	0.069	0.054	0.040	0.030	0.025	
2005	88.0	1	<b>0.149</b>	0.085	0.077	0.059	0.052	0.040	0.032	0.026	
2006	91.4	4	<b>0.128</b>	<b>0.105</b>	0.090	0.069	0.054	0.040	0.030	0.025	
2007	90.3	2	<b>0.116</b>	0.086	0.078	0.062	0.052	0.039	0.029	0.024	
2008	87.1	0	0.098	0.074	0.065	0.057	0.046	0.035	0.028	0.023	
2009	88.9	2	<b>0.151</b>	0.092	0.088	0.068	0.052	0.038	0.029	0.024	
2010	94.2	0	0.091	0.078	0.069	0.057	0.047	0.035	0.028	0.023	
2011	94.1	1	<b>0.103</b>	0.080	0.071	0.057	0.046	0.032	0.025	0.022	
2012	92.4	0	0.079	0.068	0.065	0.054	0.047	0.035	0.028	0.022	

**Table 54: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Macarthur<sup>(1)</sup>/Campbelltown West<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2004	16.2	0	0.099	0.099	0.091	0.076	0.062	0.055	0.039	0.028	
2005	94.7	6	<b>0.142</b>	<b>0.106</b>	0.091	0.073	0.061	0.044	0.033	0.029	
2006	94.3	8	<b>0.128</b>	<b>0.116</b>	<b>0.103</b>	0.074	0.059	0.044	0.032	0.027	
2007	90.6	3	<b>0.121</b>	0.098	0.089	0.071	0.059	0.042	0.032	0.026	
2008	93.6	0	0.085	0.081	0.072	0.059	0.052	0.037	0.031	0.027	
2009	92.3	7	<b>0.116</b>	<b>0.108</b>	<b>0.102</b>	0.078	0.062	0.043	0.032	0.028	
2010	93.9	1	<b>0.119</b>	0.090	0.083	0.065	0.054	0.040	0.032	0.028	
2011	93.6	2	<b>0.131</b>	0.096	0.084	0.067	0.054	0.037	0.030	0.026	
2012 <sup>(1)</sup>	52.6	0	0.079	0.074	0.068	0.057	0.047	0.034	0.028	0.025	
2012 <sup>(2)</sup>	32.5	0	0.080	0.079	0.076	0.066	0.056	0.040	0.035	0.029	

AAQ NEPM Standard - 0.100 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 55: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Oakdale**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	91.1	1	<b>0.102</b>	0.083	0.075	0.066	0.055	0.042	0.033	0.029	
2004	77.3	7	<b>0.124</b>	<b>0.106</b>	0.103	0.074	0.065	0.047	0.035	0.030	
2005	91.9	4	<b>0.130</b>	<b>0.105</b>	0.085	0.071	0.058	0.043	0.034	0.030	
2006	87.9	1	<b>0.109</b>	0.089	0.083	0.070	0.060	0.048	0.035	0.030	
2007	87.6	4	<b>0.142</b>	<b>0.104</b>	0.092	0.071	0.060	0.044	0.034	0.030	
2008	92.5	0	0.093	0.070	0.065	0.058	0.050	0.039	0.032	0.027	
2009	85.9	6	<b>0.128</b>	<b>0.106</b>	0.093	0.078	0.058	0.042	0.032	0.029	
2010	94.2	0	0.099	0.090	0.080	0.066	0.055	0.039	0.033	0.029	
2011	95.0	3	<b>0.126</b>	0.084	0.075	0.063	0.051	0.039	0.031	0.027	
2012	92.7	0	0.089	0.078	0.072	0.056	0.048	0.039	0.030	0.027	

**Table 56: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Richmond**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	86.1	2	<b>0.148</b>	0.086	0.078	0.061	0.053	0.039	0.030	0.026	
2004	89.5	0	0.096	0.080	0.076	0.065	0.058	0.045	0.034	0.029	
2005	91.8	2	<b>0.125</b>	0.091	0.083	0.065	0.058	0.045	0.035	0.029	
2006	92.8	2	<b>0.108</b>	0.088	0.077	0.069	0.058	0.045	0.035	0.029	
2007	91.1	1	<b>0.134</b>	0.086	0.075	0.068	0.058	0.045	0.034	0.029	
2008	90.6	0	0.078	0.066	0.061	0.053	0.045	0.036	0.030	0.026	
2009	90.1	1	<b>0.102</b>	0.086	0.078	0.066	0.058	0.043	0.034	0.029	
2010	93.2	0	0.089	0.078	0.071	0.060	0.052	0.040	0.032	0.028	
2011	94.3	1	<b>0.116</b>	0.077	0.067	0.058	0.048	0.037	0.031	0.026	
2012	92.9	0	0.085	0.070	0.065	0.056	0.047	0.039	0.031	0.026	

AAQ NEPM Standard - 0.100 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 57: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Rozelle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	91.2	0	0.083	0.069	0.059	0.045	0.037	0.031	0.026	0.023	
2004	88.9	0	0.094	0.080	0.074	0.056	0.045	0.034	0.027	0.024	
2005	88.9	0	0.081	0.069	0.060	0.051	0.044	0.034	0.029	0.024	
2006	92.2	0	0.093	0.069	0.063	0.052	0.042	0.032	0.027	0.023	
2007	92.0	0	0.088	0.058	0.050	0.046	0.041	0.033	0.027	0.023	
2008	92.8	0	0.056	0.050	0.046	0.042	0.038	0.030	0.026	0.022	
2009	92.6	0	0.083	0.068	0.060	0.050	0.042	0.032	0.028	0.023	
2010	89.1	0	0.073	0.057	0.055	0.047	0.040	0.033	0.029	0.025	
2011	93.3	0	0.093	0.066	0.053	0.044	0.038	0.031	0.026	0.023	
2012	94.8	0	0.069	0.057	0.052	0.045	0.042	0.034	0.029	0.024	

**Table 58: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: St Marys**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	92.7	0	0.093	0.077	0.068	0.059	0.052	0.037	0.030	0.026	
2004	93.3	3	<b>0.142</b>	0.097	0.085	0.068	0.058	0.044	0.033	0.029	
2005	92.1	2	<b>0.113</b>	0.090	0.078	0.066	0.058	0.042	0.034	0.029	
2006	92.6	3	<b>0.124</b>	0.091	0.078	0.067	0.056	0.043	0.032	0.027	
2007	92.2	3	<b>0.123</b>	0.093	0.077	0.065	0.057	0.044	0.033	0.028	
2008	92.7	0	0.096	0.076	0.060	0.053	0.048	0.038	0.031	0.026	
2009	93.0	5	<b>0.132</b>	0.102	0.082	0.073	0.062	0.041	0.032	0.028	
2010	93.5	0	0.095	0.083	0.073	0.064	0.053	0.040	0.032	0.027	
2011	94.8	3	<b>0.136</b>	0.094	0.074	0.060	0.051	0.037	0.030	0.026	
2012	93.3	0	0.085	0.074	0.069	0.058	0.049	0.038	0.030	0.025	

**Table 59: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentration  
Station: Albion Park <sup>(1)</sup>/Albion Park Sth<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	92.8	<b>4</b>	<b>0.130</b>	<b>0.105</b>	0.067	0.044	0.040	0.034	0.030	0.027	
2004 <sup>(1)</sup>	93.5	1	<b>0.112</b>	0.083	0.068	0.051	0.044	0.035	0.030	0.027	
2005 <sup>(1)</sup>	4.8	0	0.067	0.067	0.067	0.066	0.060	0.038	0.030	0.023	
2006 <sup>(2)</sup>	86.2	0	0.096	0.083	0.075	0.054	0.046	0.036	0.031	0.027	
2007 <sup>(2)</sup>	91.4	0	0.092	0.071	0.060	0.051	0.042	0.035	0.031	0.028	
2008 <sup>(2)</sup>	90.5	0	0.062	0.058	0.056	0.047	0.040	0.034	0.030	0.025	
2009 <sup>(2)</sup>	93.2	1	<b>0.102</b>	0.075	0.070	0.053	0.044	0.037	0.034	0.030	
2010 <sup>(2)</sup>	90.3	0	0.093	0.061	0.059	0.049	0.041	0.031	0.028	0.026	
2011 <sup>(2)</sup>	89.6	1	<b>0.118</b>	0.071	0.059	0.046	0.038	0.032	0.028	0.024	
2012 <sup>(2)</sup>	93.8	0	0.067	0.058	0.051	0.044	0.041	0.032	0.029	0.025	

AAQ NEPM Standard - 0.100 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 60: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Kembla Grange**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	93.3	<b>2</b>	<b>0.113</b>	0.095	0.069	0.044	0.038	0.033	0.030	0.025	
2004	91.3	<b>3</b>	<b>0.120</b>	0.093	0.064	0.052	0.043	0.036	0.031	0.027	
2005	92.6	0	0.091	0.074	0.066	0.054	0.044	0.036	0.032	0.027	
2006	94.6	0	0.093	0.074	0.065	0.052	0.047	0.036	0.030	0.026	
2007	94.1	0	0.093	0.076	0.063	0.049	0.043	0.034	0.031	0.027	
2008	93.6	0	0.072	0.063	0.055	0.048	0.042	0.032	0.029	0.025	
2009	87.5	1	<b>0.103</b>	0.083	0.070	0.052	0.044	0.035	0.031	0.027	
2010	89.7	0	0.081	0.061	0.056	0.049	0.043	0.033	0.029	0.025	
2011	94.4	1	<b>0.121</b>	0.073	0.063	0.052	0.042	0.034	0.030	0.026	
2012	94.3	0	0.068	0.057	0.052	0.045	0.041	0.032	0.029	0.025	

**Table 61: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Wollongong**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2003	92.8	0	0.097	0.086	0.072	0.046	0.040	0.033	0.029	0.025
2004	92.5	1	<b>0.103</b>	0.084	0.071	0.056	0.043	0.034	0.029	0.026
2005	92.4	1	<b>0.102</b>	0.074	0.066	0.054	0.046	0.035	0.030	0.025
2006	94.6	0	0.096	0.073	0.064	0.054	0.047	0.036	0.030	0.026
2007	90.2	0	0.077	0.068	0.062	0.051	0.042	0.035	0.029	0.025
2008	94.0	0	0.067	0.062	0.056	0.048	0.043	0.033	0.029	0.025
2009	90.7	0	0.083	0.074	0.056	0.046	0.041	0.034	0.030	0.026
2010	91.8	0	0.082	0.067	0.062	0.052	0.043	0.034	0.029	0.025
2011	93.1	0	0.084	0.069	0.055	0.048	0.040	0.034	0.028	0.024
2012	94.9	0	0.065	0.062	0.054	0.047	0.039	0.031	0.027	0.024

AAQ NEPM Standard - 0.100 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 62: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentration  
Station: Newcastle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2003	92.4	0	0.079	0.065	0.055	0.045	0.039	0.035	0.030	0.025
2004	92.3	1	<b>0.112</b>	0.070	0.067	0.052	0.044	0.036	0.030	0.025
2005	92.4	0	0.078	0.061	0.058	0.049	0.042	0.035	0.030	0.026
2006	93.7	0	0.068	0.063	0.060	0.047	0.042	0.035	0.029	0.024
2007	43.9	0	0.053	0.052	0.051	0.047	0.040	0.033	0.027	0.022
2008	89.9	0	0.064	0.054	0.049	0.044	0.039	0.034	0.028	0.024
2009	86.3	0	0.073	0.068	0.062	0.050	0.043	0.037	0.032	0.027
2010	89.1	0	0.086	0.069	0.060	0.049	0.041	0.036	0.031	0.027
2011	90.7	0	0.066	0.057	0.053	0.047	0.041	0.035	0.029	0.024
2012	94.3	0	0.071	0.057	0.052	0.046	0.041	0.033	0.028	0.024

**Table 63: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentration  
Station: Wallsend**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	91.6	0	0.077	0.065	0.061	0.050	0.042	0.034	0.029	0.025	
2004	88.2	1	<b>0.103</b>	0.075	0.065	0.054	0.048	0.037	0.030	0.026	
2005	91.3	0	0.094	0.070	0.065	0.053	0.046	0.037	0.031	0.026	
2006	93.2	0	0.086	0.070	0.062	0.051	0.045	0.036	0.029	0.024	
2007	92.3	0	0.070	0.063	0.055	0.049	0.045	0.036	0.029	0.025	
2008	91.9	0	0.057	0.054	0.052	0.044	0.040	0.033	0.028	0.023	
2009	85.7	0	0.086	0.068	0.063	0.054	0.044	0.036	0.030	0.024	
2010	88.3	0	0.067	0.065	0.056	0.047	0.040	0.034	0.029	0.024	
2011	94.0	0	0.071	0.056	0.055	0.049	0.040	0.033	0.027	0.022	
2012	94.7	0	0.080	0.064	0.055	0.050	0.043	0.034	0.028	0.023	

AAQ NEPM Standard - 0.100 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 64: Statistical summary for O<sub>3</sub> - Annual daily maximum 1-hour average concentrations  
Station: Bathurst**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2002	34.7	0	0.064	0.063	0.063	0.058	0.052	0.044	0.038	0.031	
2003	76.4	0	0.056	0.052	0.051	0.047	0.042	0.036	0.032	0.029	
2004	89.9	0	0.092	0.069	0.061	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	0.067	0.060	0.054	0.048	0.041	0.034	0.029	
2007	54.3	0	0.068	0.067	0.062	0.054	0.050	0.039	0.032	0.029	

**Table 65: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Blacktown<sup>(1)</sup>/Prospect<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	94.3	<b>3</b>	<b>0.157</b>	0.080	0.069	0.056	0.045	0.035	0.028	0.023	
2004 <sup>(1)</sup>	41.3	<b>4</b>	<b>0.107</b>	<b>0.089</b>	<b>0.081</b>	0.070	0.062	0.044	0.033	0.026	
2005-6 <sup>#</sup>											
2007 <sup>(2)</sup>	75.1	1	<b>0.085</b>	0.063	0.060	0.055	0.048	0.036	0.028	0.023	
2008 <sup>(2)</sup>	93.1	1	<b>0.096</b>	0.069	0.058	0.047	0.042	0.033	0.026	0.022	
2009 <sup>(2)</sup>	95.7	<b>6</b>	<b>0.100</b>	<b>0.087</b>	0.074	0.063	0.053	0.039	0.030	0.024	
2010 <sup>(2)</sup>	85.9	<b>2</b>	<b>0.097</b>	0.072	0.068	0.056	0.046	0.035	0.028	0.022	
2011 <sup>(2)</sup>	99.3	<b>3</b>	<b>0.114</b>	0.077	0.061	0.051	0.043	0.032	0.026	0.022	
2012 <sup>(2)</sup>	95.6	0	0.073	0.064	0.061	0.053	0.045	0.036	0.027	0.022	

AAQ NEPM Standard - 0.080 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

# Station closed pending relocation

**Table 66: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Bringelly**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	95.3	<b>5</b>	<b>0.133</b>	<b>0.083</b>	0.069	0.059	0.050	0.038	0.031	0.026	
2004	95.1	<b>6</b>	<b>0.110</b>	<b>0.088</b>	0.080	0.064	0.053	0.041	0.032	0.028	
2005	92.4	<b>3</b>	<b>0.102</b>	0.079	0.072	0.060	0.050	0.040	0.032	0.027	
2006	96.1	<b>5</b>	<b>0.110</b>	<b>0.084</b>	0.077	0.062	0.051	0.041	0.031	0.026	
2007	94.8	<b>4</b>	<b>0.095</b>	<b>0.083</b>	0.071	0.058	0.052	0.040	0.031	0.027	
2008	93.6	0	0.078	0.071	0.061	0.050	0.046	0.036	0.029	0.025	
2009	92.5	<b>5</b>	<b>0.108</b>	<b>0.085</b>	0.078	0.063	0.054	0.039	0.029	0.025	
2010	85.2	<b>3</b>	<b>0.089</b>	0.072	0.066	0.055	0.047	0.037	0.030	0.025	
2011	88.5	<b>2</b>	<b>0.118</b>	0.076	0.070	0.056	0.048	0.035	0.029	0.025	
2012	97.0	0	0.072	0.066	0.062	0.054	0.046	0.037	0.029	0.025	

**Table 67: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Lidcombe<sup>(1)</sup> / Chullora<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(2)</sup>	84.2	0	0.077	0.059	0.055	0.041	0.037	0.032	0.026	0.021	
2004 <sup>(2)</sup>	91.2	<b>4</b>	<b>0.086</b>	<b>0.081</b>	0.067	0.054	0.045	0.035	0.029	0.024	
2005 <sup>(2)</sup>	96.2	0	0.080	0.066	0.061	0.052	0.042	0.034	0.028	0.023	
2006 <sup>(2)</sup>	98.8	<b>2</b>	<b>0.104</b>	0.071	0.064	0.054	0.044	0.034	0.028	0.022	
2007 <sup>(2)</sup>	97.1	0	0.074	0.065	0.057	0.051	0.041	0.033	0.027	0.022	
2008 <sup>(2)</sup>	98.3	0	0.074	0.058	0.050	0.045	0.039	0.030	0.025	0.020	
2009 <sup>(2)</sup>	96.8	<b>2</b>	<b>0.112</b>	0.075	0.070	0.056	0.045	0.033	0.026	0.021	
2010 <sup>(2)</sup>	96.4	0	0.072	0.062	0.058	0.045	0.039	0.029	0.024	0.021	
2011 <sup>(2)</sup>	97.1	1	<b>0.096</b>	0.067	0.056	0.047	0.038	0.030	0.023	0.020	
2012 <sup>(2)</sup>	98.1	0	0.068	0.058	0.049	0.041	0.037	0.028	0.024	0.020	

**Table 68: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Liverpool**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	97.1	<b>3</b>	<b>0.132</b>	0.076	0.063	0.049	0.041	0.033	0.028	0.022	
2004	87.6	<b>4</b>	<b>0.092</b>	<b>0.082</b>	0.071	0.062	0.048	0.036	0.029	0.023	
2005	92.0	<b>2</b>	<b>0.121</b>	0.074	0.068	0.053	0.046	0.036	0.030	0.024	
2006	95.2	<b>4</b>	<b>0.124</b>	<b>0.088</b>	0.074	0.064	0.049	0.037	0.028	0.023	
2007	92.3	<b>2</b>	<b>0.094</b>	0.074	0.067	0.057	0.046	0.035	0.028	0.022	
2008	90.5	1	<b>0.089</b>	0.064	0.057	0.050	0.042	0.032	0.026	0.021	
2009	92.5	<b>4</b>	<b>0.103</b>	<b>0.085</b>	0.077	0.057	0.046	0.035	0.028	0.022	
2010	98.3	1	<b>0.081</b>	0.069	0.061	0.052	0.042	0.033	0.026	0.021	
2011	97.3	1	<b>0.095</b>	0.068	0.060	0.051	0.042	0.030	0.024	0.020	
2012	96.1	0	0.071	0.062	0.055	0.048	0.043	0.033	0.026	0.021	

AAQ NEPM Standard - 0.080 ppm (rolling 4-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 69: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Macarthur<sup>(1)</sup>/Campbelltown West<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2004	16.9	1	<b>0.084</b>	<b>0.084</b>	0.080	0.061	0.055	0.047	0.037	0.027	
2005	98.9	<b>7</b>	<b>0.126</b>	<b>0.096</b>	0.080	0.061	0.055	0.040	0.032	0.028	
2006	98.5	<b>8</b>	<b>0.117</b>	<b>0.094</b>	<b>0.085</b>	0.066	0.054	0.040	0.030	0.025	
2007	94.1	<b>7</b>	<b>0.101</b>	<b>0.084</b>	0.079	0.063	0.054	0.039	0.030	0.025	
2008	97.9	0	0.070	0.065	0.063	0.054	0.047	0.035	0.030	0.025	
2009	96.6	<b>9</b>	<b>0.097</b>	<b>0.090</b>	<b>0.083</b>	0.068	0.056	0.040	0.031	0.027	
2010	98.0	1	<b>0.103</b>	0.075	0.073	0.057	0.049	0.038	0.031	0.027	
2011	96.4	<b>2</b>	<b>0.122</b>	0.079	0.072	0.062	0.048	0.035	0.029	0.025	
2012 <sup>(1)</sup>	54.7	0	0.073	0.062	0.059	0.052	0.043	0.031	0.027	0.023	
2012 <sup>(2)</sup>	33.8	0	0.071	0.069	0.065	0.061	0.051	0.038	0.033	0.028	

**Table 70: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Oakdale**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	95.0	<b>3</b>	<b>0.089</b>	0.079	0.067	0.057	0.050	0.039	0.032	0.028	
2004	80.6	<b>6</b>	<b>0.099</b>	<b>0.090</b>	<b>0.084</b>	0.066	0.057	0.043	0.033	0.030	
2005	95.9	<b>4</b>	<b>0.106</b>	<b>0.088</b>	0.074	0.062	0.052	0.040	0.032	0.029	
2006	91.6	1	<b>0.085</b>	0.078	0.072	0.061	0.053	0.043	0.033	0.029	
2007	91.0	<b>5</b>	<b>0.116</b>	<b>0.086</b>	0.077	0.063	0.053	0.042	0.033	0.029	
2008	96.8	0	0.075	0.061	0.056	0.052	0.045	0.037	0.031	0.026	
2009	89.9	<b>6</b>	<b>0.108</b>	<b>0.090</b>	0.080	0.064	0.053	0.040	0.032	0.029	
2010	98.4	<b>2</b>	<b>0.088</b>	0.075	0.070	0.058	0.049	0.038	0.032	0.028	
2011	99.2	<b>3</b>	<b>0.098</b>	0.074	0.066	0.057	0.047	0.036	0.030	0.026	
2012	96.7	1	<b>0.081</b>	0.071	0.060	0.050	0.045	0.036	0.029	0.026	

**Table 71: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Richmond**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	89.5	<b>3</b>	<b>0.138</b>	0.078	0.068	0.056	0.048	0.037	0.029	0.025	
2004	93.8	1	<b>0.088</b>	0.074	0.068	0.057	0.052	0.042	0.032	0.028	
2005	96.3	<b>3</b>	<b>0.100</b>	0.080	0.069	0.060	0.052	0.042	0.033	0.028	
2006	97.3	<b>2</b>	<b>0.095</b>	0.078	0.072	0.061	0.052	0.042	0.034	0.027	
2007	94.1	<b>3</b>	<b>0.121</b>	0.079	0.068	0.059	0.053	0.042	0.032	0.027	
2008	94.5	0	0.067	0.060	0.055	0.048	0.041	0.034	0.029	0.024	
2009	94.2	<b>3</b>	<b>0.090</b>	0.079	0.069	0.058	0.051	0.040	0.032	0.027	
2010	97.3	1	<b>0.082</b>	0.067	0.061	0.054	0.047	0.037	0.031	0.026	
2011	98.5	1	<b>0.088</b>	0.065	0.059	0.050	0.045	0.034	0.029	0.025	
2012	96.6	0	0.070	0.061	0.056	0.050	0.044	0.036	0.030	0.025	

AAQ NEPM Standard - 0.080 ppm (rolling 4-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 72: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Rozelle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	95.3	0	0.070	0.058	0.052	0.039	0.034	0.029	0.025	0.021	
2004	92.9	1	<b>0.087</b>	0.071	0.066	0.051	0.041	0.032	0.026	0.022	
2005	92.9	0	0.065	0.060	0.055	0.045	0.039	0.032	0.027	0.022	
2006	96.6	1	<b>0.082</b>	0.063	0.056	0.047	0.037	0.031	0.025	0.021	
2007	93.7	0	0.075	0.054	0.046	0.042	0.037	0.031	0.026	0.021	
2008	97.0	0	0.048	0.046	0.043	0.038	0.034	0.028	0.025	0.020	
2009	94.8	0	0.073	0.059	0.054	0.044	0.037	0.031	0.026	0.022	
2010	86.8	0	0.067	0.056	0.051	0.043	0.036	0.031	0.027	0.023	
2011	97.1	0	0.080	0.058	0.049	0.041	0.035	0.029	0.024	0.021	
2012	98.6	0	0.054	0.049	0.047	0.042	0.037	0.032	0.028	0.023	

**Table 73: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: St Marys**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	96.8	<b>2</b>	<b>0.091</b>	0.063	0.061	0.052	0.047	0.035	0.029	0.025	
2004	97.5	<b>3</b>	<b>0.128</b>	<b>0.081</b>	0.070	0.060	0.052	0.040	0.032	0.027	
2005	96.2	<b>3</b>	<b>0.091</b>	0.078	0.068	0.059	0.050	0.040	0.032	0.027	
2006	96.6	<b>4</b>	<b>0.109</b>	<b>0.084</b>	0.067	0.059	0.052	0.041	0.030	0.026	
2007	93.1	<b>4</b>	<b>0.105</b>	<b>0.088</b>	0.069	0.058	0.051	0.040	0.031	0.026	
2008	97.0	1	<b>0.082</b>	0.069	0.056	0.048	0.044	0.036	0.029	0.025	
2009	97.2	<b>5</b>	<b>0.106</b>	<b>0.087</b>	0.073	0.063	0.055	0.039	0.031	0.026	
2010	97.8	1	<b>0.083</b>	0.072	0.066	0.057	0.049	0.038	0.031	0.026	
2011	98.8	<b>3</b>	<b>0.121</b>	0.080	0.063	0.054	0.047	0.034	0.028	0.024	
2012	97.2	0	0.072	0.065	0.061	0.053	0.045	0.035	0.029	0.024	

AAQ NEPM Standard - 0.080 ppm (rolling 4-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 74: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Albion Park <sup>(1)</sup>/Albion Park Sth <sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	96.8	<b>4</b>	<b>0.111</b>	<b>0.085</b>	0.061	0.040	0.037	0.033	0.029	0.025	
2004 <sup>(1)</sup>	97.5	1	<b>0.092</b>	0.077	0.057	0.047	0.040	0.033	0.029	0.026	
2005 <sup>(1)</sup>	5.0	0	0.063	0.063	0.063	0.061	0.054	0.039	0.029	0.022	
2006 <sup>(2)</sup>	90.0	0	0.077	0.073	0.065	0.048	0.041	0.035	0.030	0.026	
2007 <sup>(2)</sup>	94.6	0	0.080	0.061	0.057	0.046	0.039	0.033	0.030	0.026	
2008 <sup>(2)</sup>	94.1	0	0.055	0.053	0.048	0.044	0.038	0.032	0.029	0.024	
2009 <sup>(2)</sup>	95.4	1	<b>0.083</b>	0.066	0.060	0.048	0.041	0.036	0.033	0.028	
2010 <sup>(2)</sup>	86.2	0	0.073	0.056	0.048	0.044	0.037	0.029	0.027	0.024	
2011 <sup>(2)</sup>	85.7	<b>3</b>	<b>0.099</b>	0.061	0.052	0.042	0.034	0.031	0.027	0.023	
2012 <sup>(2)</sup>	97.8	0	0.064	0.051	0.047	0.041	0.037	0.031	0.028	0.024	

**Table 75: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Kembla Grange**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	97.4	<b>3</b>	<b>0.107</b>	0.077	0.060	0.042	0.035	0.032	0.028	0.024	
2004	95.4	<b>3</b>	<b>0.100</b>	0.078	0.055	0.047	0.040	0.034	0.029	0.025	
2005	96.7	1	<b>0.084</b>	0.063	0.059	0.048	0.041	0.034	0.030	0.026	
2006	98.9	1	<b>0.081</b>	0.063	0.057	0.046	0.042	0.034	0.029	0.025	
2007	97.8	1	<b>0.082</b>	0.065	0.059	0.046	0.040	0.033	0.029	0.025	
2008	97.5	0	0.066	0.054	0.050	0.043	0.039	0.031	0.028	0.023	
2009	90.1	<b>2</b>	<b>0.090</b>	0.075	0.065	0.046	0.040	0.033	0.029	0.026	
2010	86.7	0	0.078	0.055	0.052	0.044	0.038	0.031	0.028	0.024	
2011	98.4	<b>2</b>	<b>0.105</b>	0.066	0.057	0.048	0.038	0.033	0.029	0.025	
2012	98.4	0	0.061	0.051	0.047	0.041	0.037	0.031	0.027	0.024	

AAQ NEPM Standard - 0.080 ppm (rolling 4-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 76: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Wollongong**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	96.4	0	0.080	0.077	0.062	0.042	0.037	0.031	0.028	0.024	
2004	96.3	<b>2</b>	<b>0.090</b>	0.068	0.061	0.050	0.040	0.032	0.028	0.024	
2005	96.2	1	<b>0.099</b>	0.064	0.061	0.049	0.041	0.033	0.029	0.024	
2006	98.6	1	<b>0.086</b>	0.066	0.055	0.048	0.042	0.033	0.028	0.024	
2007	93.2	0	0.073	0.064	0.054	0.046	0.039	0.033	0.028	0.023	
2008	97.9	0	0.063	0.056	0.051	0.043	0.040	0.031	0.027	0.023	
2009	92.9	0	0.074	0.064	0.050	0.043	0.037	0.033	0.029	0.025	
2010	94.9	0	0.073	0.061	0.055	0.046	0.039	0.032	0.027	0.024	
2011	96.9	0	0.078	0.066	0.052	0.043	0.036	0.032	0.027	0.023	
2012	98.9	0	0.061	0.055	0.050	0.042	0.038	0.030	0.026	0.023	

**Table 77: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentrations  
Station: Newcastle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	96.3	0	0.061	0.055	0.050	0.042	0.038	0.033	0.028	0.024	
2004	96.4	0	0.073	0.062	0.059	0.048	0.041	0.034	0.028	0.024	
2005	96.5	0	0.070	0.055	0.050	0.044	0.039	0.033	0.028	0.024	
2006	97.9	0	0.064	0.057	0.053	0.043	0.038	0.033	0.028	0.022	
2007	45.6	0	0.047	0.046	0.046	0.041	0.036	0.031	0.025	0.021	
2008	93.8	0	0.058	0.049	0.046	0.040	0.037	0.032	0.027	0.022	
2009	88.2	0	0.067	0.062	0.056	0.047	0.042	0.035	0.031	0.025	
2010	85.1	0	0.076	0.062	0.054	0.045	0.040	0.034	0.029	0.025	
2011	86.8	0	0.063	0.051	0.048	0.044	0.038	0.033	0.027	0.023	
2012	97.8	0	0.057	0.049	0.048	0.043	0.039	0.032	0.027	0.022	

AAQ NEPM Standard - 0.080 ppm (rolling 4-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 78: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Wallsend**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	95.7	0	0.059	0.058	0.056	0.044	0.039	0.032	0.028	0.024	
2004	92.0	0	0.078	0.065	0.057	0.050	0.044	0.035	0.029	0.024	
2005	95.4	0	0.074	0.063	0.058	0.048	0.041	0.034	0.029	0.024	
2006	97.3	0	0.066	0.064	0.057	0.046	0.040	0.033	0.027	0.023	
2007	95.1	0	0.068	0.057	0.050	0.045	0.041	0.034	0.028	0.023	
2008	95.7	0	0.054	0.048	0.045	0.040	0.036	0.031	0.027	0.022	
2009	89.2	0	0.076	0.063	0.058	0.046	0.040	0.034	0.028	0.023	
2010	88.2	0	0.063	0.056	0.052	0.042	0.037	0.032	0.027	0.023	
2011	95.8	0	0.059	0.053	0.050	0.045	0.037	0.031	0.025	0.021	
2012	98.7	0	0.070	0.056	0.051	0.046	0.041	0.033	0.027	0.022	

**Table 79: Statistical summary for O<sub>3</sub> - Daily maximum rolling 4-hour average concentration  
Station: Bathurst**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2001	52.3	0	0.060	0.051	0.050	0.046	0.042	0.035	0.030	0.025	
2002	36.1	0	0.062	0.060	0.057	0.054	0.049	0.043	0.037	0.030	
2003	79.6	0	0.053	0.050	0.049	0.045	0.040	0.035	0.031	0.028	
2004	93.7	0	0.067	0.058	0.055	0.050	0.048	0.041	0.032	0.027	
2005	94.5	0	0.054	0.052	0.050	0.046	0.042	0.036	0.032	0.029	
2006	98.5	0	0.071	0.062	0.058	0.051	0.045	0.040	0.033	0.028	
2007	56.7	0	0.066	0.062	0.059	0.050	0.048	0.037	0.031	0.028	

## Sulfur dioxide

### Statistical summary

**Table 80: Statistical summary for SO<sub>2</sub> - Daily maximum 1-hour average concentrations (2012)**

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
<b>Sydney</b>									
Bringelly	94.6	0.015	0.005	0.005	0.003	0.003	0.002	0.001	0.000
Chullora	93.6	0.025	0.011	0.008	0.007	0.005	0.003	0.002	0.001
Macarthur	52.6	0.006	0.005	0.005	0.004	0.003	0.002	0.001	0.000
Campbelltown W	33.9	0.008	0.006	0.005	0.005	0.004	0.002	0.001	0.001
Prospect	91.3	0.012	0.008	0.007	0.006	0.004	0.003	0.002	0.001
Richmond	83.4	0.013	0.008	0.007	0.005	0.004	0.002	0.001	0.000
<b>Illawarra</b>									
Albion Park Sth	92.5	0.027	0.017	0.015	0.010	0.008	0.003	0.001	0.000
Wollongong	94.9	0.017	0.016	0.014	0.010	0.008	0.004	0.002	0.001
<b>Central coast</b>									
Wyong	19.3	0.030	0.030	0.027	0.018	0.013	0.005	0.002	0.001
<b>Lower Hunter</b>									
Newcastle	93.1	0.034	0.025	0.022	0.019	0.014	0.008	0.004	0.002
Wallsend	95.1	0.035	0.021	0.020	0.016	0.013	0.008	0.004	0.002

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 81: Statistical summary for SO<sub>2</sub> - Daily 24-hour average concentrations (2012)**

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
<b>Sydney</b>									
Bringelly	98.4	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
Chullora	97.0	0.004	0.003	0.002	0.002	0.001	0.001	0.000	0.000
Macarthur	54.6	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
Campbelltown W	35.0	0.002	0.002	0.002	0.002	0.001	0.001	0.000	0.000
Prospect	94.5	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.000
Richmond	86.3	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
<b>Illawarra</b>									
Albion Park Sth	96.4	0.010	0.004	0.004	0.003	0.002	0.001	0.000	0.000
Wollongong	99.2	0.005	0.004	0.003	0.002	0.001	0.001	0.000	0.000
<b>Central coast</b>									
Wyong	19.9	0.004	0.004	0.004	0.003	0.003	0.002	0.001	0.000
<b>Lower Hunter</b>									
Newcastle	97.5	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.001
Wallsend	99.7	0.005	0.004	0.004	0.003	0.002	0.002	0.001	0.000

AAQ NEPM Standard - 0.080 ppm (24-hour average)

## Trend analysis

Table 82: Maximum 1-hour average concentrations for SO<sub>2</sub> (ppm)

Region/ Performance monitoring station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Blacktown/ Prospect*	0.016	0.016			0.022	0.014	0.017	0.018	0.014	0.012
Bringelly	0.017	0.015	0.009	0.009	0.017	0.019	0.012	0.008	0.011	0.015
Chullora			0.015	0.015	0.020	0.021	0.029	0.021	0.026	0.025
Macarthur			0.015	0.010	0.015	0.015	0.010	0.010	0.014	0.006
Campbelltown W										0.008
Richmond	0.011	0.021	0.015	0.018	0.024	0.015	0.013	0.009	0.010	0.013
<b>Illawarra</b>										
Albion Park*/Albion Park Sth	0.035*	0.034*	0.031*	0.038	0.038	0.028	0.031	0.032	0.035	0.027
Warrawong	0.063	0.088	0.070	0.022						
Wollongong	0.031	0.053	0.038	0.035	0.032	0.021	0.020	0.027	0.018	0.017
<b>Central coast</b>										
Wyong										0.030
<b>Lower Hunter</b>										
Newcastle			0.037	0.034	0.043	0.033	0.039	0.027	0.033	0.034
Wallsend	0.047	0.067	0.048	0.058	0.039	0.044	0.044	0.031	0.044	0.035

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

Table 83: Maximum 24-hour average concentrations for SO<sub>2</sub> (ppm)

Region/ Performance monitoring station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Blacktown*/Prospect	0.004	0.004			0.005	0.004	0.003	0.004	0.003	0.003
Bringelly	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.002
Chullora			0.005	0.004	0.004	0.005	0.005	0.004	0.005	0.004
Macarthur			0.003	0.003	0.004	0.004	0.004	0.003	0.002	0.002
Campbelltown W										0.002
Richmond	0.003	0.004	0.002	0.003	0.004	0.003	0.004	0.002	0.003	0.002
<b>Illawarra</b>										
Albion Park*/ Albion Park Sth	0.009*	0.009*	0.011*	0.010	0.014	0.008	0.012	0.011	0.010	0.010
Warrawong	0.011	0.012	0.009	0.007						
Wollongong	0.006	0.015	0.006	0.007	0.008	0.007	0.004	0.008	0.009	0.005
<b>Central coast</b>										
Wyong										0.004
<b>Lower Hunter</b>										
Newcastle			0.008	0.009	0.012	0.008	0.010	0.005	0.009	0.007
Wallsend	0.010	0.014	0.007	0.009	0.007	0.007	0.007	0.007	0.007	0.005

AAQ NEPM Standard - 0.080 ppm (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 84: Annual average concentrations for SO<sub>2</sub> (ppm)**

Region/ Performance monitoring Station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Blacktown*/Prospect	0.001*	0.001*			0.001	0.000	0.000	0.001	0.001	0.001
Bringelly	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Chullora			0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Macarthur			0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
Campbelltown W										0.001
Richmond	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Illawarra</b>										
Albion Park*/ Albion Park Sth	0.001*	0.001*	0.002*	0.001	0.001	0.001	0.001	0.001	0.001	0.000
Warrawong	0.001	0.001	0.001	0.001						
Wollongong	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.001
<b>Central coast</b>										
Wyong										0.001
<b>Lower Hunter</b>										
Newcastle			0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Wallsend	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001

AAQ NEPM Standard - 0.020 ppm (Annual average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 85: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Blacktown<sup>(1)</sup>/Prospect<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	91.3	0	0.016	0.012	0.010	0.007	0.006	0.004	0.003	0.002	
2004 <sup>(1)</sup>	39.1	0	0.016	0.013	0.012	0.010	0.007	0.006	0.004	0.002	0.002
2005 <sup>(#)</sup>											
2006 <sup>(#)</sup>											
2007 <sup>(2)</sup>	67.0	0	0.022	0.016	0.013	0.007	0.006	0.003	0.002	0.001	
2008 <sup>(2)</sup>	85.1	0	0.014	0.011	0.010	0.008	0.005	0.003	0.002	0.001	
2009 <sup>(2)</sup>	91.3	0	0.017	0.010	0.010	0.008	0.006	0.004	0.002	0.001	
2010 <sup>(2)</sup>	88.9	0	0.018	0.013	0.011	0.008	0.006	0.004	0.002	0.001	
2011 <sup>(2)</sup>	93.8	0	0.014	0.011	0.008	0.006	0.005	0.003	0.002	0.001	
2012 <sup>(2)</sup>	91.3	0	0.012	0.008	0.007	0.006	0.004	0.003	0.002	0.001	

# Station closed pending relocation.

**Table 86: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Bringelly**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	93.0	0	0.017	0.007	0.006	0.004	0.003	0.002	0.001	0.001	0.001
2004	90.8	0	0.015	0.008	0.007	0.005	0.004	0.002	0.001	0.000	0.000
2005	91.3	0	0.009	0.008	0.006	0.004	0.004	0.002	0.001	0.000	0.000
2006	91.4	0	0.009	0.006	0.005	0.004	0.003	0.002	0.001	0.001	0.001
2007	84.2	0	0.017	0.009	0.007	0.005	0.004	0.002	0.001	0.000	0.000
2008	89.2	0	0.019	0.008	0.006	0.005	0.003	0.002	0.001	0.000	0.000
2009	84.6	0	0.012	0.008	0.005	0.004	0.003	0.001	0.000	0.000	0.000
2010	79.9	0	0.008	0.005	0.005	0.004	0.003	0.002	0.001	0.000	0.000
2011	88.9	0	0.011	0.005	0.005	0.003	0.003	0.002	0.001	0.000	0.000
2012	94.6	0	0.015	0.005	0.005	0.003	0.003	0.002	0.001	0.000	0.000

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 87: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Chullora**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2005	68.8	0	0.015	0.013	0.011	0.009	0.007	0.004	0.002	0.001	0.001
2006	93.9	0	0.015	0.013	0.011	0.009	0.007	0.004	0.003	0.002	0.002
2007	86.7	0	0.020	0.016	0.012	0.009	0.007	0.003	0.002	0.001	0.001
2008	77.5	0	0.021	0.018	0.012	0.007	0.006	0.004	0.002	0.001	0.001
2009	89.8	0	0.029	0.015	0.012	0.010	0.008	0.004	0.002	0.001	0.001
2010	92.1	0	0.021	0.015	0.014	0.010	0.007	0.004	0.002	0.001	0.001
2011	92.7	0	0.026	0.016	0.011	0.009	0.006	0.004	0.002	0.001	0.001
2012	93.6	0	0.025	0.011	0.008	0.007	0.005	0.003	0.002	0.001	0.001

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 88: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Macarthur<sup>(1)</sup>/Campbelltown West<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2005	53.1	0	0.015	0.012	0.008	0.006	0.004	0.003	0.002	0.001	
2006	93.2	0	0.010	0.008	0.006	0.005	0.004	0.002	0.001	0.001	
2007	90.9	0	0.015	0.011	0.010	0.006	0.005	0.003	0.002	0.001	
2008	92.1	0	0.015	0.013	0.009	0.006	0.004	0.003	0.001	0.001	
2009	91.6	0	0.010	0.009	0.007	0.006	0.004	0.003	0.002	0.001	
2010	92.9	0	0.010	0.006	0.006	0.005	0.004	0.002	0.001	0.001	
2011	91.9	0	0.014	0.009	0.006	0.005	0.003	0.002	0.001	0.000	
2012 <sup>(1)</sup>	52.6	0	0.006	0.005	0.005	0.004	0.003	0.002	0.001	0.000	
2012 <sup>(2)</sup>	33.9	0	0.008	0.006	0.005	0.005	0.004	0.002	0.001	0.001	

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 89: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Richmond**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	93.0	0	0.011	0.010	0.009	0.006	0.004	0.003	0.001	0.001	
2004	89.7	0	0.021	0.012	0.009	0.007	0.005	0.002	0.001	0.001	
2005	92.8	0	0.015	0.009	0.007	0.006	0.004	0.002	0.001	0.001	
2006	92.0	0	0.018	0.011	0.009	0.006	0.004	0.002	0.001	0.001	
2007	91.0	0	0.024	0.008	0.007	0.005	0.004	0.002	0.001	0.000	
2008	72.0	0	0.015	0.010	0.007	0.005	0.003	0.002	0.001	0.000	
2009	89.5	0	0.013	0.010	0.009	0.006	0.004	0.002	0.001	0.000	
2010	93.3	0	0.009	0.007	0.006	0.005	0.003	0.002	0.001	0.000	
2011	94.5	0	0.010	0.008	0.005	0.004	0.003	0.002	0.001	0.000	
2012	83.4	0	0.013	0.008	0.007	0.005	0.004	0.002	0.001	0.000	

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 90: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Albion Park <sup>(1)</sup>/Albion Park Sth<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	93.7	0	0.035	0.026	0.022	0.016	0.012	0.005	0.001	0.000	
2004 <sup>(1)</sup>	92.9	0	0.034	0.029	0.027	0.017	0.013	0.005	0.001	0.000	
2005 <sup>(1)</sup>	4.8	0	0.031	0.031	0.031	0.031	0.030	0.007	0.001	0.000	
2006 <sup>(2)</sup>	86.7	0	0.038	0.028	0.024	0.019	0.011	0.004	0.001	0.000	
2007 <sup>(2)</sup>	83.1	0	0.038	0.033	0.031	0.019	0.013	0.006	0.001	0.000	
2008 <sup>(2)</sup>	93.0	0	0.028	0.026	0.022	0.015	0.011	0.005	0.001	0.000	
2009 <sup>(2)</sup>	85.4	0	0.031	0.027	0.023	0.018	0.013	0.005	0.001	0.000	
2010 <sup>(2)</sup>	89.6	0	0.032	0.027	0.023	0.019	0.013	0.005	0.001	0.000	
2011 <sup>(2)</sup>	87.4	0	0.035	0.024	0.022	0.017	0.009	0.004	0.000	0.000	
2012 <sup>(2)</sup>	83.4	0	0.013	0.008	0.007	0.005	0.004	0.002	0.001	0.000	

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 91: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Warrawong**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2000	90.8	0	0.110	0.077	0.039	0.028	0.020	0.010	0.003	0.000	
2001	93.1	0	0.162	0.074	0.058	0.042	0.027	0.011	0.003	0.000	
2002	94.0	0	0.046	0.031	0.029	0.023	0.019	0.011	0.004	0.000	
2003	93.7	0	0.063	0.052	0.040	0.022	0.017	0.009	0.002	0.000	
2004	91.4	0	0.088	0.039	0.029	0.021	0.013	0.006	0.002	0.000	
2005	91.8	0	0.070	0.032	0.025	0.019	0.014	0.008	0.002	0.000	
2006	37.9	0	0.022	0.022	0.020	0.015	0.010	0.004	0.001	0.000	

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 92: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Wollongong**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2003	93.7	0	0.031	0.025	0.023	0.015	0.013	0.008	0.004	0.002
2004	92.8	0	0.053	0.024	0.018	0.014	0.011	0.006	0.003	0.001
2005	93.0	0	0.038	0.023	0.021	0.015	0.011	0.006	0.003	0.001
2006	94.5	0	0.035	0.020	0.018	0.015	0.012	0.007	0.004	0.001
2007	78.9	0	0.032	0.022	0.020	0.016	0.011	0.007	0.003	0.001
2008	78.2	0	0.021	0.019	0.015	0.012	0.009	0.006	0.002	0.000
2009	75.3	0	0.020	0.016	0.014	0.010	0.007	0.004	0.002	0.000
2010	88.4	0	0.027	0.018	0.015	0.013	0.011	0.006	0.003	0.001
2011	92.9	0	0.018	0.018	0.017	0.012	0.009	0.005	0.003	0.001
2012	94.9	0	0.017	0.016	0.014	0.010	0.008	0.004	0.002	0.001

AAQ NEPM Standard - 0.200 ppm (1-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 93: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Newcastle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2005	72.6	0	0.037	0.035	0.029	0.020	0.015	0.008	0.005	0.002
2006	93.3	0	0.034	0.028	0.021	0.017	0.013	0.007	0.004	0.001
2007	44.5	0	0.043	0.032	0.025	0.021	0.014	0.008	0.005	0.003
2008	86.9	0	0.033	0.027	0.024	0.019	0.015	0.010	0.004	0.002
2009	69.7	0	0.039	0.033	0.027	0.021	0.015	0.008	0.005	0.002
2010	84.6	0	0.027	0.022	0.020	0.015	0.012	0.008	0.004	0.002
2011	90.7	0	0.033	0.027	0.023	0.017	0.014	0.008	0.005	0.001
2012	93.1	0	0.034	0.025	0.022	0.019	0.014	0.008	0.004	0.002

**Table 94: Statistical summary for SO<sub>2</sub> - Annual daily maximum 1-hour average concentrations  
Station: Wallsend**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2003	90.3	0	0.047	0.034	0.029	0.023	0.017	0.011	0.006	0.003
2004	90.1	0	0.067	0.042	0.033	0.022	0.016	0.010	0.005	0.002
2005	93.4	0	0.048	0.033	0.027	0.021	0.016	0.009	0.005	0.002
2006	94.5	0	0.058	0.027	0.025	0.021	0.016	0.011	0.005	0.002
2007	83.9	0	0.039	0.032	0.027	0.022	0.018	0.010	0.005	0.002
2008	91.3	0	0.044	0.032	0.026	0.021	0.018	0.011	0.006	0.002
2009	67.2	0	0.044	0.028	0.025	0.019	0.014	0.009	0.005	0.001
2010	70.3	0	0.031	0.022	0.020	0.017	0.014	0.009	0.004	0.001
2011	93.7	0	0.044	0.031	0.024	0.018	0.014	0.008	0.004	0.001
2012	95.1	0	0.035	0.021	0.020	0.016	0.013	0.008	0.004	0.002

**Table 95: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Blacktown <sup>(1)</sup>/Prospect <sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	95.1	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000
2004 <sup>(1)</sup>	40.7	0	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2005 <sup>#</sup>											
2006 <sup>#</sup>											
2007 <sup>(2)</sup>	67.1	0	0.005	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.000
2008 <sup>(2)</sup>	89.9	0	0.004	0.003	0.003	0.002	0.001	0.001	0.000	0.000	0.000
2009 <sup>(2)</sup>	96.4	0	0.003	0.003	0.002	0.002	0.002	0.001	0.000	0.000	0.000
2010 <sup>(2)</sup>	96.4	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.000
2011 <sup>(2)</sup>	97.8	0	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.000
2012 <sup>(2)</sup>	94.5	0	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000

# Station closed pending relocation.

AAQ NEPM Standard - 0.080 ppm (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 96: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Bringelly**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	97.3	0	0.002	0.002	0.002	0.001	0.001	0.000	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	0.000
2005	95.3	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000
2006	95.3	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000
2007	86.8	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2008	92.3	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000	-0.001
2009	87.1	0	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	-0.001
2010	85.8	0	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000
2011	94.8	0	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
2012	98.4	0	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000

**Table 97: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Chullora**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2005	71.8	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	0.000	0.000
2006	98.4	0	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2007	89.3	0	0.004	0.004	0.003	0.003	0.002	0.001	0.001	0.000	0.000
2008	80.9	0	0.005	0.004	0.003	0.002	0.002	0.001	0.001	0.001	0.000
2009	94.5	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	0.001	0.000
2010	95.9	0	0.004	0.004	0.003	0.003	0.002	0.001	0.001	0.001	0.000
2011	96.7	0	0.005	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000
2012	97.0	0	0.004	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000

**Table 98: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Macarthur<sup>(1)</sup>/Campbelltown West<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2005	55.3	0	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000
2006	97.3	0	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000
2007	94.8	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.000
2008	97.0	0	0.004	0.003	0.003	0.002	0.002	0.001	0.000	0.000	0.000
2009	95.9	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.000
2010	97.0	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2011	96.2	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2012 <sup>(1)</sup>	54.6	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2012 <sup>(2)</sup>	35.0	0	0.002	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.000

AAQ NEPM Standard - 0.080 ppm (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 99: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Richmond**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	97.0	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2004	92.9	0	0.004	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2005	96.7	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2006	95.9	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.000
2007	94.5	0	0.004	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.000
2008	74.9	0	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000
2009	93.7	0	0.004	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2010	97.5	0	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000
2011	98.4	0	0.003	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
2012	86.3	0	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000

**Table 100: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Albion Park<sup>(1)</sup>/Albion Park South<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	98.9	0	0.009	0.008	0.006	0.004	0.003	0.001	0.000	0.000	0.000
2004 <sup>(1)</sup>	97.0	0	0.009	0.007	0.006	0.004	0.003	0.001	0.000	0.000	0.000
2005 <sup>(1)</sup>	4.9	0	0.011	0.011	0.011	0.010	0.007	0.002	0.000	0.000	0.000
2006 <sup>(2)</sup>	89.3	0	0.010	0.008	0.007	0.004	0.003	0.001	0.000	0.000	0.000
2007 <sup>(2)</sup>	83.8	0	0.014	0.011	0.008	0.004	0.003	0.001	0.000	0.000	0.000
2008 <sup>(2)</sup>	97.0	0	0.008	0.006	0.005	0.004	0.003	0.002	0.000	0.000	0.000
2009 <sup>(2)</sup>	88.5	0	0.012	0.009	0.008	0.006	0.004	0.002	0.000	0.000	0.000
2010 <sup>(2)</sup>	97.8	0	0.011	0.010	0.008	0.006	0.003	0.001	0.000	0.000	0.000
2011 <sup>(2)</sup>	94.8	0	0.010	0.007	0.006	0.004	0.002	0.001	0.000	0.000	0.000
2012 <sup>(2)</sup>	96.4	0	0.010	0.004	0.004	0.003	0.002	0.001	0.000	0.000	0.000

AAQ NEPM Standard - 0.080 ppm (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 101: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Warrawong**

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

**Table 102: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Wollongong**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	98.4	0	0.006	0.005	0.005	0.003	0.003	0.001	0.001	0.000	0.000
2004	97.0	0	0.015	0.007	0.005	0.003	0.002	0.001	0.001	0.000	0.000
2005	97.5	0	0.006	0.006	0.003	0.003	0.002	0.001	0.001	0.000	0.000
2006	98.9	0	0.007	0.005	0.004	0.003	0.002	0.001	0.001	0.000	0.000
2007	79.2	0	0.008	0.006	0.005	0.003	0.002	0.002	0.001	0.001	0.000
2008	79.8	0	0.007	0.004	0.003	0.003	0.002	0.001	0.000	-0.001	
2009	73.4	0	0.004	0.003	0.003	0.002	0.002	0.001	0.000	-0.001	
2010	92.9	0	0.008	0.005	0.004	0.002	0.002	0.001	0.000	0.000	
2011	96.7	0	0.009	0.004	0.003	0.003	0.002	0.001	0.000	0.000	
2012	99.2	0	0.005	0.004	0.003	0.002	0.001	0.001	0.000	0.000	

**Table 103: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Newcastle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2005	75.3	0	0.008	0.006	0.005	0.004	0.003	0.002	0.001	0.000	
2006	97.3	0	0.009	0.005	0.005	0.004	0.003	0.002	0.001	0.000	
2007	45.8	0	0.012	0.012	0.007	0.005	0.003	0.002	0.001	0.000	
2008	90.2	0	0.008	0.006	0.006	0.004	0.003	0.002	0.001	0.000	
2009	73.4	0	0.010	0.008	0.006	0.004	0.004	0.002	0.001	0.000	
2010	91.8	0	0.005	0.005	0.004	0.004	0.003	0.002	0.001	0.000	
2011	98.9	0	0.009	0.006	0.005	0.005	0.004	0.002	0.001	0.000	
2012	97.5	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.001	

AAQ NEPM Standard - 0.080 ppm (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 104: Statistical summary for SO<sub>2</sub> - 24-hour average concentrations  
Station: Wallsend**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2002	82.5	0	0.011	0.008	0.007	0.006	0.004	0.003	0.002	0.001	
2003	93.7	0	0.010	0.008	0.005	0.004	0.003	0.002	0.001	0.001	
2004	92.9	0	0.014	0.008	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	0.005	0.004	0.002	0.001	0.000	
2008	95.4	0	0.007	0.006	0.006	0.005	0.004	0.002	0.001	0.001	
2009	68.2	0	0.007	0.006	0.006	0.004	0.003	0.002	0.001	0.000	
2010	74.2	0	0.007	0.005	0.004	0.003	0.003	0.002	0.001	0.000	
2011	99.5	0	0.007	0.005	0.005	0.003	0.002	0.001	0.001	0.000	
2012	99.7	0	0.005	0.004	0.004	0.003	0.002	0.002	0.001	0.000	

# Particles as PM<sub>10</sub>

## Statistical summary

Table 105: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations (2012)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles ( $\mu\text{g}/\text{m}^3$ )						
			99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
<b>Sydney</b>									
Bringelly	100.0	40.1	34.6	30.2	27.1	24.7	19.0	14.9	11.2
Chullora	98.6	<b>52.4</b>	36.6	35.1	31.7	27.6	21.8	16.9	13.4
Liverpool	97.0	42.5	39.3	37.7	35.1	30.8	24.4	18.8	13.7
Macarthur*	54.6	33.9	28.3	26.3	21.8	18.8	15.6	12.2	8.8
Campbelltown W*	35.2	39.3	37.1	34.4	30.2	27.9	24.0	18.1	13.9
Camden	19.1	35.6	35.5	34.5	31.1	28.6	23.6	20.0	14.8
Oakdale	98.9	38.9	33.4	28.2	24.0	19.8	14.9	10.2	6.9
Prospect	94.3	38.7	34.8	33.8	29.3	26.5	20.5	16.3	13.0
Richmond	95.9	<b>99.2</b>	43.7	33.8	28.6	24.8	17.6	12.9	10.2
Rozelle	99.5	40.7	35.4	32.1	29.4	25.6	20.3	15.7	12.3
<b>Illawarra</b>									
Albion Park Sth	98.4	43.9	36.0	32.7	26.9	22.9	16.7	11.9	8.6
Kembla Grange	98.4	<b>57.2</b>	45.5	42.6	37.1	29.7	23.7	16.5	11.9
Wollongong	98.6	47.5	38.2	36.1	33.4	28.8	22.8	16.5	12.2
<b>Central coast</b>									
Wyong	19.9	37.4	37.2	35.4	31.3	30.4	26.9	21.7	17.1
<b>Lower Hunter</b>									
Beresfield	99.2	<b>50.8</b>	47.4	44.1	39.2	32.4	25.8	19.6	15.2
Newcastle	98.9	48.7	43.3	41.8	36.2	32.5	26.0	18.8	14.4
<b>Regional</b>									
Albury	92.1	<b>54.4</b>	38.7	32.3	25.8	21.3	16.7	12.8	10.2
Bathurst	99.5	<b>55.5</b>	31.0	28.1	24.2	21.3	16.4	12.2	9.2
Tamworth	98.9	<b>55.1</b>	47.0	38.0	27.8	24.3	19.5	14.3	10.7
Wagga Wagga Nth	98.4	<b>67.2</b>	46.5	43.1	37.4	32.6	23.1	16.6	12.4

AAQ NEPM Standard – 50.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

\* Data availability rates at Macarthur and Campbelltown West were below 75% due to relocation of monitoring station (from the former to the latter site).

**Bold** font indicates values that exceed the AAQ NEPM standard

## Trend analysis

**Table 106: Maximum 24-hour average concentrations for PM<sub>10</sub> (µg/m<sup>3</sup>)**

Region/ Performance monitoring Station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Bringelly	<b>275.1</b>	<b>62.5</b>	<b>54.5</b>	<b>72.2</b>	<b>51.0</b>	<b>62.7</b>	<b>1683.9</b>	41.1	<b>86.0</b>	40.1
Chullora	<b>275.1</b>	<b>62.5</b>	<b>54.5</b>	<b>72.2</b>	<b>51.0</b>	<b>62.7</b>	<b>1683.9</b>	41.1	<b>65.2</b>	<b>52.4</b>
Liverpool	<b>213.7</b>	<b>55.8</b>	<b>50.7</b>	<b>66.1</b>	<b>66.5</b>	44.3	<b>1474.7</b>	42.1	<b>68.8</b>	42.5
Macarthur	<b>283.3</b>	<b>62.1</b>	<b>55.5</b>	<b>75.2</b>	<b>53.1</b>	<b>53.8</b>	<b>1579.8</b>	41.1	38.1	33.9
Campbelltown W										39.3
Camden										35.6
Oakdale		<b>60.6</b>	<b>53.2</b>	<b>92.3</b>	<b>53.1</b>	<b>65.5</b>	<b>1146.3</b>	<b>58.7</b>	<b>54.7</b>	38.9
Prospect		41.3	42.3	<b>56.5</b>	49.2	<b>68.2</b>	<b>1528.3</b>	33.3	41.5	38.7
Richmond	<b>196.4</b>	46.6	47.4	<b>63.1</b>	43.0	39.0	<b>1637.3</b>	37.0	46.2	<b>99.2</b>
Rozelle	38.1	<b>54.1</b>	46.8	<b>50.3</b>	<b>54.4</b>	43.1	<b>1562.8</b>	37.6	39.4	40.7
<b>Illawarra</b>										
Albion Park Sth				<b>61.4</b>	<b>53.8</b>	<b>96.1</b>	<b>1359.6</b>	41.8	<b>51.0</b>	43.9
Kembla Grange		<b>58.8</b>	<b>60.5</b>	<b>86.0</b>	<b>59.2</b>	<b>100.8</b>	<b>1174.0</b>	47.5	<b>55.5</b>	<b>57.2</b>
Wollongong	<b>280.5</b>	49.0	<b>56.5</b>	<b>63.3</b>	<b>58.5</b>	<b>78.3</b>	<b>1145.4</b>	49.6	48.5	47.5
<b>Central coast</b>										
Wyong										37.4
<b>Lower Hunter</b>										
Beresfield	<b>87.0</b>	<b>53.1</b>	<b>53.1</b>	<b>51.9</b>	<b>64.0</b>	<b>59.9</b>	<b>1999.0</b>	50.0	42.8	<b>50.8</b>
Newcastle		46.7	48.3	<b>51.2</b>	<b>58.1</b>	<b>54.4</b>	<b>2426.8</b>	<b>57.1</b>	49.2	48.7
<b>Regional</b>										
Albury	<b>940.2</b>	<b>56.0</b>	<b>56.9</b>	<b>213.0</b>	<b>212.8</b>	<b>124.8</b>	<b>249.7</b>	<b>60.8</b>	28.0	<b>54.4</b>
Bathurst	<b>622.3</b>	<b>68.5</b>	44.9	<b>59.6</b>	<b>162.8</b>	<b>63.0</b>	<b>2114.4</b>	43.3	24.3	<b>55.5</b>
Tamworth	<b>241.6</b>	<b>56.2</b>	<b>88.7</b>	47.8	48.8	<b>100.4</b>	<b>1791.4</b>	29.1	<b>50.9</b>	<b>55.1</b>
Wagga Wagga/ Wagga Wagga Nth*	<b>970.0</b>	<b>109.0</b>	<b>161.9</b>	<b>188.3</b>	<b>110.3</b>	<b>294.9</b>	<b>297.4</b>	<b>64.9</b>	39.2	<b>67.2*</b>

AAQ NEPM Standard – 50.0 µg/m<sup>3</sup> (24-hour average)

\* Wagga Wagga Nth site was commissioned in October 2011.

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 107: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Blacktown<sup>(1)</sup>/Prospect<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003 <sup>(1)</sup>	94.8	5	<b>187.8</b>	<b>69.4</b>	43.6	34.8	29.3	21.8	16.9	12.7	
2004 <sup>(1)</sup>	35.8	0	44.1	43.4	41.9	39.2	33.7	27.4	22.6	18.1	
2005-6 <sup>#</sup>											
2007 <sup>(2)</sup>	82.7	0	46.3	43.3	41.6	33.4	28.1	21.9	16.8	12.4	
2008 <sup>(2)</sup>	88.5	0	41.8	39.6	35.0	32.6	27.5	21.0	16.4	12.8	
2009 <sup>(2)</sup>	96.4	<b>11</b>	<b>1680.3</b>	<b>135.3</b>	<b>60.7</b>	38.9	32.3	24.1	18.2	13.5	
2010 <sup>(2)</sup>	97.5	0	40.1	31.7	30.1	26.7	22.8	18.7	14.9	11.2	
2011 <sup>(2)</sup>	93.2	0	41.5	36.2	31.7	27.4	24.3	19.3	15.1	10.9	
2012 <sup>(2)</sup>	94.3	0	38.7	34.8	33.8	29.3	26.5	20.5	16.3	13.0	

# Station closed pending relocation

AAQ NEPM Standard – 50.0 μg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 108: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Bringelly**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	97.0	<b>6</b>	<b>275.1</b>	<b>56.0</b>	44.3	34.1	28.7	21.7	16.6	11.8	
2004	93.4	2	<b>62.5</b>	46.0	41.6	35.1	30.7	24.8	18.9	13.2	
2005	92.1	2	<b>54.5</b>	46.5	43.5	35.7	30.8	23.8	18.4	13.7	
2006	88.8	3	<b>72.2</b>	<b>52.3</b>	42.6	33.4	29.3	25.0	19.0	14.5	
2007	99.5	1	<b>51.0</b>	48.5	42.4	33.5	30.3	23.7	16.6	12.0	
2008	97.0	1	<b>62.7</b>	35.2	33.0	28.6	24.6	19.3	14.4	10.6	
2009	94.8	<b>6</b>	<b>1683.9</b>	<b>114.8</b>	47.4	37.1	31.9	22.8	17.0	12.4	
2010	97.3	0	41.1	37.5	33.9	29.1	23.7	18.5	14.4	10.7	
2011	98.9	2	<b>86.0</b>	41.5	36.5	30.7	25.0	18.9	14.3	10.6	
2012	100.0	0	40.1	34.6	30.2	27.1	24.7	19.0	14.9	11.2	

**Table 109: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Chullora**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	85.2	<b>11</b>	<b>213.7</b>	<b>61.1</b>	<b>57.5</b>	47.2	36.0	28.8	21.0	16.3	
2004	90.7	3	<b>55.8</b>	49.8	46.2	39.0	34.2	27.2	21.2	16.1	
2005	88.8	1	<b>50.7</b>	46.1	43.8	38.3	33.6	27.4	20.4	16.3	
2006	97.0	3	<b>66.1</b>	49.2	38.6	34.4	31.1	26.4	21.3	16.5	
2007	97.5	2	<b>66.5</b>	39.4	37.7	34.2	29.2	23.1	18.8	13.4	
2008	97.0	0	44.3	38.8	36.5	33.0	30.2	23.7	18.6	13.9	
2009	98.4	<b>9</b>	<b>1474.7</b>	<b>121.0</b>	<b>58.7</b>	38.1	32.7	25.0	19.9	14.8	
2010	98.6	0	42.1	39.1	35.6	30.7	26.6	21.4	16.9	12.9	
2011	99.2	<b>7</b>	<b>65.2</b>	<b>55.8</b>	49.0	38.1	30.7	23.1	18.1	13.6	
2012	98.6	1	<b>52.4</b>	36.6	35.1	31.7	27.6	21.8	16.9	13.4	

AAQ NEPM Standard – 50.0 μg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 110: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Liverpool**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	90.1	<b>6</b>	<b>283.3</b>	<b>62.5</b>	45.8	37.4	32.3	25.3	19.4	14.8	
2004	91.5	1	<b>62.1</b>	46.6	44.7	36.8	32.9	26.3	20.6	14.8	
2005	96.4	2	<b>55.5</b>	48.1	43.7	38.1	32.5	26.5	20.2	15.1	
2006	95.9	3	<b>75.2</b>	<b>50.5</b>	40.8	35.0	31.6	26.3	20.5	16.0	
2007	95.3	1	<b>53.1</b>	41.3	39.1	35.9	30.3	23.7	17.6	12.8	
2008	92.9	1	<b>53.8</b>	36.2	33.6	30.1	26.6	21.7	16.9	12.2	
2009	93.7	<b>8</b>	<b>1579.8</b>	<b>114.8</b>	<b>59.5</b>	38.8	31.7	25.1	18.4	14.3	
2010	97.3	0	41.1	35.3	33.0	29.9	26.2	20.4	16.2	12.0	
2011	69.0	1	<b>68.8</b>	46.1	37.5	33.1	27.7	21.7	16.9	13.0	
2012	97.0	0	39.3	37.7	35.1	30.8	24.4	18.8	13.7	42.5	

**Table 111: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Macarthur/Campbelltown West<sup>(2)</sup>**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003											
2004	14.5	1	<b>60.6</b>	<b>60.6</b>	<b>53.8</b>	42.8	38.0	30.9	21.8	15.6	
2005	83.6	1	<b>53.2</b>	46.6	41.9	35.7	31.3	24.4	18.1	13.7	
2006	100.0	4	<b>92.3</b>	<b>53.5</b>	34.5	31.0	26.2	22.4	15.6	11.5	
2007	96.4	1	<b>53.1</b>	38.0	36.7	29.8	25.8	20.1	14.7	10.4	
2008	99.5	1	<b>65.5</b>	33.2	30.7	27.6	23.3	17.5	13.7	9.9	
2009	96.7	7	<b>1146.3</b>	<b>111.4</b>	<b>56.2</b>	35.5	29.6	21.2	15.5	10.5	
2010	99.5	1	<b>58.7</b>	35.7	30.9	26.8	21.5	16.7	12.5	9.5	
2011	98.4	0	38.1	31.9	28.5	23.0	20.6	16.0	12.1	8.9	
2012 <sup>(1)</sup>	33.9	0	28.3	26.3	21.8	18.8	15.6	12.2	8.8	33.9	
2012 <sup>(2)</sup>	39.3	0	37.1	34.4	30.2	27.9	24.0	18.1	13.9	39.3	

AAQ NEPM Standard – 50.0 μg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 112: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Oakdale**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003											
2004	56.8	0	41.3	36.3	28.7	23.8	19.2	15.7	10.1	6.4	
2005	92.9	0	42.3	38.8	32.5	27.7	22.2	16.6	12.4	8.4	
2006	96.4	1	<b>56.5</b>	35.8	33.9	28.6	23.6	17.8	12.6	8.5	
2007	97.3	0	49.2	36.4	32.2	25.4	22.4	16.4	11.2	7.2	
2008	96.7	1	<b>68.2</b>	33.9	31.0	27.0	21.3	15.5	10.7	7.2	
2009	91.2	6	<b>1528.3</b>	<b>130.2</b>	48.4	30.6	25.5	19.5	12.7	7.5	
2010	99.5	0	33.3	29.3	27.9	23.3	18.1	13.4	9.2	6.6	
2011	99.5	1	<b>54.7</b>	28.1	24.9	21.3	17.3	13.1	9.6	6.9	
2012	98.9	0	38.9	33.4	28.2	24.0	19.8	14.9	10.2	6.9	

**Table 113: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Richmond**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (ug/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	96.7	7	<b>196.4</b>	<b>76.0</b>	<b>52.8</b>	35.4	28.8	21.1	15.7	11.3	
2004	96.2	0	46.6	41.1	38.4	33.7	29.8	22.5	17.4	12.1	
2005	97.0	0	47.4	43.8	37.3	30.3	25.8	20.1	15.3	11.5	
2006	97.0	2	<b>63.1</b>	44.9	38.0	30.8	27.1	21.5	16.0	12.2	
2007	98.4	0	43.0	34.4	33.4	28.6	24.3	18.6	13.6	10.0	
2008	98.4	0	39.0	30.9	28.1	24.9	20.2	16.0	11.9	8.9	
2009	95.9	<b>6</b>	<b>1637.3</b>	<b>121.7</b>	46.1	32.9	28.0	19.4	13.4	9.6	
2010	96.2	0	37.0	30.2	26.9	24.6	20.6	15.9	12.0	9.2	
2011	98.9	0	46.2	32.3	29.7	25.3	21.3	16.0	11.8	8.9	
2012	95.9	3	<b>99.2</b>	43.7	33.8	28.6	24.8	17.6	12.9	10.2	

AAQ NEPM Standard – 50.0 µg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 114: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Rozelle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (ug/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	9.9	0	38.1	38.1	38.0	37.2	31.7	22.4	18.7	16.2	
2004	92.3	1	<b>54.1</b>	43.8	38.8	34.0	30.1	24.6	19.3	14.0	
2005	95.1	0	46.8	42.6	39.3	35.2	31.4	24.3	18.8	14.9	
2006	94.0	1	<b>50.3</b>	45.0	38.8	33.6	29.3	24.7	19.4	15.4	
2007	97.5	1	<b>54.4</b>	38.2	36.1	30.7	27.1	21.7	17.2	13.2	
2008	96.4	0	43.1	34.0	32.6	28.7	26.0	20.6	16.7	12.9	
2009	95.3	<b>8</b>	<b>1562.8</b>	<b>128.5</b>	<b>55.8</b>	36.1	31.0	24.3	17.8	13.1	
2010	98.9	0	37.6	31.1	29.3	26.8	24.3	19.6	15.6	12.1	
2011	98.4	0	39.4	34.7	32.3	27.2	24.5	20.5	15.7	12.0	
2012	99.5	0	40.7	35.4	32.1	29.4	25.6	20.3	15.7	12.3	

**Table 115: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Albion Park Sth**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (ug/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003-5											
2006	85.8	2	<b>61.4</b>	42.3	38.6	35.9	29.4	21.7	15.3	10.5	
2007	88.5	1	<b>53.8</b>	42.6	37.8	33.4	28.4	20.8	13.6	8.7	
2008	97.0	1	<b>96.1</b>	40.0	35.3	29.7	25.2	18.2	13.0	9.4	
2009	99.5	<b>9</b>	<b>1359.6</b>	73.0	50.7	38.0	31.6	22.8	15.4	10.1	
2010	96.7	0	41.8	37.2	35.6	29.0	24.7	18.4	11.6	8.6	
2011	98.9	1	<b>51.0</b>	34.9	31.6	27.2	23.5	17.0	11.9	8.6	
2012	98.4	0	43.9	36.0	32.7	26.9	22.9	16.7	11.9	8.6	

**Table 116: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Kembla Grange**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003											
2004	57.4	1	<b>58.8</b>	46.8	43.3	37.0	30.3	21.8	14.9	10.5	
2005	97.8	4	<b>60.5</b>	<b>50.8</b>	46.8	39.1	33.6	23.4	17.1	12.2	
2006	99.2	<b>9</b>	<b>86.0</b>	<b>69.6</b>	<b>54.5</b>	40.4	34.5	26.0	18.7	13.0	
2007	99.5	5	<b>59.2</b>	<b>50.5</b>	46.6	39.0	33.2	24.3	17.7	12.1	
2008	98.6	4	<b>100.8</b>	<b>52.8</b>	42.0	33.3	30.3	23.3	16.7	11.1	
2009	99.2	<b>14</b>	<b>1174.0</b>	<b>134.4</b>	<b>67.0</b>	42.5	34.0	25.5	18.0	11.5	
2010	98.6	0	47.5	42.7	39.5	33.4	28.4	22.7	16.2	11.7	
2011	98.9	1	<b>55.5</b>	45.9	39.7	33.6	29.1	21.1	15.0	9.9	
2012	98.4	3	<b>57.2</b>	45.5	42.6	37.1	29.7	23.7	16.5	11.9	

AAQ NEPM Standard – 50.0 μg/m<sup>3</sup> (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

**Table 117: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Wollongong**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	98.1	<b>8</b>	<b>280.5</b>	<b>61.8</b>	<b>51.3</b>	34.7	29.3	21.4	16.8	12.4	
2004	97.0	0	49.0	46.2	42.3	36.7	30.6	23.4	17.4	12.2	
2005	97.3	1	<b>56.5</b>	45.6	41.9	34.5	29.8	23.6	16.7	12.6	
2006	96.4	4	<b>63.3</b>	<b>52.6</b>	46.7	37.5	32.3	25.1	18.5	13.0	
2007	95.3	3	<b>58.5</b>	49.3	42.7	37.8	31.8	24.7	18.3	13.1	
2008	94.5	1	<b>78.3</b>	41.0	36.8	31.2	28.7	21.5	16.3	12.1	
2009	95.9	<b>6</b>	<b>1145.4</b>	<b>107.0</b>	49.5	40.3	34.7	24.5	18.8	12.6	
2010	95.1	0	49.6	44.2	40.2	31.9	28.3	22.4	15.8	12.1	
2011	96.7	0	48.5	42.4	37.7	32.6	26.3	21.0	15.8	11.4	
2012	98.6	0	47.5	38.2	36.1	33.4	28.8	22.8	16.5	12.2	

**Table 118: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Beresfield**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	91.2	<b>5</b>	<b>87.0</b>	<b>60.7</b>	47.5	34.0	29.0	22.7	17.5	13.1	
2004	87.2	1	<b>53.1</b>	47.2	43.8	39.2	33.1	24.9	19.3	14.0	
2005	95.9	1	<b>53.1</b>	44.3	41.1	37.0	31.7	25.2	18.6	14.6	
2006	96.4	2	<b>51.9</b>	44.5	43.2	36.8	34.2	26.7	18.7	14.6	
2007	90.1	<b>5</b>	<b>64.0</b>	<b>55.1</b>	49.3	41.8	32.1	25.2	18.4	13.1	
2008	95.4	<b>5</b>	<b>59.9</b>	<b>52.5</b>	38.3	32.3	27.3	21.5	16.9	13.4	
2009	98.6	<b>15</b>	<b>1999.0</b>	<b>174.3</b>	<b>70.6</b>	47.7	35.3	26.2	18.4	14.2	
2010	97.0	0	50.0	37.7	32.1	28.3	24.7	20.0	15.4	12.3	
2011	95.1	0	42.8	39.9	35.8	29.3	25.5	21.3	16.1	12.5	
2012	99.2	1	<b>50.8</b>	47.4	44.1	39.2	32.4	25.8	19.6	15.2	

AAQ NEPM Standard – 50.0 μg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 119: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Newcastle**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003											
2004	19.4	0	46.7	46.6	46.6	39.4	34.1	27.3	21.7	17.0	
2005	81.6	0	48.3	41.7	39.3	35.7	31.8	26.4	20.9	16.5	
2006	97.3	1	<b>51.2</b>	43.2	38.1	34.2	30.8	25.6	20.5	15.8	
2007	47.1	3	<b>58.1</b>	<b>56.8</b>	49.9	39.5	33.6	26.8	21.5	17.2	
2008	93.2	2	<b>54.4</b>	44.2	39.6	34.4	31.4	24.8	19.1	15.1	
2009	93.2	<b>13</b>	<b>2426.8</b>	<b>119.5</b>	<b>71.2</b>	44.9	37.0	28.1	22.3	16.5	
2010	96.2	1	<b>57.1</b>	38.7	34.7	30.3	27.3	23.1	17.9	13.7	
2011	99.5	0	49.2	42.6	38.7	32.4	29.6	24.0	18.2	13.6	
2012	98.9	0	48.7	43.3	41.8	36.2	32.5	26.0	18.8	14.4	

**Table 120: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Albury**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	80.8	<b>29</b>	<b>940.2</b>	<b>272.5</b>	<b>201.3</b>	<b>95.2</b>	49.3	23.1	14.2	9.7	
2004	77.3	2	<b>56.0</b>	45.0	41.0	36.7	32.2	18.6	13.2	9.9	
2005	90.1	3	<b>56.9</b>	<b>50.4</b>	41.0	36.2	30.7	20.4	14.3	10.9	
2006	87.9	<b>14</b>	<b>213.0</b>	<b>114.8</b>	<b>75.8</b>	48.1	35.4	24.0	17.8	13.3	
2007	91.2	<b>11</b>	<b>212.8</b>	<b>117.3</b>	<b>91.5</b>	44.9	31.4	22.3	15.2	11.0	
2008	96.4	8	<b>124.8</b>	<b>67.8</b>	<b>53.5</b>	40.2	29.7	20.7	14.3	9.9	
2009	96.7	<b>15</b>	<b>249.7</b>	<b>144.0</b>	<b>102.0</b>	39.0	28.5	19.3	14.0	10.1	
2010	99.5	2	<b>60.8</b>	45.1	31.6	24.1	19.4	14.6	11.2	8.6	
2011	90.7	0	28.0	25.2	23.7	19.9	17.9	14.5	11.9	9.2	
2012	92.1	1	<b>54.4</b>	38.7	32.3	25.8	21.3	16.7	12.8	10.2	

**Table 121: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Bathurst**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	90.4	<b>12</b>	<b>622.3</b>	<b>122.2</b>	<b>74.1</b>	34.8	27.9	17.2	13.0	8.9	
2004	88.5	4	<b>68.5</b>	<b>54.9</b>	47.0	39.0	33.0	24.4	15.3	9.8	
2005	93.2	0	44.9	40.8	36.3	30.4	25.4	18.6	12.9	8.9	
2006	98.6	3	<b>59.6</b>	46.0	44.3	35.2	28.6	22.3	15.4	11.5	
2007	95.1	2	<b>162.8</b>	48.6	38.9	32.0	26.6	19.2	13.5	9.2	
2008	94.8	1	<b>63.0</b>	40.8	35.9	28.8	24.1	16.9	12.3	8.8	
2009	97.8	<b>12</b>	<b>2114.4</b>	<b>122.4</b>	<b>69.8</b>	36.9	26.8	20.3	13.8	9.0	
2010	98.6	0	43.3	32.6	26.7	21.2	18.5	12.5	7.9	5.0	
2011	97.3	0	24.3	23.2	21.1	18.6	17.5	13.8	10.3	7.8	
2012	99.5	2	<b>55.5</b>	31.0	28.1	24.2	21.3	16.4	12.2	9.2	

AAQ NEPM Standard – 50.0 μg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

**Table 122: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Tamworth**

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	92.9	7	<b>241.6</b>	<b>70.7</b>	<b>51.4</b>	34.7	25.8	19.7	15.1	11.4	
2004	79.2	2	<b>56.2</b>	47.0	40.4	34.8	31.0	24.8	19.4	15.4	
2005	68.2	2	<b>88.7</b>	42.9	33.7	29.8	27.4	20.6	14.8	10.6	
2006	79.2	0	47.8	39.0	36.7	29.3	26.7	21.3	15.0	11.0	
2007	73.7	0	48.8	42.3	34.5	30.3	26.2	19.4	14.7	10.1	
2008	85.8	3	<b>100.4</b>	<b>52.0</b>	40.7	30.5	23.8	18.7	14.0	10.5	
2009	96.7	<b>17</b>	<b>1791.4</b>	<b>235.9</b>	<b>120.7</b>	47.0	33.8	22.8	15.7	11.4	
2010	98.4	0	29.1	26.5	24.6	21.8	18.4	14.7	11.2	8.3	
2011	96.7	1	<b>50.9</b>	34.0	27.4	22.4	19.2	15.8	12.3	9.1	
2012	98.9	1	<b>55.1</b>	47.0	38.0	27.8	24.3	19.5	14.3	10.7	

**Table 123: Statistical summary for PM<sub>10</sub> - 24-hour average concentrations  
Station: Wagga Wagga / Wagga Wagga Nth\***

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ug/m <sup>3</sup> )	Percentiles (μg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2002	99.2	34	193.2	123.3	101.9	60.7	48.7	33.6	24.6	17.1	
2003	87.4	21	970.0	133.9	101.9	56.7	44.6	28.9	19.3	12.8	
2004	91.0	28	109.0	70.5	68.5	61.3	47.0	33.2	21.5	13.8	
2005	90.7	27	161.9	80.9	72.4	59.5	46.4	30.4	19.8	14.1	
2006	95.6	37	188.3	110.0	86.8	61.1	50.7	36.2	24.9	16.9	
2007	97.5	34	110.3	82.0	75.2	61.0	47.5	33.0	21.7	14.8	
2008	93.7	23	294.9	70.6	62.6	53.2	45.1	28.4	21.0	14.5	
2009	82.5	21	297.4	214.4	112.3	55.9	46.2	30.6	19.8	12.4	
2010	97.0	6	64.9	52.1	48.5	38.7	29.0	21.5	15.4	10.0	
2011*	96.3	0	39.2	33.9	31.5	27.5	24.1	19.1	14.4	10.5	
2012*	98.4	1	67.2	44.8	42.9	37.0	32.6	23.1	16.5	12.3	

AAQ NEPM Standard – 50.0 μg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values that exceed the AAQ NEPM standard

\* Wagga Wagga Nth site was commissioned in October 2011

## Particles as PM<sub>2.5</sub>

### *Continuous TEOM PM<sub>2.5</sub> data from 2010*

The current USEPA approved method for PM<sub>2.5</sub> compliance monitoring is a non-continuous (batch), 1-day-in-3 technique that requires pre and post laboratory weighing. Because this involves a significant delay in acquiring data, jurisdictions use continuous techniques to enable the near real-time reporting of air quality via the web expected by the community (e.g. TEOM, or BAM monitors). The PM<sub>2.5</sub> AAQ NEPM variation requires the reporting of all PM<sub>2.5</sub> data, including the compliance method and the continuous monitoring technique.

Prior to 2010, our continuous TEOM PM<sub>2.5</sub> data were reported with the internal USEPA PM<sub>10</sub> equivalency factors (of A=3 and B=1.03 where  $y = A + Bx$ ) applied to assessments of continuous TEOM PM<sub>2.5</sub> data in the main body of the report (Table 21, and Tables 124 to 134). Removing the PM<sub>10</sub> equivalency factor has brought the NSW reporting in harmony with other Australian jurisdictions. This approach also better approximates data derived from the reference method specified in the PM<sub>2.5</sub> AAQ NEPM variation.

### *Continuous PM<sub>2.5</sub> monitoring techniques during 2012*

During 2012, a staged rollout was undertaken to replace continuous TEOM PM<sub>2.5</sub> monitors with the USEPA equivalent method Beta Attenuation Monitors (BAM), starting with Beresfield on 21/2/2012 and ending with Earlwood on 15/12/2012. The BAM method differs from TEOM in sample treatment; the less harsh heating of the sample in the BAM is presumed to lead to greater retention of volatile components adsorbed to the fine particulate matter.

## Statistical summary

**Table 124: Statistical summary for PM<sub>2.5</sub> – daily 24-hour average concentrations (2012) – continuous TEOM\* and BAM methods**

Region/ Performance monitoring station	Data availability rates (%)	Maximum conc. ( $\mu\text{g}/\text{m}^3$ )	Percentiles ( $\mu\text{g}/\text{m}^3$ )							
			99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
<b>Sydney</b>										
Chullora	97.5	23.7	18.1	14.8	12.2	10.0	7.5	5.4	3.7	
Earlwood	98.9	20.7	17.4	14.5	11.8	10.3	7.3	4.6	3.2	
Liverpool	85.8	24.9	21.5	19.5	15.2	13.9	10.8	7.6	5.7	
Richmond	94.3	<b>116.7</b>	18.0	14.8	11.0	9.4	6.7	4.1	2.6	
Camden	20.8	19.5	19.4	18.1	13.2	11.6	9.5	7.8	5.3	
<b>Illawarra</b>										
Wollongong	98.1	15.6	13.7	13.1	10.6	8.3	5.9	4.0	2.4	
<b>Central Coast</b>										
Wyong	19.7	14.7	14.7	14.6	12.5	11.4	9.0	6.9	4.8	
<b>Lower Hunter</b>										
Beresfield	93.4	22.4	21.0	18.1	14.4	12.7	9.9	7.1	5.3	
Wallsend	99.5	16.2	14.2	13.1	11.3	9.1	6.4	4.3	3.1	

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data uses USEPA factors of A=0 and B=1.00

## Trend data

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

**Table 125: Maximum 24-hour average concentrations for PM<sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ ) – continuous TEOM\*and BAM methods**

Region/ Performance monitoring station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Chullora	<b>81.2</b>	23.5	<b>25.4</b>	<b>32.8</b>	20.5	19.5	<b>183.2</b>	24.2	23.9	23.7
Earlwood	<b>35.3</b>	20.1	<b>26.8</b>	<b>29.1</b>	19.8	18.2	<b>186.7</b>	22.5	23.6	20.7
Liverpool	<b>45.9</b>	<b>38.9</b>	<b>30.7</b>	<b>48.1</b>	23.0	<b>32.2</b>	<b>268.1</b>	21.8	<b>38.0</b>	24.9
Richmond	<b>44.5</b>	23.3	22.7	<b>31.6</b>	21.1	17.7	<b>148.9</b>	20.8	<b>42.9</b>	<b>116.7</b>
Camden										19.5
<b>Illawarra</b>										
Warrawong	<b>152.6</b>	23.6	24.0	15.0						
Wollongong	<b>106.1</b>	22.6	22.1	<b>26.6</b>	22.5	14.6	<b>241.0</b>	23.5	17.7	15.6
<b>Central Coast</b>										
Wyong										14.7
<b>Lower Hunter</b>										
Beresfield	<b>42.9</b>	<b>27.8</b>	19.5	24.9	23.0	16.9	<b>230.8</b>	<b>25.9</b>	18.8	22.4
Wallsend	<b>30.2</b>	23.5	18.0	<b>25.6</b>	18.2	22.8	<b>415.6</b>	18.8	16.2	16.2

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data uses USEPA factors of A=0 and B=1.00

### 24-hour PM<sub>2.5</sub> average

PM<sub>2.5</sub> TEOM 24-hour daily averages provided in NEPM reports from 2009 onwards will differ from those reported previously as the USEPA PM<sub>10</sub> equivalence factors have been removed from all TEOM PM<sub>2.5</sub> data values; in reports prior to 2009 these factors were accounted for.

**Table 126: Annual average concentrations for PM<sub>2.5</sub> (µg/m<sup>3</sup>) – continuous TEOM\* and BAM methods**

Region/ Performance monitoring station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Sydney</b>										
Chullora	<b>11.1</b>	<b>8.6</b>	7.6	7.2	6.4	5.9	7.1	5.7	5.9	6.1
Earlwood	7.8	7.5	7.1	6.9	5.9	5.5	6.8	5.7	5.4	5.6
Liverpool	<b>10.3</b>	<b>9.2</b>	<b>8.4</b>	<b>8.9</b>	7.2	6.5	<b>8.3</b>	6.3	5.9	<b>8.5</b>
Richmond	6.6	6.5	5.8	5.9	5.8	7.3	5.7	4.2	4.7	5.3
Camden										7.8
<b>Illawarra</b>										
Warrawong	<b>8.7</b>	<b>8.1</b>	7.4	6.0						
Wollongong	7.3	6.7	6.3	6.4	6.0	5.3	7.1	5.1	4.6	4.6
<b>Central Coast</b>										
Wyong										7.3
<b>Lower Hunter</b>										
Beresfield	6.1	7.7	6.8	6.8	6.3	6.0	<b>8.5</b>	6.0	5.5	7.9
Wallsend	6.6	6.7	6.5	6.4	5.8	5.9	<b>8.1</b>	4.6	4.8	5.1

AAQ NEPM Standard – 8.0 µg/m<sup>3</sup> (8-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data uses USEPA factors of A=0 and B=1.00

## Statistical trends

**Table 127: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – continuous TEOM\*and BAM<sup>#</sup> methods**  
**Station: Chullora**

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m <sup>3</sup> )	Percentiles (µg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	70.4	7	<b>81.2</b>	<b>36.5</b>	<b>25.3</b>	19.2	16.8	13.1	9.7	7.6	
2004	89.6	0	23.5	20.0	18.5	15.9	14.0	10.9	7.9	5.7	
2005	93.2	2	<b>25.4</b>	19.5	17.2	15.1	12.9	9.2	6.7	5.0	
2006	94.2	2	<b>32.8</b>	16.6	14.6	13.1	11.4	8.8	6.4	4.8	
2007	65.5	0	20.5	17.4	16.8	13.4	11.9	8.1	5.4	3.7	
2008	96.7	0	19.5	16.6	14.4	11.8	9.9	7.6	5.4	3.7	
2009	98.6	3	<b>183.2</b>	18.9	17.2	14.0	11.1	8.5	5.9	3.9	
2010	93.4	0	24.2	17.7	15.2	11.9	9.9	7.3	5.0	3.4	
2011	98.9	0	23.9	18.6	16.2	12.3	10.8	7.6	5.2	3.4	
2012	97.5	0	23.7	18.1	14.8	12.2	10.0	7.5	5.4	3.7	

AAQ NEPM advisory reporting standard – 25.0 µg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data uses USEPA factors of A=0 and B=1.00

<sup>#</sup> TEOM replaced with BAM 14/12/2012

**Table 128: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – continuous TEOM\* and BAM<sup>#</sup> methods**  
**Station: Earlwood**

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m <sup>3</sup> )	Percentiles (µg/m <sup>3</sup> )							
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>	
2003	98.6	5	<b>35.3</b>	<b>30.4</b>	24.2	16.3	14.3	9.7	6.5	4.5	
2004	96.2	0	20.1	19.5	18.0	15.1	13.1	10.1	6.8	4.5	
2005	98.9	2	<b>26.8</b>	20.1	18.7	14.0	12.2	9.1	6.1	4.4	
2006	98.6	2	<b>29.0</b>	17.8	15.1	13.1	11.6	8.3	6.4	4.4	
2007	96.7	0	19.8	16.8	15.6	12.2	10.5	7.8	5.2	3.3	
2008	98.6	0	18.3	15.3	14.7	11.3	9.6	7.2	4.9	3.2	
2009	75.6	1	<b>186.7</b>	22.5	18.9	13.9	11.3	8.2	5.2	3.4	
2010	95.9	0	22.5	16.5	14.2	11.5	9.7	7.3	5.0	3.4	
2011	96.2	0	23.6	18.4	15.8	12.7	10.5	6.9	4.5	2.8	
2012	98.9	0	20.7	17.4	14.5	11.8	10.3	7.3	4.6	3.2	

AAQ NEPM advisory reporting standard – 25.0 µg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data uses USEPA factors of A=0 and B=1.00

<sup>#</sup> TEOM replaced with BAM 19/12/2012

**Table 129: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – continuous TEOM\* and BAM<sup>#</sup> methods**  
**Station: Liverpool**

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m <sup>3</sup> )	Percentiles (µg/m <sup>3</sup> )						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2003	65.8	6	<b>45.9</b>	<b>42.9</b>	<b>29.4</b>	20.7	17.2	13.4	8.8	6.3
2004	85.5	4	<b>38.9</b>	<b>27.3</b>	23.3	17.2	15.8	11.8	8.5	5.1
2005	91.2	2	<b>30.8</b>	24.2	22.0	17.2	15.3	10.9	7.3	4.9
2006	98.6	3	<b>48.1</b>	22.2	18.5	15.8	14.1	11.0	8.3	5.9
2007	94.8	0	23.0	19.4	18.3	15.2	12.1	9.2	6.6	4.3
2008	92.6	1	<b>32.1</b>	16.6	14.9	12.2	10.6	8.3	5.8	3.9
2009	95.1	3	<b>268.2</b>	<b>25.2</b>	19.9	15.0	12.9	9.7	6.7	4.2
2010	95.9	0	21.8	17.8	15.5	13.2	10.9	8.1	5.5	3.8
2011	99.2	2	<b>38.0</b>	20.7	16.2	14.0	10.9	7.4	4.9	3.1
2012	85.8	0	24.9	21.5	19.5	15.2	13.9	10.8	7.6	5.7

AAQ NEPM advisory reporting standard – 25.0 µg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data-uses USEPA factors of A=0 and B=1.00

# TEOM replaced with BAM 2/3/2012

**Table 130: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – continuous TEOM\* and BAM<sup>#</sup> methods**  
**Station: Richmond**

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m <sup>3</sup> )	Percentiles (µg/m <sup>3</sup> )						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2003	95.9	6	<b>57.2</b>	<b>39.9</b>	24.5	15.7	11.7	7.8	5.2	3.4
2004	96.7	0	23.3	20.1	17.7	14.2	11.5	8.5	5.7	3.4
2005	83.8	0	22.7	15.7	14.5	12.4	10.8	7.3	4.9	3.3
2006	84.9	1	<b>31.6</b>	17.4	13.1	10.9	9.3	7.4	5.3	3.8
2007	12.9	0	21.1	18.6	16.0	13.6	9.5	7.7	6.0	4.3
2008	98.9	0	17.7	14.6	13.7	12.3	10.5	8.6	6.9	5.6
2009	89.3	3	<b>192.3</b>	23.0	16.9	11.5	9.8	6.7	4.4	2.8
2010	97.0	0	20.8	13.7	12.2	9.2	7.9	5.7	3.5	2.1
2011	97.8	2	<b>42.9</b>	22.7	15.7	10.6	8.6	6.2	3.7	2.2
2012	94.2	2	<b>116.7</b>	18.0	14.8	11.0	9.4	6.7	4.1	2.6

AAQ NEPM advisory reporting standard – 25.0 µg/m<sup>3</sup> (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data-uses USEPA factors of A=0 and B=1.00

# TEOM replaced with BAM 7/9/2012

**Table 131: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – continuous TEOM\* method  
Station: Warrawong**

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value ( $\mu\text{g}/\text{m}^3$ )	Percentiles ( $\mu\text{g}/\text{m}^3$ )						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2000	97.3	2	<b>30.8</b>	17.9	15.8	12.1	9.9	7.3	5.1	3.6
2001	95.1	0	19.8	18.1	17.2	14.5	11.7	8.8	5.7	3.6
2002	96.7	10	<b>83.5</b>	<b>42.4</b>	<b>30.3</b>	21.7	17.4	11.9	7.4	4.9
2003	98.4	4	<b>152.6</b>	<b>26.0</b>	21.4	17.7	14.4	10.9	7.5	5.0
2004	94.5	0	23.6	21.0	18.6	17.0	14.4	10.8	7.2	4.8
2005	94.5	0	24.0	21.0	18.7	15.7	13.2	9.7	6.5	4.3
2006	40.5	0	15.0	15.0	14.0	12.5	10.8	8.3	5.9	3.3

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data-uses USEPA factors of A=0 and B=1.00

**Table 132: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – continuous TEOM\* and BAM# methods  
Station: Wollongong**

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value ( $\mu\text{g}/\text{m}^3$ )	Percentiles ( $\mu\text{g}/\text{m}^3$ )						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2002	95.6	11	<b>86.2</b>	<b>46.4</b>	<b>26.1</b>	21.9	15.0	10.3	6.3	4.0
2003	97.0	5	<b>106.0</b>	<b>30.9</b>	20.8	15.2	12.6	8.6	6.0	4.2
2004	97.0	0	22.6	19.1	17.6	14.5	12.3	8.9	5.9	3.6
2005	97.8	0	22.0	18.0	16.6	13.0	11.9	8.2	5.5	3.8
2006	100.0	2	<b>26.6</b>	17.4	14.4	12.5	11.2	8.4	5.7	3.6
2007	98.4	0	22.5	18.5	16.3	13.7	10.8	7.7	5.2	3.2
2008	94.0	0	14.7	14.2	13.0	10.7	9.3	7.0	4.8	3.0
2009	96.2	3	<b>241.0</b>	23.0	19.3	15.0	12.0	8.3	5.6	3.4
2010	92.9	0	23.5	15.0	13.8	11.0	9.2	6.3	4.2	3.0
2011	96.4	0	17.7	16.0	14.1	11.2	8.8	6.4	3.8	2.4
2012	98.1	0	15.6	13.7	13.1	10.6	8.3	5.9	4.0	2.4

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data-uses USEPA factors of A=0 and B=1.00

# TEOM replaced with BAM 5/12/2012

**Table 133: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – continuous TEOM\* and BAM<sup>#</sup> methods**  
**Station: Beresfield**

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value ( $\mu\text{g}/\text{m}^3$ )	Percentiles ( $\mu\text{g}/\text{m}^3$ )						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2003	90.7	3	<b>42.8</b>	<b>26.7</b>	19.8	14.3	10.7	7.7	5.1	3.1
2004	90.4	1	<b>27.8</b>	20.3	19.6	16.5	13.3	9.8	7.1	4.6
2005	93.7	0	19.5	17.8	16.3	14.9	12.2	8.8	5.9	4.1
2006	98.9	0	24.9	17.8	15.5	13.3	11.4	8.5	5.9	4.3
2007	86.0	0	23.0	17.2	15.9	13.6	11.5	8.4	5.5	3.5
2008	92.1	0	16.9	15.1	13.9	11.7	9.7	7.7	5.7	3.6
2009	94.0	5	<b>230.9</b>	<b>34.4</b>	21.5	16.3	13.6	9.6	6.6	4.7
2010	97.3	1	<b>25.9</b>	15.1	13.3	11.7	9.9	7.5	5.3	4.0
2011	99.2	0	18.8	15.0	13.5	11.0	9.7	7.0	4.9	3.2
2012	93.4	0	22.4	21.0	18.1	14.4	12.7	9.9	7.1	5.3

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data uses USEPA factors of A=0 and B=1.00

# TEOM replaced with BAM 29/11/2012

**Table 134: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – continuous TEOM\* and BAM<sup>#</sup> methods**  
**Station: Wallsend**

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value ( $\mu\text{g}/\text{m}^3$ )	Percentiles ( $\mu\text{g}/\text{m}^3$ )						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2003	88.2	2	<b>30.2</b>	22.9	18.5	13.4	11.1	8.7	5.5	3.8
2004	87.4	0	23.5	17.4	15.2	12.8	11.0	8.5	5.8	4.2
2005	95.9	0	18.0	16.5	15.3	13.3	11.3	8.3	5.8	4.1
2006	99.2	1	<b>25.6</b>	16.6	14.5	12.1	10.5	8.2	5.8	4.1
2007	92.3	0	18.2	15.2	14.9	12.3	10.0	7.5	5.1	3.3
2008	87.7	0	22.7	18.3	14.7	12.0	10.1	7.5	5.1	3.4
2009	90.7	5	<b>415.6</b>	<b>38.4</b>	20.3	14.3	12.5	8.1	5.4	3.8
2010	92.9	0	18.8	11.9	10.7	8.8	7.4	5.7	4.2	3.0
2011	100.0	0	16.2	13.9	12.3	10.9	8.8	6.2	4.2	2.7
2012	99.5	0	16.2	14.2	13.1	11.3	9.1	6.4	4.3	3.1

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* Please note that all PM<sub>2.5</sub> TEOM data uses USEPA factors of A=0 and B=1.00

# TEOM replaced with BAM 21/2/2012

## Statistical summary

Table 135: Statistical summary for PM<sub>2.5</sub> - Daily 24-hour average concentrations (2012) – FRM method

Region/ Performance monitoring station	Data availability rates (%)	Maximum conc. ( $\mu\text{g}/\text{m}^3$ )	Percentiles ( $\mu\text{g}/\text{m}^3$ )						
			99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
Sydney									
Chullora	38.0	14.6	12.7	10.8	9.9	9.4	8.3	6.3	4.6

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* data availability rates are based on a one-day-in-three sampling regime.

\*\* Please note that sampling at the Richmond site ceased at the end of 2007

## Trend data

Annual averages and annual maximum 24-hour averages for all stations are given below. Please note that monitoring as part of this study did not begin until February 2005, and monitoring ceased at Richmond in September 2007 due to technical issues. Please note that the data availability rates are based on a one-day-in-three sampling regime.

Table 136: Maximum 24-hour average concentrations for PM<sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ ) – FRM

Region/ Performance monitoring station	2005	2006	2007	2008	2009	2010	2011	2012
Sydney								
Chullora	<b>27.8</b>	<b>30.0</b>	19.2	22.1	<b>27.5</b>	<b>28.2</b>	16.7	14.6
Richmond**	<b>28.8</b>	<b>45.8</b>	18.3					

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* data availability rates are based on a one-day-in-three sampling regime.

\*\* Please note that monitoring at Richmond ceased in 2007

Table 137: Annual average concentrations for PM<sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ ) – FRM

Region/ Performance monitoring station	2005	2006	2007	2008	2009	2010	2011	2012
Sydney								
Chullora	7.3	6.8	6.7	6.1	6.7	6.5	6.2	NA
Richmond**	6.4	6.5	6.6					

AAQ NEPM advisory reporting standard – 8.0  $\mu\text{g}/\text{m}^3$  (annual average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* data availability rates are based on a one-day-in-three sampling regime.

\*\* Please note that monitoring at Richmond ceased in 2007

NA as a result of technical problems and problems with parts availability, an annual average was not able to be calculated

**Table 138: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – FRM Station: Chullora**

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value ( $\mu\text{g}/\text{m}^3$ )	Percentiles ( $\mu\text{g}/\text{m}^3$ )						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2005	72.1	1	<b>27.8</b>	19.1	17.6	13.0	11.7	9.2	6.7	4.6
2006	84.4	1	<b>30.0</b>	20.3	16.6	13.3	11.2	8.3	5.8	4.1
2007	80.3	0	19.2	15.5	14.6	13.8	11.4	8.2	5.8	4.0
2008	88.5	0	22.1	19.2	14.3	11.5	10.5	7.2	5.4	4.0
2009	87.6	2	<b>27.5</b>	<b>26.7</b>	19.1	13.1	11.3	9.1	5.4	3.8
2010	83.8	1	<b>28.2</b>	21.9	16.6	12.8	11.0	7.5	5.8	4.2
2011	77.9	0	16.7	16.3	15.5	13.9	12.5	7.5	5.4	3.8
2012	38.0	0	14.6	12.7	10.8	9.9	9.4	8.3	6.3	4.6

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* data availability rates are based on a one-day-in-three sampling regime

**Table 139: Statistical summary for PM<sub>2.5</sub> - 24-hour average concentrations – FRM Station: Richmond\*\***

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value ( $\mu\text{g}/\text{m}^3$ )	Percentiles ( $\mu\text{g}/\text{m}^3$ )						
				99 <sup>th</sup>	98 <sup>th</sup>	95 <sup>th</sup>	90 <sup>th</sup>	75 <sup>th</sup>	50 <sup>th</sup>	25 <sup>th</sup>
2005	69.7	2	<b>28.8</b>	<b>27.7</b>	21.3	13.3	11.5	7.5	5.0	3.3
2006	68.9	1	<b>45.8</b>	19.3	13.0	11.3	10.6	8.0	5.8	3.6
2007	49.2	0	18.3	16.8	15.7	15.4	11.8	8.8	5.6	3.6

AAQ NEPM advisory reporting standard – 25.0  $\mu\text{g}/\text{m}^3$  (24-hour average)

**Bold** font indicates values in excess of the AAQ NEPM advisory reporting standard

\* data availability rates are based on a one-day-in-three sampling regime

\*\* Please note that sampling at the Richmond site ceased at the end of 2007