

South Australia's Air Quality 2004 Data Tables



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December 2005

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ERRATUM

Page 20—'Port Pirie West Primary School, 1984-2004'

The published data table is incorrect, and should to be replaced with the table overleaf.

Port Pirie West Primary School, The Terrace, 1984–2004 (amended version February 2007)

Year	Number of Valid Days	Average, $\mu\text{g}/\text{m}^3$	Maximum, $\mu\text{g}/\text{m}^3$	2nd Highest, $\mu\text{g}/\text{m}^3$	6th Highest, $\mu\text{g}/\text{m}^3$	90th Percentile, $\mu\text{g}/\text{m}^3$	Median Value, $\mu\text{g}/\text{m}^3$
1984 ¹	33	49.2	134.6	94.4	69.0	75.2	42.6
1985	59	62.0	420.0	171.8	92.8	90.6	50.1
1986	59	59.5	204.0	162.6	99.0	97.9	53.3
1987	60	53.5	114.7	100.0	77.0	75.8	49.5
1988 ²	61	74.8	240.9	236.3	127.2	125.2	63.5
1989 ³	43	64.0	289.2	220.0	121.4	121.6	42.6
1990	55	46.3	122.9	97.2	74.2	74.0	42.7
1991	59	56.0	192.6	152.3	90.6	88.2	46.9
1992	56	47.4	133.7	126.0	89.5	88.6	40.3
1993	55	58.8	199.0	154.2	101.0	97.2	47.7
1994	57	44.9	107.4	97.6	64.3	63.4	43.0
1995	57	41.6	121.3	84.0	65.7	64.3	40.8
1996	60	43.2	120.8	112.4	62.6	62.0	38.4
1997	60	47.2	118.6	111.0	85.7	84.7	41.3
1998	61	38.1	115.3	78.3	66.6	60.2	35.4
1999	59	56.8	271.3	226.8	80.2	77.8	46.9
2000 ⁴	44	46.3	156.9	106.3	65.2	65.4	41.6
2001 ⁵	29	37.6	102.1	87.3	49.2	53.9	35.2
2002	61	50.9	168.2	116.1	88.4	87.8	42.4
2003	54	45.3	159.3	109.2	72.3	71.0	37.8
2004	57	44.7	122.4	109.1	78.8	75.8	42.6

¹ Incomplete data for 1984; monitoring commenced 18 May 1984

² Incomplete data for 1988; monitoring suspended 27 June 1988

³ Incomplete data for 1989; monitoring resumed 25 September 1989

⁴ Incomplete data for 2000; monitoring suspended 15 September 2000

⁵ Incomplete data for 2001; monitoring resumed 12 July 2001

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SUMMARY

This report is a compilation of tables summarising the results of ambient air quality monitoring by the South Australian Environment Protection Authority (EPA) in 2004.

The report covers the EPA monitoring sites in Adelaide, Port Augusta, Port Pirie and Whyalla. The substances monitored at these sites in 2004 were:

- carbon monoxide
- nitrogen dioxide
- ozone
- sulfur dioxide
- lead (at Port Pirie monitoring sites only)
- particulate matter, as PM₁₀
- particulate matter, as PM_{2.5}
- total suspended particles.

The report also presents historical data for total suspended particle monitoring at the EPA monitoring sites at Northfield and Osborne in Adelaide and four monitoring sites in Port Pirie.

AIR QUALITY MONITORING SITES AND METHODS

Air quality monitoring regions and sites

During the 2004 year, ambient air quality monitoring was carried out at eight sites in the Adelaide airshed and in three regional centres, Port Augusta, Whyalla and Port Pirie, in the Spencer Gulf airshed. The following tables describing the monitoring sites use these descriptions for the objectives for each site.

PMS	A performance monitoring station is a monitoring site used to measure achievement against the goals set by the National Environment Protection (Ambient Air Quality) Measure (Air NEPM). It should be operated in the same location for at least five years.
Trend	A trend site is a performance monitoring station that is intended to remain in place for an extended period of at least 10 years to observe long-term changes in pollutant levels.
Campaign	Monitoring is performed at a campaign site for a short-term period as part of a screening study.
NEPM study	Particles as PM _{2.5} are monitored at these sites to provide data for study under a variation to the Air NEPM.
Industrial	Industrial sites are not located as specified in the Air NEPM so cannot be used as performance monitoring stations. Their purpose is to monitor the environmental impact of industrial facilities on adjacent residential areas.

Particulate matter, as PM₁₀, can be measured by tapered element oscillating microbalance (TEOM) or by high volume sampler (HVS). TEOM is a continuously monitoring unit whereas the HVS is used to collect a 24-hour sample one day in six (or, for Whyalla, one day in three).

Table 1: Monitoring sites in the Adelaide airshed, showing pollutants measured

Monitoring site	Carbon monoxide (CO)	Sulfur dioxide (SO ₂)	Nitrogen oxides (NO _x)	Ozone(O ₃)	Particulate matter		
					< 2.5 µm (PM _{2.5})	< 10 µm (PM ₁₀)	(TSP)
Adelaide (Hindley Street)	Trend; PMS						
Christies Beach		Trend; PMS					
Elizabeth	Trend; PMS	Campaign	PMS	PMS		PMS (TEOM)	
Gawler			Campaign	Campaign		Campaign (TEOM)	
Kensington Gardens		Campaign	Trend; PMS	Trend; PMS	NEPM Study	Trend; PMS (TEOM)	
Netley			Trend; PMS	Trend; PMS	NEPM Study	Trend; PMS (TEOM & HVS)	
Northfield		Campaign	Trend; PMS	Trend; PMS		Trend; PMS (HVS)	Trend; PMS (HVS)
Osborne						Industrial (HVS)	Industrial (HVS)

PM₁₀ particles of less than 10 micrometres in diameter
 PM_{2.5} particles of less than 2.5 micrometres in diameter
 TSP total suspended particles

Notes on monitoring sites

Adelaide (Hindley Street) Inner city monitoring site for 'upper bound' carbon monoxide levels; started in 1988 and ended on 30 June 2005.

Christies Beach (Winnerah Road) Suburban monitoring site established in 1992 to monitor air quality near Port Stanvac oil refinery; monitoring ceased on 31 December 2004 after the refinery was decommissioned in July 2003.

Elizabeth (Heard Street, Elizabeth Downs) Suburban monitoring site for 'background' carbon monoxide levels, started in 2002 and continuing; also a performance monitoring site for nitrogen oxides and ozone, starting in January 2002; campaign monitoring for sulfur dioxide conducted from May 2002 to 31 March 2004; monitoring for particulate matter, as PM₁₀, began on 31 May 2004.

Gawler (Popham Avenue, Gawler East) Suburban site with campaign monitoring for nitrogen oxides and ozone from January 2002 to 19 October 2004, and for PM₁₀ from June 2002 to 22 October 2004.

Kensington Gardens (East Terrace) Suburban monitoring site used for trend and performance monitoring for nitrogen oxides (since October 2001), ozone (since 2001) and PM₁₀ (since June 2002); PM_{2.5} monitored for the NEPM study from June 2002 to 12 March 2004; campaign monitoring for sulfur dioxide from August 2002 to 7 January 2005.

Netley (Transport Avenue) Western industrial suburban area monitoring site used for trend and performance monitoring for nitrogen oxides and ozone (since 1979) and for PM₁₀ (since September 2001); monitoring for PM_{2.5} for the NEPM study began in 2001 and is continuing.

Northfield (Hampstead Road) Monitoring site located at the Hampstead Centre, off Hampstead Road, Northfield; used for trend and performance monitoring for nitrogen oxides and ozone (since 1979) and for TSP since June 1995; campaign monitoring for sulfur dioxide since October 2002; PM₁₀ monitored by HVS since February 2003.

Osborne (Mersey Road) Monitoring site located on boundary of a mineral processing plant to determine the air pollution impact on the surrounding residential area, so Air NEPM criteria not applicable; PM₁₀ and TSP data collected since July 1988 by HVS on one day in six.

Table 2: Monitoring sites in the Spencer Gulf airshed, showing pollutants measured

Monitoring site	Carbon monoxide (CO)	Sulfur dioxide (SO ₂)	Nitrogen oxides (NO _x)	Ozone (O ₃)	Particulate matter			Lead (Pb)
					< 2.5 µm (PM _{2.5})	< 10 µm (PM ₁₀)	(TSP)	
Port Augusta								
Hospital						Trend; PMS (HVS)		
Port Pirie								
Oliver St		Campaign	Campaign	Campaign		Trend; PMS (HVS & TEOM)	Trend; PMS (HVS)	Trend; PMS (HVS)
Terrace							Trend; PMS (HVS)	Trend; PMS (HVS)
Senate Rd							Trend; PMS (HVS)	Trend; PMS (HVS)
Ellen St								Industrial (HVS)
Whyalla								
Nicolson Avenue		Campaign	Campaign	Campaign				
Hummock Hill						Industrial (HVS)	Industrial (HVS)	
Walls St						Industrial (TEOM)		
Civic Park						Trend; PMS (HVS)	Trend; PMS (HVS)	

Notes on monitoring sites

Port Augusta	Monitoring site located in grounds of the local hospital; PM ₁₀ monitored since 1996.
Port Pirie	
Oliver Street	PM ₁₀ and TSP, with lead determinations, monitored by HVS from May 1984 to August 1988, resuming September 1998. Monitoring for PM ₁₀ by TEOM began 27 June 2003; campaign monitoring for sulfur dioxide, nitrogen oxides and ozone in progress since mid-2002. Results for ozone not reported pending further investigation.
The Terrace	Monitoring site at the Port Pirie West Primary School; TSP and lead data collected since May 1984.
Senate Road	Monitoring site in Frank Green Park; TSP and lead data collected since March 1999.
Ellen Street	Monitoring site near boundary of lead smelter, so Air NEPM criterion for lead not applicable; monitoring for TSP and lead started in June 1984, was suspended in August 1998 and resumed in July 2001.
Whyalla	
Nicolson Avenue	Campaign monitoring site established in 2004 to monitor ozone (starting 14 January 2004), nitrogen dioxide and sulfur dioxide (starting 1 April 2004).
Hummock Hill	Monitoring site close to boundary of steel works, established to study concentrations of dust near the pelletising plant; monitoring for TSP began in 1989 and for PM ₁₀ in 1990; monitoring site was relocated to current position in May 2000; frequency of sampling increased from one day in six to one day in three in May 2002.
Walls Street	Industrial compliance site with continuous monitoring for PM ₁₀ particulate matter with a TEOM unit starting in July 2003; the site was relocated approximately six metres due north on 29 June 2004.
Civic Park	Background site for particulate monitoring in Whyalla; TSP monitored since 1989 and PM ₁₀ since October 2001; frequency of sampling increased from one day in six to one day in three in May 2002.

Air quality monitoring methods

Non-dispersive infrared analysis

Carbon monoxide is measured using a non-dispersive infrared analyser, of the gas filter correlation type. A pre-filtered air sample is drawn through a sample cell. Infrared radiation is passed through the sample cell and a carbon monoxide-free reference cell. The analyser compares the light intensities measured for the sample cell and the reference cell to determine the infrared light absorbed by carbon monoxide in the sample cell. From this, the concentration of carbon monoxide can be calculated.

Chemiluminescence

Nitric oxide, nitrogen dioxide and total nitrogen oxides (NO_x) are measured using gas-phase chemiluminescence.

The air sample is split into two parts: sample A and sample B.

Sample A is passed over a heated catalyst to convert all its nitrogen dioxide into nitric oxide. The sample then goes to a reaction chamber where it is mixed with ozone. The ozone reacts with all the nitric oxide to produce nitrogen dioxide and chemiluminescent light. The light, detected with a photomultiplier, represents the total nitrogen oxides in the sample.

Sample B is sent directly to the reaction chamber and the light that it produces on reaction with ozone represents only the nitric oxide in the sample.

If the light energy detected from sample B is deducted from the light energy detected from sample A, the difference represents the amount of nitrogen dioxide in the original sample of air.

Ultraviolet photometer

An ultraviolet photometric analyser is used to measure ozone. A filtered sample of air is drawn through the analyser and the ozone concentration is determined by measuring the reduction in intensity of ultraviolet light.

Fluorescence

Sulfur dioxide measurements rely on excitation of the sulfur dioxide molecule in the presence of ultraviolet light. The excited molecule then emits photons of light as it returns to its ground state (lowest energy state) and the emitted light is measured in a photomultiplier. Hydrocarbons interfere with the fluorescence so are removed by a scrubbing system before analysis.

Tapered element oscillating microbalance

Continuous particulate matter concentrations (PM_{10} and $\text{PM}_{2.5}$) are measured by TEOM, which draws air through a filter at a constant flow rate and constant temperature. The mass of particulate material on the filter is determined from the measured change in frequency at which the element attached to the filter is oscillating. The TEOM instrument uses an impacting mechanism to separate particles and measures PM_{10} and $\text{PM}_{2.5}$ as their equivalent aerodynamic diameters.

High-volume particulate sampling

One-day samples of particulate matter as PM₁₀ and TSP are collected using HVS. The sampler draws air through a filter paper in an evenly distributed pattern at a known constant airflow rate for 24 hours. The resulting increase in the weight of the filter paper is the total airborne particulate material in the air volume (airflow rate x time). The airflow rate is automatically controlled to within ± 1 standard cubic metre per hour. The high-volume samplers conform to Australian Standard 2724.3 and are sited as specified by AS 2922.

Lead

The sample of particulate material collected on the filter paper of the HVS is analysed by atomic absorption spectroscopy for lead using a nitric acid extraction method as specified by Australian Standard 2800.

CARBON MONOXIDE

Air NEPM standard 9.0 ppm (8-hour average)
 Maximum allowable exceedences One day a year

Monitoring site	Data recovery % days	No. days NEPM std exceeded	Annual average ppm	Maximum ppm	Percentiles of daily peak 8-hour average		
					99 th , ppm	95 th , ppm	90 th , ppm
Adelaide	83	0	1.1	4.9	4.5	3.6	3.2
Elizabeth	98	0	0.0	0.8	0.6	0.4	0.3

ppm parts per million

NITROGEN DIOXIDE (ANNUAL AVERAGE AND 1-HOUR AVERAGE)

Air NEPM standard	0.12 ppm (1-hour average)
Maximum allowable exceedences	One day a year
Air NEPM standard	0.03 ppm (1-year average)
Maximum allowable exceedences	None

Monitoring site	Data recovery % days	No. days NEPM std exceeded	Annual average ppm	1-hour maximum ppm	Percentiles of daily peak 1-hour average		
					99 th , ppm	95 th , ppm	90 th , ppm
Elizabeth	98	0	0.004	0.037	0.031	0.025	0.023
Gawler ¹	79	0	0.004	0.028	0.025	0.021	0.020
Kensington Gdns	99	0	0.005	0.037	0.032	0.025	0.023
Netley	99	0	0.009	0.103	0.041	0.034	0.030
Northfield	99	0	0.006	0.045	0.038	0.029	0.026
Port Pirie: Oliver Street	100	0	0.003	0.047	0.016	0.013	0.012
Whyalla: Nicolson Avenue	83	0	0.004	0.025	0.024	0.023	0.021

¹ Incomplete data for 2004 year: monitoring at Gawler site ended 19 October 2004

OZONE (PHOTOCHEMICAL OXIDANTS) (1-HOUR AVERAGE)

Air NEPM standard 0.10 ppm (1-hour average)
 Maximum allowable exceedences One day a year

Monitoring site	Data recovery % days	No. days NEPM std exceeded	Annual average ppm	Maximum ppm	Percentiles of daily peak 1-hour average		
					99 th , ppm	95 th , ppm	90 th , ppm
Elizabeth	99	0	0.020	0.088	0.065	0.046	0.041
Gawler ¹	80	0	0.020	0.077	0.055	0.043	0.038
Kensington Gdns	100	0	0.021	0.078	0.067	0.047	0.041
Netley	100	0	0.017	0.067	0.056	0.044	0.037
Northfield	97	0	0.019	0.081	0.065	0.045	0.040
Whyalla: Nicolson Avenue	88	0	0.021	0.051	0.044	0.037	0.035

¹ Incomplete data for 2004 year: monitoring at the Gawler site ended on 19 October 2004

OZONE (PHOTOCHEMICAL OXIDANTS) (4-HOUR AVERAGE)

Air NEPM standard 0.08 ppm (4-hour average)
 Maximum allowable exceedences One day a year

Monitoring site	Data recovery % days	No. days NEPM std exceeded	Annual average ppm	Maximum ppm	Percentiles of daily peak 4-hour average		
					99 th , ppm	95 th , ppm	90 th , ppm
Elizabeth	99	0	0.020	0.079	0.056	0.042	0.037
Gawler ¹	80	0	0.020	0.065	0.050	0.040	0.034
Kensington Gdns	100	0	0.021	0.071	0.059	0.043	0.038
Netley	100	0	0.017	0.059	0.048	0.040	0.036
Northfield	97	0	0.018	0.067	0.058	0.041	0.038
Whyalla: Nicolson Avenue	89	0	0.020	0.046	0.042	0.036	0.033

¹ Incomplete data for 2004 year: monitoring at the Gawler site ended on 19 October 2004

SULFUR DIOXIDE (ANNUAL AVERAGE AND 1-HOUR AVERAGE)

Air NEPM standard	0.20 ppm (1-hour average)
Maximum allowable exceedences	One day a year
Air NEPM standard	0.02 ppm (1-year average)
Maximum allowable exceedences	None

Monitoring site	Data recovery % days	No. days NEPM std exceeded	Annual average ppm	Maximum ppm	Percentiles of daily peak 1-hour average		
					99 th , ppm	95 th , ppm	90 th , ppm
Christies Beach ¹	87	0	0.000	0.014	0.010	0.003	0.002
Elizabeth ²	25	0	0.001	0.008	0.007	0.004	0.004
Kensington Gdns	100	0	0.000	0.012	0.009	0.004	0.002
Northfield	97	0	0.000	0.012	0.007	0.004	0.003
Port Pirie: Oliver Street	100	31	0.008	0.440	0.356	0.260	0.185
Whyalla: Nicolson Avenue ³	75	0	0.000	0.099	0.026	0.010	0.006

¹ Monitoring at the Christies Beach site ended on 31 December 2004

² Incomplete data for 2004 year: monitoring at the Elizabeth site ended on 31 March 2004

³ Incomplete data for 2004 year: monitoring at the Nicolson Avenue site began on 1 April 2004

SULFUR DIOXIDE (ANNUAL AVERAGE AND 1-DAY AVERAGE)

Air NEPM standard	0.08 ppm (1-day average)
Maximum allowable exceedences	One day a year
Air NEPM standard	0.02 ppm (1-year average)
Maximum allowable exceedences	None

Monitoring site	Data recovery % days	No. days NEPM std exceeded	Annual average ppm	Maximum ppm	Percentiles of daily peak 1-day average		
					99 th , ppm	95 th , ppm	90 th , ppm
Christies Beach ¹	83	0	0.000	0.004	0.001	0.001	0.000
Elizabeth ²	25	0	0.001	0.004	0.003	0.003	0.003
Kensington Gdns	99	0	0.000	0.003	0.002	0.001	0.001
Northfield	96	0	0.000	0.003	0.002	0.001	0.001
Port Pirie: Oliver Street	100	0	0.008	0.051	0.039	0.028	0.022
Whyalla: Nicolson Avenue ³	74	0	0.000	0.007	0.003	0.001	0.001

¹ Monitoring at the Christies Beach site ended on 31 December 2004

² Incomplete data for 2004 year: monitoring at the Elizabeth site ended on 31 March 2004

³ Incomplete data for 2004 year: monitoring at the Nicolson Avenue site began on 1 April 2004

AIRBORNE LEAD (ANNUAL AVERAGE)

Airborne lead levels are monitored at four sites in Port Pirie: Oliver Street; Port Pirie West Primary School, The Terrace; Frank Green Park, Senate Road; and Ellen Street. The lead determinations are made on TSP samples collected by HVS, one day in six.

Air NEPM standard 0.50 $\mu\text{g}/\text{m}^3$ (1-year average)
 Maximum allowable exceedences None

Monitoring site	Number of valid samples	Annual average, $\mu\text{g}/\text{m}^3$	Maximum daily value, $\mu\text{g}/\text{m}^3$	2 nd highest daily value, $\mu\text{g}/\text{m}^3$	90 th percentile value, $\mu\text{g}/\text{m}^3$	Median daily value, $\mu\text{g}/\text{m}^3$
Oliver Street	60	0.59	3.69	3.38	1.58	0.26
The Terrace	57	0.63	5.17	4.36	1.60	0.20
Senate Road	60	0.28	3.00	1.90	0.87	0.08
Ellen Street	59	3.91	19.97	19.89	12.74	1.24

$\mu\text{g}/\text{m}^3$ microgram per square metre

PARTICULATE MATTER, PM₁₀ (1-DAY AVERAGE) BY TEOM METHOD

Air NEPM standard
Maximum allowable exceedences

50 µg/m³ (1-day average)
Five days per year

Monitoring site	Number of valid days	No. days NEPM std exceeded	Average, µg/m ³	Maximum. µg/m ³	2 nd highest, µg/m ³	6 th highest, µg/m ³	90 th percentile, µg/m ³	Median value, µg/m ³
Elizabeth ¹	203	1	13.9	63.9	44.4	32.3	22.3	12.4
Gawler ²	279	4	16.6	90.3	69.7	40.6	27.2	14.3
Kensington Gardens	343	1	14.7	53.7	46.3	32.4	23.2	13.0
Netley	361	3	18.8	62.7	62.1	41.2	29.5	17.3
Port Pirie: Oliver Street	356	4	18.3	135.8	65.9	46.4	28.5	15.7
Whyalla: Walls Street ³	354		19.3	93.7	92.3	73.1	36.9	15.0

¹ Incomplete data for 2004 year: monitoring at the Elizabeth site began on 31 May 2004

² Incomplete data for 2004 year: monitoring at the Gawler site ended on 22 October 2004

³ Walls Street, Whyalla, not designated as a performance monitoring site for Air NEPM, so data not compared to the Air NEPM standard

PARTICULATE MATTER, PM₁₀ (1-DAY AVERAGE) BY HIGH VOLUME SAMPLING

Air NEPM standard
Maximum allowable exceedences

50 µg/m³ (1-day average)
Five days per year

Monitoring site	Number of valid days	No. days NEPM std exceeded ⁴	Average, µg/m ³	Maximum. µg/m ³	2 nd highest, µg/m ³	6 th highest, µg/m ³	90 th percentile, µg/m ³	Median value, µg/m ³
Netley ¹	58	1	19.8	55.1	49.3	32.5	32.3	16.5
Northfield ¹	58	3	19.3	78.6	58.9	33.2	32.5	14.9
Port Pirie: Oliver Street ¹	50	2	25.3	78.7	71.6	39.7	39.8	23.3
Whyalla: Civic Park ²	103	0	15.4	35.2	33.9	29.8	25.0	13.8
Osborne ^{1, 3}	60		23.5	127.6	52.8	41.2	41.2	19.4
Port Augusta: Hospital ^{1, 3}	56		20.5	53.0	49.6	40.1	40.1	16.6
Whyalla: Hummock Hill ^{2, 3}	112		34.8	223.5	191.8	117.3	80.5	21.2

¹ Monitoring by HVS one day in six

² Monitoring by HVS one day in three at Whyalla monitoring sites

³ Sites not designated as performance monitoring sites for Air NEPM, so data not compared to the Air NEPM standard

⁴ HVS one day in three or one day in six, does not meet the Air NEPM requirement for 75% data recovery

PARTICULATE MATTER, PM_{2.5} (1-DAY AVERAGE) BY TEOM METHOD

Air NEPM advisory reporting standard 25 µg/m³ (1-day average)

Air NEPM advisory reporting standard 8 µg/m³ (1-year average)

Monitoring site	Number of valid days	Average, µg/m ³	Maximum, µg/m ³	2 nd highest, µg/m ³	6 th highest, µg/m ³	90 th percentile, µg/m ³	Median value, µg/m ³
Kensington Gardens ¹	68	7.8	15.9	14.9	12.7	12.6	7.2
Netley	352	8.2	20.2	18.9	16.6	12.3	7.5

¹ Incomplete data for 2004 year: monitoring at Kensington Gardens site ended on 12 March 2004

TOTAL SUSPENDED PARTICLES (1-DAY AVERAGE) BY HIGH VOLUME SAMPLING

The Air NEPM does not specify a standard for TSP. The World Health Organization Guidelines for Air Quality (1999) used a standard of 120 $\mu\text{g}/\text{m}^3$ but Guidelines for Air Quality (2000) do not specify a standard for TSP.

Monitoring site	Number of valid days	Average, $\mu\text{g}/\text{m}^3$	Maximum, $\mu\text{g}/\text{m}^3$	2 nd highest, $\mu\text{g}/\text{m}^3$	6 th highest, $\mu\text{g}/\text{m}^3$	90 th percentile, $\mu\text{g}/\text{m}^3$	Median value, $\mu\text{g}/\text{m}^3$
Northfield ¹	56	55.3	277.9	184.7	100.8	97.6	43.2
Osborne ¹	61	59.4	668.1	149.0	95.0	90.1	41.0
Port Pirie: Oliver Street ¹	60	45.7	167.3	159.0	84.6	76.0	37.4
Port Pirie: The Terrace ¹	57	44.7	122.4	109.1	78.8	75.8	42.6
Port Pirie: Senate Road ¹	60	46.2	148.9	140.3	93.8	71.1	40.3
Port Pirie: Ellen Street ¹	59	61.4	212.6	164.0	110.6	105.2	52.9
Whyalla: Civic Park ²	117	30.3	104.1	96.3	66.3	58.0	24.8
Whyalla: Hummock Hill ²	113	90.1	539.7	414.0	340.6	255.2	44.1

¹ Monitoring by HVS one day in six

² Monitoring by HVS one day in three at Whyalla monitoring sites

TOTAL SUSPENDED PARTICLES (1-DAY AVERAGE) BY HIGH VOLUME SAMPLING

Northfield, 1995-2004

Year	Number of valid days	Average, $\mu\text{g}/\text{m}^3$	Maximum, $\mu\text{g}/\text{m}^3$	2nd highest, $\mu\text{g}/\text{m}^3$	6th highest, $\mu\text{g}/\text{m}^3$	90th percentile, $\mu\text{g}/\text{m}^3$	Median value, $\mu\text{g}/\text{m}^3$
1995 ¹	31	24.8	50.7	46.2	37.0	40.2	22.8
1996	60	25.9	57.6	55.4	41.1	39.6	22.6
1997	60	30.1	137.9	58.9	44.0	41.9	28.6
1998	59	43.9	126.4	101.5	79.3	77.7	38.4
1999	57	49.1	294.9	226.1	93.5	88.7	35.6
2000 ²	42	44.0	141.9	95.2	73.8	78.1	34.6
2001 ³	25	31.6	56.2	52.2	40.6	45.8	30.9
2002	55	52.4	160.5	132.6	98.6	96.6	42.9
2003	60	48.5	403.8	143.9	80.5	71.8	37.7
2004	56	55.3	277.9	184.7	100.8	97.6	43.2

¹ Incomplete data for 1995 year: monitoring began on 20 June 1995

² Incomplete data for 2000 year: monitoring ended on 15 September 2000

³ Incomplete data for 2001 year: monitoring began on 6 August 2001

Mersey Road, Osborne, 1988-2004

Year	Number of valid days	Average, $\mu\text{g}/\text{m}^3$	Maximum, $\mu\text{g}/\text{m}^3$	2 nd highest, $\mu\text{g}/\text{m}^3$	6 th highest, $\mu\text{g}/\text{m}^3$	90 th percentile, $\mu\text{g}/\text{m}^3$	Median value, $\mu\text{g}/\text{m}^3$
1988 ¹	30	46.9	118.8	101.3	70.3	84.0	37.6
1989	59	57.6	206.6	186.7	110.8	109.4	47.2
1990	57	57.9	365.4	134.0	116.3	112.6	40.3
1991	51	59.8	165.7	151.7	112.5	112.5	46.4
1992	51	50.9	127.5	123.7	94.5	94.5	43.1
1993	45	43.8	128.5	111.9	81.1	86.5	30.9
1994	93	42.0	204.3	164.4	88.4	84.5	31.7
1995	54	42.3	298.5	154.5	79.5	75.7	29.2
1996	53	48.1	206.9	109.9	87.8	86.7	40.0
1997	56	72.1	263.1	217.6	141.2	135.2	56.4
1998	54	54.4	230.4	185.6	114.8	111.9	41.9
1999	52	64.8	253.5	182.1	134.3	133.2	49.0
2000 ²	43	46.9	138.6	136.0	89.0	89.2	36.3
2001 ³	23	34.8	150.9	59.8	32.4	50.9	27.2
2002	57	53.2	186.7	143.8	97.0	96.7	44.7
2003	51	59.9	195.3	156.2	121.0	121.0	45.7
2004	61	59.4	668.1	149.0	95.0	90.1	41.0

¹ Incomplete data for 1988 year: monitoring began on 2 July 1988

² Incomplete data for 2000 year: monitoring ended on 15 December 2000

³ Incomplete data for 2001 year: monitoring began on 18 August 2001

Oliver Street, Port Pirie, 1984-2004

Year	Number of valid days	Average, $\mu\text{g}/\text{m}^3$	Maximum, $\mu\text{g}/\text{m}^3$	2 nd highest, $\mu\text{g}/\text{m}^3$	6 th highest, $\mu\text{g}/\text{m}^3$	90 th percentile, $\mu\text{g}/\text{m}^3$	Median value, $\mu\text{g}/\text{m}^3$
1984 ¹	42	20.6	60.3	40.4	31.6	32.0	17.2
1985	57	31.7	126.7	102.0	57.9	54.9	23.9
1986	59	44.8	121.8	118.3	92.9	88.1	36.5
1987	59	48.1	150.1	99.7	85.7	85.7	46.1
1988 ²	9	23.0	35.0	31.6	18.3	32.3	19.1
<i>No data collected from 19 August 1988 to 18 September 1998</i>							
1998 ³	19	31.8	79.1	44.2	37.2	42.0	28.0
1999	57	53.6	251.8	244.0	81.4	80.3	46.5
2000 ⁴	43	44.8	193.6	140.2	71.5	73.1	32.8
2001 ⁵	28	29.4	77.8	63.2	35.1	46.5	26.7
2002	61	45.1	120.8	111.3	68.3	65.5	41.5
2003	59	43.8	113.8	107.1	73.2	70.8	39.1
2004	60	45.7	167.3	159	84.6	76.0	37.4

¹ Incomplete data for 1984 year: monitoring began on 16 May 1984

² Incomplete data for 1988 year: monitoring from 2 July 1988 to 19 August 1988

³ Incomplete data for 1998 year: monitoring began on 8 September 1998

⁴ In complete data for 2000 year: monitoring ended on 15 September 2000

⁵ Incomplete data for 2001 year: monitoring began on 6 July 2001

Port Pirie West Primary School, The Terrace, 1984-2004

Year	Number of valid days	Average, $\mu\text{g}/\text{m}^3$	Maximum, $\mu\text{g}/\text{m}^3$	2nd highest, $\mu\text{g}/\text{m}^3$	6th highest, $\mu\text{g}/\text{m}^3$	90th percentile, $\mu\text{g}/\text{m}^3$	Median value, $\mu\text{g}/\text{m}^3$
1984 ¹	33	109	294	219	160	168	92
1985	59	144	987	388	218	212	117
1986	59	133	459	342	228	226	117
1987	60	120	265	225	176	169	112
1988	61	137	398	385	251	246	117
1989	43	127	426	364	255	264	92
1990	55	100	271	199	162	161	94
1991	59	115	384	307	199	178	94
<i>No data collected from 26 December 1991 to 5 January 1998</i>							
1998	61	38.1	115.3	78.3	66.6	60.2	35.4
1999	59	56.8	271.3	226.8	80.2	77.8	46.9
2000 ²	44	46.3	156.9	106.3	65.2	65.4	41.6
2001 ³	29	37.6	102.1	87.3	49.2	53.9	35.2
2002	61	50.9	168.2	116.1	88.4	87.8	42.4
2003	58	45.6	159.3	109.2	72.3	71.3	38.7
2004	57	44.7	122.4	109.1	78.8	75.8	42.6

¹ Incomplete data for 1984 year: monitoring began on 18 May 1984

² Incomplete data for 2000 year: monitoring ended on 15 September 2000

³ Incomplete data for 2001 year: monitoring began on 30 June 2001

Note: this table should be replaced by the correct version under 'Erratum'.

Frank Green Park, Senate Road, Port Pirie, 1999-2004

Year	Number of valid days	Average, $\mu\text{g}/\text{m}^3$	Maximum, $\mu\text{g}/\text{m}^3$	2 nd highest, $\mu\text{g}/\text{m}^3$	6 th highest, $\mu\text{g}/\text{m}^3$	90 th percentile, $\mu\text{g}/\text{m}^3$	Median value, $\mu\text{g}/\text{m}^3$
1999 ¹	48	52.2	256.9	207.9	67.8	69.2	43.4
2000 ²	44	39.5	146.8	94.7	67.6	77.5	28.7
2001 ³	25	27.6	58.2	51.7	31.8	34.1	29.0
2002	61	49.2	153.9	149.3	92.1	88.0	40.5
2003	57	47.6	107.4	106.6	85.8	76.3	43.9
2004	60	46.2	148.9	140.3	93.8	71.1	40.3

¹ Incomplete data for 1999 year: monitoring began on 19 March 1999

² Incomplete data for 2000 year: monitoring ended on 15 September 2000

³ Incomplete data for 2001 year: monitoring began on 18 July 2001

Ellen Street, Port Pirie, 1984-2004

Year	Number of valid days	Average, $\mu\text{g}/\text{m}^3$	Maximum, $\mu\text{g}/\text{m}^3$	2 nd highest, $\mu\text{g}/\text{m}^3$	6 th highest, $\mu\text{g}/\text{m}^3$	90 th percentile, $\mu\text{g}/\text{m}^3$	Median value, $\mu\text{g}/\text{m}^3$
1984 ¹	34	65.2	318.2	176.9	84.1	102.1	51.6
1985	60	87.4	251.2	205.2	158.4	151.4	80.0
1986	61	73.1	212.5	200.5	127.8	124.6	63.5
1987	61	48.7	128.7	112.2	83.7	75.8	42.8
1988	60	61.3	185.5	180.6	126.7	107.5	49.6
1989	61	82.8	584.9	223.5	124.7	119.9	73.9
1990	58	75.5	169.1	167.3	123.1	119.8	67.7
1991	58	83.5	216.3	209.8	155.8	145.4	69.2
1992	61	82.4	275.2	196.8	152.9	146.3	67.4
1993	61	65.2	130.7	125.3	106.0	100.5	60.6
1994	58	63.9	189.0	153.0	118.9	105.8	58.4
1995	60	59.2	154.8	139.6	101.2	100.6	55.4
1996	60	62.6	152.0	131.1	111.8	110.3	55.6
1997	59	51.9	178.1	128.9	76.7	75.5	46.1
1998 ²	39	47.8	123.5	113.7	59.1	73.8	41.8
<i>No data collected from 28 August 1998 to 12 July 2001</i>							
2001 ³	29	50.8	151.0	105.3	62.9	82.9	46.1
2002	61	63.4	252.5	147.0	97.1	90.4	57.5
2003	58	60.3	170.7	142.9	114.1	105.8	50.7
2004	59	61.4	212.6	164.0	110.6	105.2	52.9

¹ Incomplete data for 1984 year: monitoring began 5 June 1984

² Incomplete data for 1998 year: monitoring ended on 28 August 1998

³ Incomplete data for 2001 year: monitoring began on 12 July 2001