Queensland Air Monitoring 2024

National Environment Protection (Ambient Air Quality) Measure

Queensland Government

Prepared by: Air Quality Monitoring, Department of the Environment, Tourism Science and Innovation.

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Summary

This document fulfils annual reporting requirements for Queensland under clause 18 of the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM).

Ambient air quality monitoring at AAQ NEPM sites in Queensland from January to December 2024 recorded no exceedances of the AAQ NEPM standards for carbon monoxide, nitrogen dioxide, ozone and lead at any Queensland monitoring station. Exceedances of the AAQ NEPM standards occurred for:

- 1-hour and 1-day average sulfur dioxide concentrations at The Gap in Mount Isa due to industrial emissions;
- 1-day average PM_{10} (particles less than 10 micrometres in diameter) concentration at Springwood in South East Queensland due to smoke impacts from permitted hazard-reduction burns; Woree in Cairns and South Gladstone in Gladstone due to dust impacts from local construction activities; and at The Gap in Mount Isa due to bushfire smoke, windblown dust during strong winds, and local dust impacts;
- 1-day average $PM_{2.5}$ (particles less than 2.5 micrometres in diameter) concentration at Springwood and Flinders View in South East Queensland, Toowoomba, Woree in Cairns and The Gap in Mount Isa due to smoke impacts from bushfires or permitted hazard-reduction burns.

Most PM_{10} and $PM_{2.5}$ 1-day standard exceedances recorded in 2024 were directly attributed to exceptional events, including regional dust storms, bushfires, or authorised hazard-reduction burns. These events are excluded from compliance determinations under the AAQ NEPM framework. The only exceptions were:

- The Gap (Mount Isa): exceedances on 7 February and 24 September due to local dust sources.
- South Gladstone (Gladstone): exceedance on 3 September due to dust from nearby construction activities.
- Woree (Cairns): exceedance on 21 October due to dust from nearby construction activities.

The AAQ NEPM goals were met across all Queensland regions except for the following cases:

- 1-hour and 1-day average sulfur dioxide concentrations at The Gap (Mount Isa) due to industrial emissions.
- 1-day average PM_{10} concentration at The Gap (Mount Isa) due to local dust sources.
- 1-day average PM_{10} concentration at Woree (Cairns) due to local dust sources.
- 1-day average PM_{10} concentration at South Gladstone (Gladstone) due to local dust sources.

The approach to population exposure evaluation and reporting adopted by Queensland using data from the entire Queensland ambient air quality monitoring network (including non-AAQ NEPM reporting stations) identified that in 2024:

- annual $PM_{2.5}$ exposure ranged between 68 and 81 per cent of the AAQ NEPM standard in locations meeting the Australian/New Zealand Standard AS/NZS 3580.1.1 neighbourhood classification;

- annual nitrogen dioxide exposure ranged between 13 and 33 per cent of the AAQ NEPM standard in locations meeting the AS/NZS 3580.1.1 neighbourhood classification; and
- maximum 8-hour ozone exposure ranged between 75 and 95 per cent of the AAQ NEPM standard in locations meeting the AS/NZS 3580.1.1 neighbourhood classification.

Introduction

Clause 18 of the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM)[1] requires all jurisdictions to submit an annual report on their compliance with the Measure. The required content of these reports is specified in the *National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 8, Annual Reports* (AAQ NEPM Technical Paper No. 8)[2].

The Coastal and Air team within the Science Division of the Department of Environment, Tourism, Science and Innovation (DETSI), formerly the Department of Environment and Science (DES) until November 2024, operates the Queensland ambient air quality monitoring network. This network includes air monitoring to assess compliance with the standards and goals of the AAQ NEPM, as detailed in the *Ambient air quality monitoring plan for Queensland*[3], together with additional ambient and investigative air monitoring for other purposes.

This report documents Queensland's compliance with the standards and goals of the AAQ NEPM in 2024 in accordance with the AAQ NEPM Technical Paper No. 8.

Section A – Monitoring summary

Current AAQ NEPM monitoring stations

DETSI monitored ambient air quality in eight of the ten regions identified in the Queensland monitoring plan in 2024 as follows:

- South East Queensland (made up of four sub-regions: North Coast, Brisbane, Gold Coast and Ipswich)
- Toowoomba
- Maryborough – Hervey Bay
- Gladstone
- Mackay
- Townsville
- Cairns
- Mount Isa.

Table 1 presents summary information for all AAQ NEPM compliance monitoring stations operating in Queensland during 2024.Figure 1 shows the location of all Queensland AAQ NEPM monitoring stations operating during 2024. Each monitoring station is categorised as one of the following:

- performance monitoring station (PMS) – nominated to measure air quality to assess achievement of the AAQ NEPM goal

[1] available from www.legislation.gov.au/Details/F2021C00475

[2] available from www.nepc.gov.au/resource/ephc-archive-ambient-air-quality-nepm

[3] available from www.qld.gov.au/environment/pollution/monitoring/air-reports/

- trend station – nominated to measure air quality to identify long-term changes and assess achievement of the AAQ NEPM goal
- campaign station – short-term investigation station, operated for at least one calendar year, to assess the need for ongoing monitoring in the region to assess achievement of the AAQ NEPM goal.
- The location category in provides a qualitative description of the exposed population at each monitoring station.

Table 1 also describes monitoring stations using population coverage descriptors in the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 3, *Monitoring Strategy*[4]:

- generally representative upper bound (GRUB) – indicative of pollutant concentrations in the upper range occurring in populated areas in the region
- population-average – indicative of air quality experienced by most of the population.

In some instances, data is reported from peak sites where the highest concentrations in the region are expected. This provides an indication of maximum exposure in the region.

Monitoring techniques used at each AAQ NEPM compliance monitoring site are listed in Table 1.

DETSI generally monitors air quality in compliance with the Australian Standard (AS) methods specified in the AAQ NEPM. During 2024 an exception to the use of AS methods was the measurement of PM_{10} and $PM_{2.5}$ by instrumentation using a backscattering of polychromatic light technique at all sites except Rocklea in South East Queensland.

PM_{10} and $PM_{2.5}$ data was collected using a tapered element oscillating balance (TEOM) instrument fitted with filter dynamics measurement system (FDMS) units at Rocklea in South East Queensland.

PM_{10} and $PM_{2.5}$ data across all sites, with the exception of Rocklea, were obtained using a Teledyne API model T640X monitor. The T640X monitor is an optical aerosol spectrometer that uses backscattering of polychromatic light to determine particle mass concentration. The T640X monitor has United States Environment Protection Agency accreditation as an equivalent method for measurement of PM_{10} and $PM_{2.5}$.

Lead monitoring by the Queensland Government at the Coast Guard monitoring site in Townsville ceased in August 2023 when operation of the monitoring site transitioned fully to Port of Townsville Limited in line with the conditions of their Environmental Authority. For 2024, Townsville lead data has been reported based on measurements from the Queensland Government monitoring site at North Ward.

All sites monitored meet data availability criteria and are therefore able to provide a valid assessment of compliance with the AAQ NEPM standards and goals for 2024.

[4] available from www.nepc.gov.au/resource/ephc-archive-ambient-air-quality-nepm

Table 1. Summary information for 2024 Queensland AAQ NEPM monitoring sites

Site	Station type	Date established	Pollutants measured	Monitoring technique	Location category	Non-conformance with AS3580.1.1 siting criteria	Main pollutant sources impacting station
South East Queensland							
North Coast sub-region							
Mountain Creek	PMS – GRUB	July 2001	O_3 NO_2 PM_{10} $PM_{2.5}$	AS 3580.6.1–2016 AS 3580.5.1–2011 TAPI T640X TAPI T640X	Residential	Nil	Major roads, forestry/ agricultural burning
Brisbane sub-region							
Deception Bay	Trend – GRUB	June 1994	O_3 NO_2	AS 3580.6.1–2016 AS 3580.5.1–2011	Residential	Trees within 20m west of site	Major roads
Woolloongabba	Trend – Peak	June 1998 (relocated June 2017)	CO	AS 3580.7.1–2011	Inner city roadside	Nil	Major roads
Rocklea	Trend – GRUB	January 1978 (relocated March 1994 and June 2007)	O_3 NO_2 PM_{10} $PM_{2.5}$	AS 3580.6.1–2016 AS 3580.5.1–2011 AS 3580.9.16:2016 AS 3580.9.13:2013	Light industry/ residential	Nil	Major roads
Springwood	PMS – Population average	March 1999	O_3 NO_2 SO_2 PM_{10} $PM_{2.5}$	AS 3580.6.1–2016 AS 3580.5.1–2011 AS 3580.4.1–2008 TAPI T640X TAPI T640X	Residential	Nil	Major roads

Table 1 (continued). Summary information for 2024 Queensland AAQ NEPM monitoring sites

Site	Station type	Date established	Pollutants measured	Monitoring technique	Location category	Non-conformance with AS3580.1.1 siting criteria	Main pollutant sources impacting station
Gold Coast sub-region							
Southport	PMS – Population average	February 2018	O_3 NO_2 PM_{10} $PM_{2.5}$	AS 3580.6.1–2016 AS 3580.5.1–2011 TAPI T640X TAPI T640X	Residential	Buildings and trees within 20m of site	Major roads
Ipswich sub-region							
Flinders View	Trend – GRUB	January 1993	O_3 NO_2 SO_2 PM_{10} $PM_{2.5}$	AS 3580.6.1–2016 AS 3580.5.1–2011 AS 3580.4.1–2008 TAPI T640X TAPI T640X	Industry/ residential	Trees within 20m of site	Major roads, industry (landfill, composting facilities)
Toowoomba							
Toowoomba	PMS – Population average	January 2022	PM_{10} $PM_{2.5}$	TAPI T640X TAPI T640X	Residential	Nil	Major roads
Maryborough – Hervey Bay							
Maryborough	PMS – Population average	October 2022	PM_{10} $PM_{2.5}$	TAPI T640X TAPI T640X	Residential	Nil	Major roads

Table 1 (continued). Summary information for 2024 Queensland AAQ NEPM monitoring sites

Site	Station type	Date established	Pollutants measured	Monitoring technique	Location category	Non-conformance with AS3580.1.1 siting criteria	Main pollutant sources impacting station
Gladstone							
Boyne Island	Trend – GRUB	October 2008	CO	AS 3580.7.1–2011	Industry/ residential	Nil	Industry (power station, metals processing)
South Gladstone	Trend – GRUB	July 1992	NO_2 SO_2 PM_{10} $PM_{2.5}$	AS 3580.5.1–2011 AS 3580.4.1–2008 TAPI T640X TAPI T640X	Industry/ residential	Nil	Major roads, industry (power station, metals processing)
Mackay							
West Mackay	PMS – GRUB	September 1997 (relocated June 2010)	PM_{10} $PM_{2.5}$	TAPI T640X TAPI T640X	Residential/ rural	Nil	Agricultural burning
Townsville							
North Ward	PMS – Population average	December 2017 (relocated August 2020)	NO_2 SO_2 PM_{10} $PM_{2.5}$ Lead	AS 3580.5.1–2011 AS 3580.4.1–2008 TAPI T640X TAPI T640X AS 3580.9.3–2003, with analysis by AS 3580.9.15:2014 (ICP)	Residential	Trees within 20m of site	Major roads, industry (port operations, metal concentrates handling)
Cairns							
Woree	PMS – Population average	March 2023	PM_{10} $PM_{2.5}$	TAPI T640X TAPI T640X	Residential	Nil	Major roads

Table 1 (continued). Summary information for 2024 Queensland AAQ NEPM monitoring sites

Site	Station type	Date established	Pollutants measured	Monitoring technique	Location category	Non-conformance with AS3580.1.1 siting criteria	Main pollutant sources impacting station
Mount Isa							
The Gap	PMS – Population average	January 2009	SO_2 PM_{10} $PM_{2.5}$ Lead	AS 3580.4.1–2008 TAPI T640X TAPI T640X AS 3580.9.3–2003, with analysis by AS 3580.9.15:2014 (ICP)	Industry/ residential	Building within 20m north-east of site	Industry (metals smelting, sulfuric acid manufacture)

PMS = performance monitoring station
GRUB = generally representative upper bound
PM_{10} = particles less than 10 micrometres in diameter
$PM_{2.5}$ = particles less than 2.5 micrometres in diameter
FDMS = Filter Dynamics Measurement System
TEOM = tapered element oscillating microbalance ICP = inductively coupled plasma
TAPI T640X = Teledyne API optical particle detection

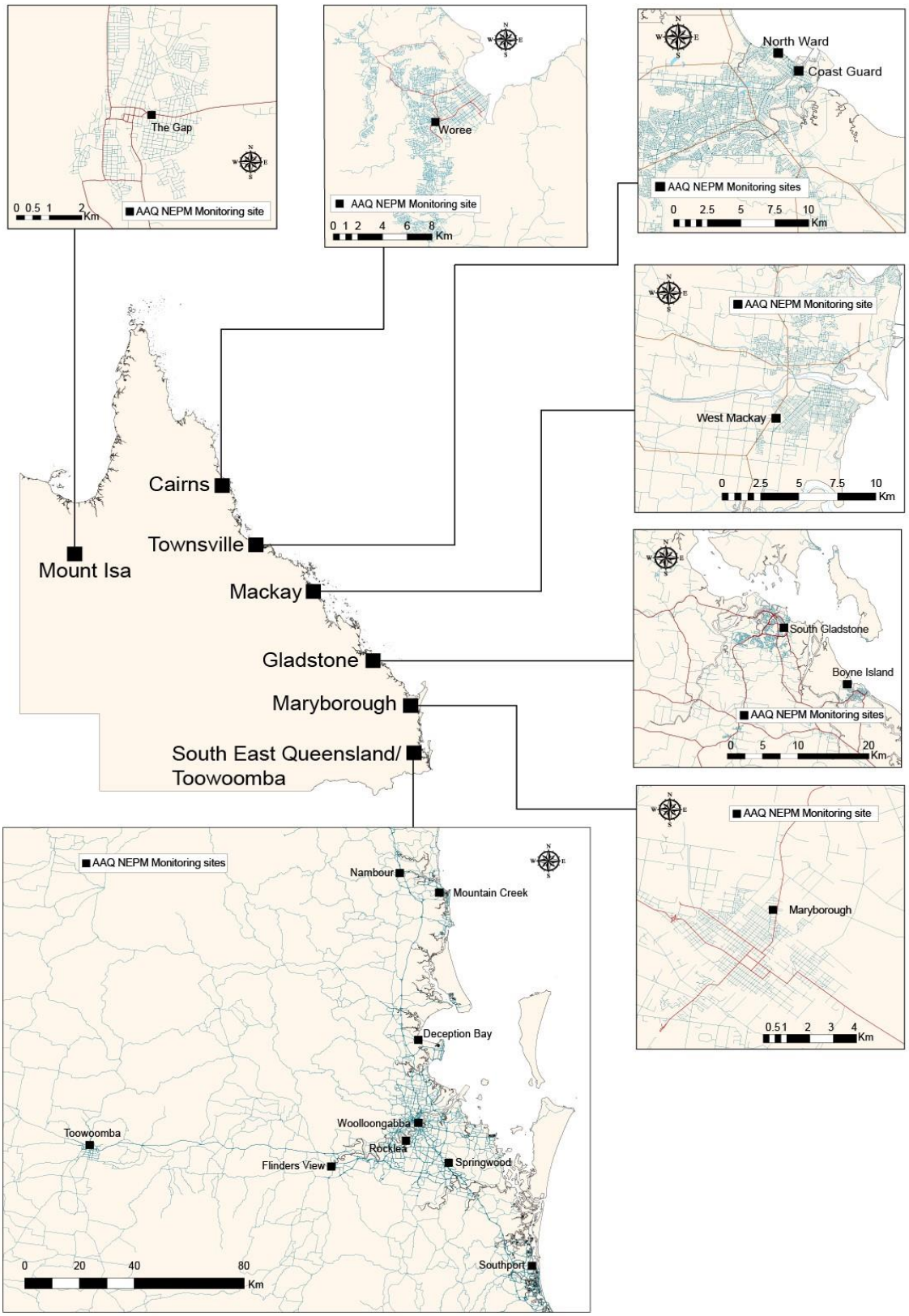

Figure 1 2024 AAQ NEPM monitoring site locations

Variations to the approved monitoring plan for Queensland

Monitoring is not required if screening criteria specified in the *National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4 – Screening Procedures*[5] (AAQ NEPM Technical Paper No. 4) are met.

Table 2 shows the regions and pollutants that satisfied the screening procedures.

Table 2. Regions that satisfy screening procedures and do not require campaign monitoring

Region	CO	NO_2	Ozone	SO_2	PM_{10}	$PM_{2.5}$	Lead
South East Queensland	–	–	–	–	–	–	A
Toowoomba	A	A	A	F	A	A	F
Maryborough – Hervey Bay	F	E & F	–	F	–	–	F
Bundaberg	F	E & F	–	F	–	–	F
Gladstone	–	–	A	–	–	–	F
Rockhampton	F	E & F	–	–	–	–	F
Mackay	F	E & F	–	F	–	–	F
Townsville	F	–	A	–	–	–	–
Cairns	F	E & F	–	F	–	–	F
Mount Isa	F	E & F	–	–	–	–	–

A = Screening by campaign monitoring at a generally representative upper bound (GRUB) monitoring location (with no significant deterioration expected over 5–10 years).
E = Screening by use of generic model results based on gross emission estimates, 'worst case' meteorology estimates and other conservative assumptions.
F = Screening by comparison with a National Environment Protection (Ambient Air Quality) Measure compliant region with greater population, emissions and pollution potential.
The '–' symbol indicates that monitoring is required to assess compliance.
For further information on the screening procedures, refer to National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, Screening Procedures, available from www.nepc.gov.au/resource/ephc-archive-ambient-air-quality-nepm.

[5] available from www.nepc.gov.au/resource/ephc-archive-ambient-air-quality-nepm

Section B – Assessment of compliance with standards and goals

This section presents details of the 2024 compliance assessment for Queensland. Compliance criteria are applied at each performance monitoring station in the state.

Compliance is achieved if approved screening procedures are satisfied or:

- there are no exceedances of the relevant standard specified in Schedule 2 of the AAQ NEPM, and
- data availability was at least 75 per cent in each calendar quarter.

For the purposes of reporting compliance against the standards and goals for photochemical oxidants (as ozone) and PM_{10} and $PM_{2.5}$ (1-day standard only), monitoring data that has been determined as being directly associated with an exceptional event can be excluded. An exceptional event is defined as a fire or dust occurrence directly related to bushfire, authorised hazard-reduction burning or continental scale windblown dust. Monitoring data associated with such events are included in determination of compliance with the AAQ NEPM goals for 1-year PM_{10} and $PM_{2.5}$ concentrations.

AAQ NEPM Technical Paper No. 8 states that a data availability rate of at least 75 per cent in each calendar quarter is required to make a valid assessment of compliance. For 2024, all monitored sites meet the required data availability and are therefore able to demonstrate compliance with the relevant standards and goals.

Compliance summaries for AAQ NEPM pollutants in 2024 are presented in Table 3 to Table 9.

Carbon monoxide

Table 3. 2024 carbon monoxide compliance summary

Region / performance monitoring station	Data availability rates (% of hours)					Number of exceedances (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		8-hour
South East Queensland							
Brisbane sub-region							
Woolloongabba	100.0	93.7	99.7	96.0	97.4	0	met
Gladstone							
Boyne Island	99.7	99.7	97.8	98.5	98.9	0	met
ND = "not demonstrated" due to insufficient data in one or more quarters. AAQ NEPM standard for CO: 9.0 ppm (8-hour average). AAQ NEPM goal for CO: standard not to be exceeded.							

Regions which do not require monitoring on the basis of screening arguments that carbon monoxide levels are reasonably expected to be consistently below the AAQ NEPM standard are:

- Bundaberg

- Cairns
- Mackay
- Maryborough/Hervey Bay
- Mount Isa
- Rockhampton
- Toowoomba
- Townsville.

Motor vehicles are the main contributor to ambient carbon monoxide concentrations in urban areas. Combustion stoves and wood heaters can also contribute, but their use in most areas currently monitored in Queensland is minimal.

Carbon monoxide concentrations at performance monitoring stations in South East Queensland (at Woolloongabba from 2007 to 2024) were consistently less than 40 per cent of the AAQ NEPM standard (see Section D – Pollutant distribution and trends). Therefore, under screening procedure F in Table 1 of the AAQ NEPM Technical Paper No. 4, carbon monoxide monitoring is not required in coastal Queensland population centres with lower traffic density and warmer winter temperatures than South East Queensland.

At the North Toowoomba monitoring site, campaign monitoring from July 2003 to December 2010 found carbon monoxide concentrations were consistently less than 30 per cent of the AAQ NEPM standard. This satisfies the 60 per cent acceptance limit specified in screening procedure A in Table 1 of the AAQ NEPM Technical Paper No. 4.

In Gladstone, carbon monoxide concentrations at the Boyne Island trend monitoring station were consistently less than 35 per cent of the AAQ NEPM Standard. Under screening procedure F in Table 1 of AAQ NEPM Technical Paper No. 4, carbon monoxide monitoring is not required in Mount Isa based on carbon monoxide concentrations measured in the Gladstone region meeting the 40 per cent acceptance limit and emissions of carbon monoxide being lower in Mount Isa than in the Gladstone airshed[6].

[6] National Pollutant Inventory reporting for 2023–24 shows that industrial facilities in Mount Isa emitted 9,025 tonnes of carbon monoxide, compared to 36,672 tonnes emitted from industrial facilities in the Gladstone region (data obtained from www.npi.gov.au).

Nitrogen dioxide

Table 4. 2024 nitrogen dioxide compliance summary

Region / performance monitoring station	Data availability rates (% of hours)					Number of exceedances (days)	Annual mean (ppm)	Performance against the standards and goals	
	Q1	Q2	Q3	Q4	Annual			1-hour	1-year
South East Queensland									
North Coast sub-region									
Mountain Creek	99.4	99.6	99.7	99.7	99.6	0	0.003	met	met
Brisbane sub-region									
Deception Bay	99.6	99.8	98.9	98.1	99.1	0	0.004	met	met
Rocklea	99.7	99.6	99.6	99.7	99.7	0	0.009	met	met
Springwood	99.5	99.3	99.7	99.7	99.6	0	0.005	met	met
Gold Coast sub-region									
Southport	97.8	99.8	99.7	99.6	99.2	0	0.004	met	met
Ipswich sub-region									
Flinders View	99.7	99.5	99.7	85.1	96.0	0	0.006	met	met
Gladstone									
South Gladstone	99.5	99.5	99.2	99.5	99.4	0	0.004	met	met
Townsville									
North Ward	93.7	99.4	99.7	92.3	96.3	0	0.002	met	met

ND = "not demonstrated" due to insufficient data in one or more quarters.

AAQ NEPM standards for NO_2: 0.080 ppm (1-hour average); 0.015 ppm (1-year average).
AAQ NEPM goal for NO_2: standards not to be exceeded.

Regions which do not require monitoring on the basis of screening arguments that nitrogen dioxide levels are reasonably expected to be consistently below the AAQ NEPM standards are:

- Bundaberg
- Cairns
- Mackay
- Maryborough/Hervey Bay
- Mount Isa
- Rockhampton
- Toowoomba.

The AAQ NEPM Technical Paper No. 4 states that nitrogen dioxide monitoring is not required if a combination of generic modelling (screening procedure E in Table 1 of the AAQ NEPM Technical Paper No. 4) and data from an AAQ NEPM compliant region with greater population, emissions and pollution potential (screening procedure F in Table 1 of the AAQ NEPM Technical Paper No. 4) show that nitrogen dioxide concentrations are below 45 per cent of the NEPM standards. Based on generic modelling conducted by CSIRO (Appendix 1 of the AAQ NEPM

Technical Paper No. 4), it was determined nitrogen dioxide concentrations in coastal and inland centres with populations below 250,000 would comply with the acceptance limit for the 1-hour standard in place prior to 2023 (45% × 0.12 ppm = 0.054 ppm). Even with the reduction in the nitrogen dioxide 1-hour standard to 0.08 ppm in 2023, the Queensland centres listed above can still be considered to comply with the lower nitrogen dioxide acceptance limit of 0.036 ppm.

Nitrogen dioxide monitoring in Townsville (Pimlico from 2004 to 2016 and North Ward between 2018 and 2024) showed that concentrations were consistently less than 45 per cent of the relevant AAQ NEPM standards. Across the 18 years of monitoring in Townsville, there has only been ten discrete hours in total (0.008 per cent) when the one-hour average nitrogen dioxide concentration has exceeded 0.036 ppm; and one-hour average nitrogen dioxide concentrations have never exceeded 0.042 ppm (53 per cent of the standard). The highest annual average nitrogen dioxide concentration during this period was 0.006 ppm (40 per cent of the standard). On this basis, it can be reasonably expected that nitrogen dioxide levels will comply with the AAQ NEPM standards in the Queensland centres of Bundaberg, Cairns, Mackay, Maryborough/Hervey Bay, Mount Isa and Rockhampton, and nitrogen dioxide monitoring is not required.

Campaign monitoring from 2006 to 2010 established that nitrogen dioxide concentrations at North Toowoomba were consistently less than 60 per cent of the AAQ NEPM standards adopted from 2021, satisfying the acceptance limit specified in screening procedure A in Table 1 of the AAQ NEPM Technical Paper No. 4.

Ozone

Table 5. 2024 ozone compliance summary

Region/ performance monitoring station	Data availability rates (% of hours)					Number of exceedances (days)	Performance against the standards and goals
	Q1	Q2	Q3	Q4	Annual		8-hour
South East Queensland							
North Coast sub-region							
Mountain Creek	97.2	100.0	99.7	93.9	97.7	0	met
Brisbane sub-region							
Deception Bay	99.7	100.0	98.9	99.2	99.5	0	met
Rocklea	99.7	99.7	98.3	99.7	99.4	0	met
Springwood	99.5	99.0	99.7	100.0	99.6	0	met
Gold Coast sub-region							
Southport	97.1	98.3	100.0	99.7	98.8	0	met
Ipswich sub-region							
Flinders View	99.4	99.2	100.0	85.1	95.9	0	met
ND = "not demonstrated" due to insufficient data in one or more quarters. AAQ NEPM standard for O_3: 0.065 ppm (8-hour average). AAQ NEPM goal for O_3: standard not to be exceeded.							

Regions which do not require monitoring on the basis of screening arguments that ozone levels are reasonably expected to be consistently below the NEPM standards are:

- Gladstone
- Toowoomba
- Townsville.

Eight-hour average ozone concentrations monitored at Targinie in the Gladstone region from mid-2001 to mid-2006 were consistently less than 75 per cent of the new AAQ NEPM standard. The Targinie campaign GRUB monitoring station was located 20 kilometres north-west of Gladstone and downwind of the region's major industrial and transport sources. This campaign monitoring established that ozone concentrations satisfied screening procedure A in Table 2 of the AAQ NEPM Technical Paper No. 4 and, in the absence of any significant increase in ozone precursor pollutant emissions, further ozone monitoring is not required in the Gladstone region.

The maximum 8-hour average ozone concentration recorded during campaign monitoring at North Toowoomba between July 2003 and December 2010 was 0.058 ppm, or 89 per cent of the AAQ NEPM standard. During this period, ozone 8-hour average concentrations only exceeded 0.049 ppm (75 per cent of the AAQ NEPM 8-hour standard) on one to two days per year on average, with most days linked with exceptional regional events (bushfire smoke episodes during spring and summer). Emissions of ozone precursor pollutants from industrial, commercial and residential sources rarely resulted in 8-hour ozone concentrations above 0.049 ppm. While not fully satisfying screening procedure A in Table 2 of the AAQ NEPM Technical

Paper No. 4, in the absence of any significant increase in ozone precursor pollutants[7] it is considered that ozone levels in Toowoomba can be reasonably expected to remain below the AAQ NEPM standard.

No exceedances of the AAQ NEPM 8-hour ozone standard were recorded at the Pimlico campaign monitoring site in Townsville between 2004 and 2016. Ozone levels exceeded 75 per cent of the AAQ NEPM 8-hour standard on only six days during this 14-year period (one day in 2008 and five days in 2011), with the elevated ozone levels largely correlating with the presence of bushfires in the region. While not fully satisfying screening procedure A in Table 2 of the AAQ NEPM Technical Paper No. 4, given ozone precursor pollutant emissions are now significantly less than in 2016[8] due to decreased industrial activity in the region, it is considered that ozone levels in Townsville can be reasonably expected to remain below the AAQ NEPM standard.

As no monitoring has been carried out to date, performance against the 8-hour ozone standard adopted in 2021 is currently 'not demonstrated' for the following regions:

- Bundaberg
- Cairns
- Mackay
- Maryborough/Hervey Bay
- Mount Isa
- Rockhampton.

Previous screening exclusions for coastal centres with a population below 62,000 and inland centres with a population below 25,000 based on generic modelling conducted by CSIRO documented in Appendix 1 of the AAQ NEPM Technical Paper No. 4 do not cover the new AAQ NEPM ozone 8-hour standard adopted in 2021. Previous conclusions that ozone monitoring is not required in the coastal Queensland centres of Bundaberg, Mackay and Maryborough/Hervey Bay, and the inland centre of Mount Isa, require further generic modelling to determine their continued validity.

With maximum 8-hour average ozone concentrations in Gladstone and Townsville exceeding the 60 per cent acceptance limit specified in screening procedure F in Table 2 of AAQ NEPM Technical Paper No. 4, previous exclusions of the need for ozone monitoring in Rockhampton and Cairns on this basis are no longer valid.

[7] National Pollutant Inventory reporting for industrial facilities in the Toowoomba region in 2021–22 compared to 2010–11 shows that while emissions of oxides of nitrogen have increased from 36 tonnes to 65 tonnes, emissions of volatile organic compounds have reduced significantly (64 tonnes compared to 23 tonnes) (data obtained from www.npi.gov.au).

[8] Following the closure of a major metals processing facility in 2016, National Pollutant Inventory reporting for industrial facilities in the Townsville region for 2021–22 compared to 2015–16 show a marked reduction in emissions of oxides of nitrogen (310 tonnes compared to 3500 tonnes) and a small decrease in emissions of volatile organic compounds from 280 tonnes to 230 tonnes (data obtained from www.npi.gov.au).

Sulfur dioxide

Table 6. 2024 SO_2 compliance summary

Region/ performance monitoring station	Data availability rates (% of hours)					Number of exceedances (days)		Performance against the standards and goals	
	Q1	Q2	Q3	Q4	Annual	1-hour	1-day	1-hour	1-day
South East Queensland									
Brisbane sub-region									
Springwood	98.1	99.3	99.7	99.7	99.2	0	0	met	met
Ipswich sub-region									
Flinders View	99.7	95.7	99.5	84.9	95.0	0	0	met	met
Gladstone									
South Gladstone	99.5	99.5	98.4	99.6	99.2	0	0	met	met
Townsville									
North Ward	89.6	96.1	99.6	92.2	94.4	0	0	met	met
Mount Isa									
The Gap	99.5	99.1	99.8	99.6	99.5	24	11	not met	not met
AAQ NEPM standards for SO_2: 0.10 ppm (1-hour average); 0.02 ppm (1-day average). AAQ NEPM goal for SO_2: standards not to be exceeded.									

Regions which do not require monitoring on the basis of screening arguments that sulfur dioxide levels are reasonably expected to be consistently below the AAQ NEPM standards are:

- Bundaberg
- Cairns
- Mackay
- Maryborough/Hervey Bay
- Toowoomba.

Ambient concentrations of sulfur dioxide are typically low unless significant industrial sources of sulfur dioxide are present (such as coal-fired power stations or metals smelting). Peak sulfur dioxide concentrations in South East Queensland and Townsville have been less than 40 per cent of the revised AAQ NEPM 1-hour and 1-day standards adopted in 2021 since 2010 and 2005 respectively (see Section D – Pollutant distribution and trends). Under screening procedure F in Table 1 of the AAQ NEPM Technical Paper No. 4, sulfur dioxide monitoring is not required in other Queensland centres with lower population and no significant sulfur dioxide point sources.

As no monitoring has been carried out to date, performance against the sulfur dioxide standards adopted in 2021 is currently 'not demonstrated' for the following region:

- Rockhampton

With maximum sulfur dioxide concentrations in Gladstone exceeding 40 per cent of the new AAQ NEPM 1-hour and 1-day standards adopted in 2021, previous exclusion of the need for sulfur dioxide monitoring in Rockhampton based on Gladstone sulfur dioxide levels meeting screening procedure F in Table 1 of AAQ NEPM Technical Paper No. 4 is no longer valid.

PM_{10}

Table 7. 2024 PM_{10} compliance summary

Region/ performance monitoring station	Data availability rates (% of hours)					Number of exceedances (days)	Annual mean (µg/m³)	Performance against the standards and goals	
	Q1	Q2	Q3	Q4	Annual			1-day	1-year
South East Queensland									
North Coast sub-region									
Mountain Creek	99.8	99.9	99.7	99.7	99.8	0	14.5	met	met
Brisbane sub-region									
Rocklea	99.5	95.1	99.6	93.9	97.0	0	13.7	met	met
Springwood	99.9	99.5	99.8	99.7	99.7	1 (1*)	16.5	met	met
Gold Coast sub-region									
Southport	99.4	99.8	99.8	99.7	99.6	0	14.8	met	met
Ipswich sub-region									
Flinders View	99.8	99.5	99.8	85.1	96.0	0	14.7	met	met
Toowoomba									
Toowoomba	97.3	100.0	99.9	99.7	99.2	0	12.9	met	met
Maryborough – Hervey Bay									
Maryborough	100.0	99.8	100.0	83.3	95.8	0	14.4	met	met
Gladstone									
South Gladstone	99.4	99.6	99.3	99.6	99.5	1	16.1	not met	met
Mackay									
West Mackay	99.2	99.8	100.0	99.3	99.6	0	17.2	met	met
Townsville									
North Ward	93.9	99.7	99.7	92.3	96.4	0	15.6	met	met
Cairns									
Woree	99.9	99.9	100.0	100.0	99.9	1	15.6	not met	met
Mount Isa									
The Gap	99.9	99.5	99.9	99.6	99.7	7 (4*, 1**)	15.4	not met	met

* Exceedance due to smoke (exceptional event). Excluded from determination of compliance with the 1-day goal.

** Exceedance due to regional windblown dust (exceptional event). Excluded from determination of compliance with the 1-day goal.

AAQ NEPM standards for PM_{10}: 50 µg/m³ (1-day average); 25 µg/m³ (1-year average).
AAQ NEPM goal for PM_{10}: standard not to be exceeded.

When reporting compliance with the PM_{10} 1-day goal, PM_{10} monitoring data determined to be directly associated with an exceptional event (e.g. bushfire smoke, dust storm) is excluded.

PM_{10} monitoring is required in all regions because screening procedure arguments that pollutant concentrations are reasonably expected to be consistently below the relevant AAQ NEPM standard are not satisfied.

As no monitoring has been carried out to date, performance is ‘not demonstrated’ for the following regions:

- Bundaberg
- Rockhampton.

$PM_{2.5}$

Table 8. 2024 $PM_{2.5}$ compliance summary

Region/ performance monitoring station	Data availability rates (% of hours)					Number of exceedances (days)	Annual mean (µg/m³)	Performance against the standards and goals	
	Q1	Q2	Q3	Q4	Annual			1-day	1-year
South East Queensland									
North Coast sub-region									
Mountain Creek	99.8	99.9	99.7	99.7	99.8	0	5.7	met	met
Brisbane sub-region									
Rocklea	99.5	95.2	99.6	93.9	97.0	0	6.2	met	met
Springwood	99.9	99.5	99.8	99.7	99.7	5 (5*)	6.6	met	met
Gold Coast sub-region									
Southport	99.4	99.8	99.8	99.7	99.6	0	5.6	met	met
Ipswich sub-region									
Flinders View	99.8	99.5	99.8	85.1	96.0	1 (1*)	6.3	met	met
Toowoomba									
Toowoomba	97.3	100.0	99.9	99.7	99.2	1 (1*)	5.5	met	met
Maryborough – Hervey Bay									
Maryborough	100.0	99.8	100.0	83.4	95.8	0	5.9	met	met
Gladstone									
South Gladstone	99.4	99.6	99.3	99.6	99.5	0	5.6	met	met
Mackay									
West Mackay	99.2	99.8	100.0	99.3	99.6	0	6.0	met	met
Townsville									
North Ward	93.9	99.7	99.7	92.3	96.4	0	5.6	met	met
Cairns									
Woree	99.9	99.9	100.0	100.0	99.9	1 (1*)	5.8	met	met
Mount Isa									
The Gap	99.9	99.5	99.9	99.5	99.7	8 (8*)	6.1	met	met

* Exceedance due to bushfire smoke (exceptional event). Excluded from determination of compliance with the 1-day goal.

AAQ NEPM standards for $PM_{2.5}$: 25 µg/m³ (1-day average); 8 µg/m³ (1-year average).
AAQ NEPM goal for $PM_{2.5}$: standard not to be exceeded.

When reporting compliance with the $PM_{2.5}$ 1-day goal, $PM_{2.5}$ monitoring data determined to be directly associated with an exceptional event (e.g. bushfire smoke, dust storm) is excluded.

$PM_{2.5}$ monitoring is required in all regions because screening procedure arguments that pollutant concentrations are reasonably expected to be consistently below the relevant AAQ NEPM advisory standard are not satisfied.

As no monitoring has been carried out to date, performance is 'not demonstrated' for the following regions:

- Bundaberg
- Rockhampton

Lead

Table 9. 2024 Lead compliance summary

Region/ performance monitoring station	Data availability rates (% of hours)					Annual mean (µg/m^3)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		1-year
Townsville							
North Ward*	100.0	100.0	100.0	100.0	100.0	0.01	met
Mount Isa							
The Gap	100.0	100.0	100.0	100.0	100.0	0.11	met

* Monitoring of TSP lead at the Coast Guard site by the Queensland Government ceased in July 2023 – North Ward site replaced Coast Guard site from 2024.

AAQ NEPM standard for lead: 0.5 µg/m^3 (1-year average).
AAQ NEPM goal for lead: standard not to be exceeded.

Regions which do not require monitoring on the basis of screening arguments that lead levels are reasonably expected to be consistently below the NEPM standard are:

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Maryborough/Hervey Bay
- Rockhampton
- South East Queensland
- Toowoomba.

The phase-out of leaded motor vehicle fuel from March 2001 means that no significant sources of lead now exist in most Queensland regions. The exceptions to this are non-vehicle sources of lead such as metals smelting and handling of metal ore concentrates.

Lead concentrations measured at the Woolloongabba performance monitoring station in South East Queensland were less than ten per cent of the AAQ NEPM standard for both 2001 (0.03 µg/m^3) and 2002 (0.02 µg/m^3). These measurements demonstrate that compliance with the AAQ NEPM standard and goal has been achieved in South East Queensland, in accordance with the *National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 9, Lead Monitoring*[9]. Lead monitoring in South East Queensland ceased in 2002.

[9] available from www.nepc.gov.au/resource/ephc-archive-ambient-air-quality-nepm

Peak lead concentrations in South East Queensland were less than 40 per cent of the AAQ NEPM standard between 1999 and 2002 (see Section D – Pollutant distribution and trends). This means that, under screening procedure F in Table 1 of the AAQ NEPM Technical Paper No. 4, lead monitoring is not required in other Queensland centres with lower population and traffic density (with the exception of Townsville and Mount Isa where other non-vehicle lead emission sources exist).

Section C – Analysis of monitoring data against standards

This section presents time, date and location information for the following annual summary statistics for 2024:

- exceedances of AAQ NEPM standards and circumstances under which they occurred;
- annual maximum and second-highest daily concentrations for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, PM_{10} and $PM_{2.5}$.

Exceedance details are presented in Table 10 to and summary statistics are presented in Table 13 to Table 19. Concentrations exceeding AAQ NEPM standards are shown in bold text in the summary tables.

Exceedance summary

In 2024, exceedances of AAQ NEPM standards at compliance monitoring sites in Queensland included sulfur dioxide in Mount Isa; PM_{10} in South East Queensland, Gladstone, Cairns and Mount Isa; and $PM_{2.5}$ in South East Queensland, Toowoomba, Gladstone, Townsville, Cairns and Mount Isa.

Sulfur Dioxide Exceedances

Industrial operations (metals smelting and sulfuric acid manufacture) emit sulfur dioxide into the atmosphere in Mount Isa. Prior to April 2012 smelter operations were controlled to meet *Mount Isa Mines Agreement Act 1985* (MIM Act) air quality limits. From April 2012 to December 2015, smelter operations were under a Transitional Environmental Program (TEP) that set out a staged program of works to achieve compliance with the air quality objectives contained in the then *Queensland Environmental Protection (Air) Policy 2008* (now the *Queensland Environmental Protection (Air) Policy 2019* and equivalent to the AAQ NEPM standards for sulfur dioxide in force at that time). Since January 2016 smelter operations have been operating under an Environmental Authority (EA) (further amended in 2022) which sets alternative air quality limits for some air pollutants, including sulfur dioxide, as part of the Copper Smelter Extension Project. As smelter operations were only controlled to meet EA limit values, ambient sulfur dioxide concentrations at The Gap monitoring site exceeded the more stringent AAQ NEPM 1-hour and 1-day standards on 24 and 10 days respectively during 2024. A listing of these exceedances is provided in Table 10.

PM_{10} Exceedances

Air quality monitoring across Queensland identified 10 exceedances of the AAQ NEPM 1-day $PM_{10,}$ at compliance monitoring stations, during the 2024 reporting period. These exceedances were attributed to a range of natural and human-induced factors, as outlined below:

South East Queensland: The Springwood monitoring site recorded one exceedance, which was caused by smoke from permitted hazard reduction burns conducted south of Brisbane.

Gladstone Region: The South Gladstone monitoring site recorded one exceedance, primarily due to dust generated by nearby construction activities.

Cairns Region: The Woree monitoring site recorded one exceedance, primarily due to dust generated by nearby construction activities.

Mount Isa Region: A total of seven exceedances were recorded in this region. The contributing factors included:

- Smoke from fires: Four exceedances were caused by smoke from bushfires and vegetation fires.
- Local dust sources: Two exceedances were linked to dust from localised sources.
- Windblown dust: One exceedance was due to windblown dust generated by gusty winds associated with the passage of a weather trough. Mount Isa's semi-arid climate, combined with strong winds accompanying low-pressure troughs or cold fronts, often results in elevated levels of windblown dust during dry conditions.

Details of the 2024 PM_{10} exceedances are summarised in Table 11

$PM_{2.5}$ Exceedances

Air quality monitoring across Queensland identified several exceedances of the AAQ NEPM 1-day $PM_{2.5}$ standard during the 2024 reporting period. These exceedances were attributed to a range of natural and human-induced factors, as outlined below:

South East Queensland: A total of six exceedances were recorded in this region. Five exceedances at the Springwood monitoring site and one exceedance at the Flinders View monitoring site were caused by smoke from permitted hazard-reduction burns.

Toowoomba Region: The Toowoomba monitoring site recorded one exceedance, which was linked to bushfire smoke.

Cairns Region: The Woree monitoring site recorded one exceedance, attributed to smoke from a hazard reduction burn in Gadgarra National Park, south of Cairns.

Mount Isa Region: Eight exceedances were recorded in this region, all of which were caused by smoke from bushfires.

Details of the 2024 $PM_{2.5}$ exceedances are summarised in Table 12

Table 10. 2024 SO_2 exceedances

Region/performance monitoring station	Standard	Concentration (µg/m3)	Date	Time	Circumstances
Mount Isa					
The Gap	1-hour	0.323	Nov 27	1	All exceedances at The Gap monitoring site were due to industry emissions
		0.266	Jan 28	20	
		0.258	Nov 9	21	
		0.256	Jan 1	16	
		0.252	Feb 13	3	
		0.233	Jan 29	16	
		0.224	Dec 2	18	
		0.195	Dec 15	8	
		0.186	Jan 28	19	
		0.171	Jan 6	10	
		0.167	Feb 21	9	
		0.144	Jan 23	4	
		0.144	Feb 21	7	
		0.142	Jan 30	11	
		0.140	Aug 15	17	
		0.137	Aug 5	10	
		0.132	Jan 5	22	
		0.130	Aug 19	13	
		0.130	Dec 15	7	
		0.127	Nov 9	22	
		0.126	Aug 15	16	
		0.123	Oct 18	7	
		0.122	Feb 13	4	
		0.122	Dec 23	1	
		0.119	Feb 21	10	
		0.116	Dec 14	10	
		0.115	Feb 5	15	
		0.115	Aug 20	10	
		0.114	Feb 13	8	
		0.114	Jun 4	12	
		0.114	Dec 17	7	
		0.113	Feb 13	9	
		0.112	Jan 30	12	
		0.111	Feb 13	2	
		0.109	Dec 20	8	
		0.108	Feb 21	8	
		0.102	Aug 19	15	

Table 10 (continued). 2024 SO_2 exceedances

Region/performance monitoring station	Standard	Concentration (µg/m³)	Date	Time	Circumstances
Mount Isa					
The Gap	1-day	0.040	Feb 13	24	All exceedances at The Gap monitoring site were due to industry emissions
		0.036	Jan 28	24	
		0.035	Feb 21	24	
		0.030	Dec 8	24	
		0.030	Aug 19	24	
		0.029	Jan 27	24	
		0.028	Jan 6	24	
		0.028	Dec 9	24	
		0.024	Aug 15	24	
		0.021	Nov 27	24	
		0.022	Jan 30	24	
AAQ NEPM standards for SO_2: 0.10 ppm (1-hour average); 0.02 ppm (1-day average). AAQ NEPM goal for SO_2: standards not to be exceeded.					

Table 11. 2024 PM_{10} exceedances

Region/performance monitoring station	Standard	Concentration (µg/m³)	Date	Time	Circumstances
South East Queensland					
Brisbane sub-region					
Springwood	1-day	66.1	Sep 23	24	Smoke from permitted hazard reduction burns
Gladstone					
South Gladstone	1-day	51.5	Sep 3	24	Dust from nearby construction activities
Cairns					
Woree	1-day	53.2	Oct 21	24	Dust from nearby construction activities
Mount Isa					
The Gap	1-day	81.8	Oct 22	24	Bushfire smoke
		80.5	Oct 23	24	
		67.1	Nov 16	24	
		54.8	Sep 24	24	Unidentified local dust source
		54.4	Jan 2	24	Bushfire smoke
		51.8	Jan 27	24	Windblown dust generated by gusty winds associated with the passage of a weather trough during dry conditions
		51.1	Feb 7	24	Unidentified local dust source

AAQ NEPM standards for PM_{10}: 50 µg/m³ (1-day average); 25 µg/m³ (1-year average).
AAQ NEPM goal for PM_{10}: standards not to be exceeded.

When reporting compliance with the PM_{10} 1-day goal, PM_{10} monitoring data determined to be directly associated with an exceptional event (e.g. bushfire smoke, authorised hazard-reduction burn smoke, dust storm) is excluded.

Table 12. 2024 $PM_{2.5}$ exceedances

Region/performance monitoring station	Standard	Concentration (µg/m³)	Date	Time	Circumstances
South East Queensland					
Brisbane sub-region					
Springwood	1-day	50.5	Sep 23	24	Smoke from bushfires or permitted hazard reduction burns
		33.5	Sep 21	24	
		29.5	Sep 22	24	
		29.4	Sep 4	24	
		27.4	Aug 30	24	
Ipswich sub-region					
Flinders View	1-day	28.3	Sep 4	24	Smoke from permitted hazard-reduction burns
Toowoomba					
Toowoomba	1-day	25.2	Aug 27	24	Bushfire smoke
Cairns					
Woree	1-day	34.2	Aug 16	24	Smoke from a permitted hazard reduction burn
Mount Isa					
The Gap	1-day	65.6	Oct 22	24	Bushfire smoke
		61.8	Oct 23	24	
		51.6	Nov 16	24	
		31.1	Jan 2	24	
		28.4	Nov 17	24	
		27.2	Nov 6	24	
		26.8	Nov 7	24	
		26.6	Oct 21	24	

AAQ NEPM standards for $PM_{2.5}$: 25 µg/m³ (1-day average); 8 µg/m³ (1-year average).
AAQ NEPM goal for $PM_{2.5}$: standards not to be exceeded.

When reporting compliance with the $PM_{2.5}$ 1-day goal, $PM_{2.5}$ monitoring data determined to be directly associated with an exceptional event (e.g. bushfire smoke, authorised hazard-reduction burn smoke, dust storm) is excluded.

Summaries of maximum and second-highest pollutant concentrations

Table 13 to Table 19 present daily peak and second-highest concentrations, and the time and date on which these occurred, for all AAQ NEPM pollutants and monitoring sites for 2024.

Table 13. 2024 summary statistics for daily peak 8-hour average CO concentrations

Region/performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
South East Queensland					
Woolloongabba	355	0.74	Jun 04:23	0.72	Jun 20:00
Gladstone					
Boyne Island	361	0.24	Sep 22:00 Dec 11:16		
AAQ NEPM standard for CO: 9.0 ppm (8-hour average). AAQ NEPM goal for CO: standard not to be exceeded.					

Table 14. 2024 summary statistics for daily peak 1-hour average NO_2 concentrations

Region/performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
South East Queensland					
North Coast sub-region					
Mountain Creek	366	0.028	Jun 19:18 Jun 20:18 Aug 01:18		
Brisbane sub-region					
Deception Bay	362	0.033	Jun 13:18 Aug 02:19		
Rocklea	366	0.042	Jun 20:21	0.040	Jun 19:18
Springwood	366	0.031	Sep 03:06	0.030	Jun 20:22
Gold Coast sub-region					
Southport	365	0.031	Jul 31:07	0.030	Jul 12:19
Ipswich sub-region					
Flinders View	352	0.043	Jul 22:17	0.042	Jun 14:17
Gladstone					
South Gladstone	366	0.031	Sep 03:13 Oct 02:14 Oct 11:14		
Townsville					
North Ward	353	0.025	Jun 11:08	0.021	Jun 20:08
AAQ NEPM standard for NO_2: 0.080 ppm (1-hour average). AAQ NEPM goal for NO_2: standards not to be exceeded.					

Table 15. 2024 summary statistics for daily peak 8-hour average O_3 concentrations

Region/performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
South East Queensland					
North Coast sub-region					
Mountain Creek	356	0.047	Nov 02:12	0.044	Oct 25:00
Brisbane sub-region					
Deception Bay	362	0.052	Sep 21:17 Sep 20:18 Nov 14:17		
Rocklea	363	0.061	Sep 01:15	0.051	Nov 01:16
Springwood	364	0.056	Nov 01:16	0.055	Nov 14:17
Gold Coast sub-region					
Southport	359	0.048	Sep 09:18	0.047	Aug 25:17
Ipswich sub-region					
Flinders View	351	0.058	Sep 09:17	0.051	Sep 08:17
AAQ NEPM standard for O_3: 0.065 ppm (8-hour average). AAQ NEPM goal for O_3: standard not to be exceeded.					

Table 16. 2024 summary statistics for daily peak 1-hour average SO_2 concentrations

Region/performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
South East Queensland					
Brisbane sub-region					
Springwood	364	0.009	Jun 27:16	0.007	Oct 06:00
Ipswich sub-region					
Flinders View	348	0.004	Sep 07:09 Oct 07:17		
Gladstone					
South Gladstone	364	0.070	Sep 03:13	0.063	Mar 15:15
Townsville					
North Ward	350	0.005	Feb 12:00 Mar 31:00		
Mount Isa					
The Gap	365	**0.323**	Nov 27:01	**0.266**	Jan 28:20

Bold text indicates a value greater than the AAQ NEPM standard.
AAQ NEPM standard for SO_2: 0.100 ppm (1-hour average).
AAQ NEPM goal for SO_2: standard not to be exceeded.

Table 17. 2024 summary statistics for daily 1-day average SO_2 concentrations

Region/performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
South East Queensland					
Brisbane sub-region					
Springwood	364	0.002	Jun 27 Oct 05 Nov 08		
Ipswich sub-region					
Flinders View	348	0.001	87 days in total		
Gladstone					
South Gladstone	364	0.011	Sep 03 Oct 02		
Townsville					
North Ward	350	0.001	15 days in total		
Mount Isa					
The Gap	365	**0.040**	Feb 13	**0.036**	Jan 28

Bold text indicates a value greater than the AAQ NEPM standard.
AAQ NEPM standard for SO2: 0.020 ppm (1-day average).
AAQ NEPM goal for SO2: standard not to be exceeded.

Table 18. 2024 summary statistics for daily 1-day average PM_{10} concentrations

Region/performance monitoring station	Number of valid days	Highest (µg/m³)	Highest (date)	2nd highest (µg/m³)	2nd highest (date)
South East Queensland					
North Coast sub-region					
Mountain Creek‡	366	32.4	Jan 23	28.9	Aug 13
Brisbane sub-region					
Rocklea†	355	40.9	Jun 20	33.9	Aug 30
Springwood ‡	366	**66.1**	Sep 23	49.1	Sep 21
Gold Coast sub-region					
Southport‡	366	30.8	Sep 01	30.1	Sep 09
Ipswich sub-region					
Flinders View‡	352	44.5	Sep 04	36	Sep 09
Toowoomba					
Toowoomba‡	363	38.1	Aug 27	30.5	Aug 25
Maryborough – Hervey Bay					
Maryborough‡	350	33.8	Nov 04	31.1	Sep 03
Gladstone					
South Gladstone‡	366	**51.5**	Sep 03	37.1	Oct 02
Mackay					
West Mackay‡	365	35.6	Jan 24	35.4	Sep 04
Townsville					
North Ward‡	353	39.9	Sep 04	34.5	Sep 05
Cairns					
Woree‡	366	**53.2**	Oct 21	46.4	Aug 16
Mount Isa					
The Gap‡	366	**81.8**	Oct 22	**80.5**	Oct 23

Bold text indicates a value greater than the AAQ NEPM standard.
† Monitoring by TEOM Model 1405DF instrumentation fitted with FDMS.
‡ Monitoring by TAPI T640X optical aerosol spectrometer.
AAQ NEPM standard for PM_{10}: 50 µg/m³ (1-day average).
AAQ NEPM goal for PM_{10}: standard not to be exceeded (excluding exceptional events).

Table 19. 2024 summary statistics for daily 1-day average $PM_{2.5}$ concentrations

Region/performance monitoring station	Number of valid days	Highest (µg/m³)	Highest (date)	2nd highest (µg/m³)	2nd highest (date)
South East Queensland					
North Coast sub-region					
Mountain Creek‡	366	14.3	Sep 01	13.5	Jun 14
Brisbane sub-region					
Rocklea†	355	22.3	Jun 20	19.1	Sep 01
Springwood†‡	366	**50.5**	Sep 23	**33.5**	Sep 21
Gold Coast sub-region					
Southport†‡	366	18.8	Sep 09	18.2	Sep 01
Ipswich sub-region					
Flinders View‡	352	**28.3**	Sep 04	22.4	Sep 09
Toowoomba					
Toowoomba‡	363	**25.2**	Aug 27	21.7	Aug 25
Maryborough – Hervey Bay					
Maryborough‡	350	24.4	Nov 04	19.2	Jul 23
Gladstone					
South Gladstone†	366	14.2	Aug 13	14	Sep 03
Mackay					
West Mackay‡	365	11.7	Aug 03	11.2	Sep 28
Townsville					
North Ward‡	353	14.5	Jun 09	14.5	Jun 09
Cairns					
Woree‡	366	**34.2**	Aug 16	21.4	Sep 24
Mount Isa					
The Gap‡	366	**65.6**	Oct 22	**61.8**	Oct 23

Bold text indicates a value greater than the AAQ NEPM standard.

† Monitoring by TEOM Model 1405DF instrumentation fitted with FDMS.
‡ Monitoring by TAPI T640X optical aerosol spectrometer.

AAQ NEPM standard for $PM_{2.5}$: 25 µg/m³ (1-day average).
AAQ NEPM goal for $PM_{2.5}$: standard not to be exceeded (excluding exceptional events).

Section D – Pollutant distribution and trends

This section presents results of further analysis of the monitoring data. Percentiles of 2024 daily peak concentrations are presented for each monitoring station and pollutant. Daily peak concentrations were only included in this analysis if at least 75 per cent of the daily data were valid. Percentiles for eight-hour average carbon monoxide and eight-hour average ozone were calculated based on daily peak concentrations. Daily peak concentrations were calculated from running hourly values, including those that overlap from one calendar day to the next. Concentrations exceeding the corresponding AAQ NEPM standard are shown in bold text.

The tables in this section also present annual statistics for all trend monitoring stations identified in the Queensland AAQ NEPM monitoring plan. For regions and sub-regions where a pollutant is not monitored at a trend station, annual statistics are presented for performance monitoring stations. Concentrations where less than 75 per cent of the annual data were valid are shown in italics.

Carbon monoxide

Table 20. 2024 percentiles of daily peak 8-hour average CO concentrations

Region/performance monitoring station	Data availability (% of days)	Maximum (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
South East Queensland								
Brisbane sub-region								
Woolloongabba	97.0	0.74	0.70	0.53	0.42	0.36	0.28	0.21
Gladstone								
Boyne Island	98.6	0.25	0.23	0.22	0.18	0.15	0.12	0.09

AAQ NEPM standard for CO: 9.0 ppm (8-hour average).
AAQ NEPM 2023 goal for CO: standard not to be exceeded.

Table 21. Percentiles of daily peak 8-hour average CO concentrations at Woolloongabba (1998–2024)

Year	Data availability (% of days)	No. of exceedances (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
1998	*57.0**	*0*	*5.1*	*5.0*	*4.4*	*4.1*	*3.4*
1999	92.3*	0	5.7	5.3	4.9	4.0	3.2
2000	92.9	0	5.0	4.7	4.2	3.4	2.9
2001	97.0	0	7.0	4.4	4.3	3.9	3.2
2002	97.0	0	4.7	4.7	4.1	3.6	3.0
2003	83.3*	0	5.4	4.4	4.2	3.5	2.7
2004	98.9	0	4.7	4.2	3.8	3.3	2.6
2005	95.1	0	4.0	3.5	3.3	2.6	2.1
2006	95.3	0	4.0	3.7	3.1	2.4	2.1
2007	*26.0**	*0*	*1.1*	*1.1*	*1.1*	*1.1*	*1.0*
2008	*66.9**	*0*	*2.9*	*2.7*	*2.5*	*2.2*	*1.8*
2009	100.0	0	2.4	2.3	2.1	1.8	1.5
2010	97.0	0	2.7	1.9	1.8	1.3	1.1
2011	99.5	0	1.9	1.7	1.6	1.3	1.0
2012	98.9	0	1.8	1.7	1.7	1.4	1.1
2013	99.7	0	1.6	1.4	1.3	1.1	0.9
2014	97.0	0	1.9	1.6	1.5	1.0	0.6
2015	98.1	0	1.6	1.4	1.3	1.0	0.8
2016	*45.8**	*0*	*1.2*	*1.2*	*1.2*	*1.0*	*0.8*
2017	*55.9**	*0*	*1.1*	*1.0*	*0.9*	*0.8*	*0.7*
2018	99.7	0	1.2	0.9	0.7	0.7	0.6
2019	95.3	0	1.2	1.0	0.8	0.7	0.6
2020	98.9	0	0.9	0.8	0.7	0.6	0.5
2021	97.8	0	0.9	0.8	0.7	0.6	0.5
2022	96.2	0	0.9	0.8	0.7	0.6	0.4
2023	90.4	0	0.8	0.8	0.7	0.6	0.5
2024	97.0	0	0.7	0.7	0.5	0.4	0.4

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
AAQ NEPM standard for CO: 9.0 ppm (8-hour average).
AAQ NEPM goal for CO (until 2020): standard exceeded on no more than one day per year.
AAQ NEPM goal for CO (from 2021): standard not to be exceeded.

Table 22. Percentiles of daily peak 8-hour average CO concentrations at North Toowoomba (2003–2010)

Year	Data availability (% of days)	No. of exceedances (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
2003	*42.4**	*0*	*2.6*	*2.5*	*2.3*	*2.2*	*1.9*
2004	97.0	0	3.4	2.8	2.5	2.0	1.5
2005	99.5	0	2.3	1.8	1.7	1.1	0.7
2006	95.3	0	1.9	1.8	1.7	1.3	1.1
2007	97.5	0	2.2	1.8	1.6	1.0	0.4
2008	98.4	0	1.9	1.7	1.5	1.1	0.8
2009	100.0	0	1.8	1.4	1.2	1.0	0.7
2010	92.6*	0	1.7	1.5	1.3	0.9	0.5

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
AAQ NEPM standard for CO: 9.0 ppm (8-hour average).
AAQ NEPM goal for CO (until 2020): standard exceeded on no more than one day per year.
AAQ NEPM goal for CO (from 2021): standard not to be exceeded.

Table 23. Percentiles of daily peak 8-hour average CO concentrations at Boyne Island (2008–2024)

Year	Data availability (% of days)	No. of exceedances (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
2008	*23.8**	*0*	*0.3*	*0.3*	*0.3*	*0.2*	*0.2*
2009	94.0	0	2.1	0.7	0.5	0.2	0.1
2010	95.1	0	1.0	0.8	0.4	0.2	0.1
2011	94.5	0	2.8	1.5	0.6	0.3	0.2
2012	99.2	0	1.3	0.5	0.4	0.3	0.3
2013	99.5	0	0.7	0.5	0.4	0.3	0.3
2014	98.9	0	0.9	0.4	0.3	0.2	0.2
2015	93.4	0	0.4	0.3	0.3	0.2	0.2
2016	99.2	0	1.4	0.4	0.3	0.2	0.2
2017	99.2	0	1.4	0.4	0.3	0.2	0.2
2018	94.2	0	0.4	0.1	0.1	0.1	0.1
2019	98.4	0	0.8	0.4	0.3	0.2	0.1
2020	100.0	0	0.3	0.3	0.3	0.2	0.2
2021	99.5	0	0.3	0.3	0.2	0.2	0.1
2022	77.8*	0	0.2	0.2	0.2	0.2	0.2
2023	16.7*	0	0.7	0.7	0.7	0.2	0.2
2024	98.6	0	0.2	0.2	0.2	0.2	0.2

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
AAQ NEPM standard for CO: 9.0 ppm (8-hour average).
AAQ NEPM goal for CO (until 2020): standard exceeded on no more than one day per year.
AAQ NEPM goal for CO (from 2021): standard not to be exceeded.

Nitrogen dioxide

Table 24. 2024 percentiles of daily peak 1-hour average NO_2 concentrations

Region/performance monitoring station	Data availability (% of days)	Maximum (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
South East Queensland								
North Coast sub-region								
Mountain Creek	100.0	0.028	0.027	0.023	0.021	0.015	0.010	0.007
Brisbane sub-region								
Deception Bay	98.9	0.033	0.031	0.028	0.024	0.022	0.015	0.009
Rocklea	100.0	0.042	0.039	0.035	0.032	0.028	0.022	0.016
Springwood	100.0	0.031	0.027	0.026	0.023	0.021	0.017	0.012
Gold Coast sub-region								
Southport	99.7	0.031	0.029	0.028	0.024	0.021	0.015	0.009
Ipswich sub-region								
Flinders View	96.2	0.043	0.037	0.034	0.032	0.027	0.020	0.013
Gladstone								
South Gladstone	100.0	0.031	0.029	0.026	0.023	0.020	0.016	0.011
Townsville								
North Ward	96.5	0.025	0.020	0.018	0.015	0.012	0.007	0.005
AAQ NEPM standard for NO_2: 0.08 ppm (1-hour average). AAQ NEPM goal for NO_2: standard not to be exceeded.								

Table 25. Percentiles of daily peak 1-hour average NO_2 concentrations at Mountain Creek (2002–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2002	91.5*	0 (0)	0.036	0.006	0.036	0.034	0.031	0.028
2003	91.4	0 (0)	0.033	0.005	0.029	0.028	0.026	0.023
2004	98.1	0 (0)	0.041	0.005	0.036	0.035	0.029	0.026
2005	100.0	0 (0)	0.032	0.005	0.031	0.028	0.025	0.022
2006	100.0	0 (0)	0.035	0.005	0.032	0.030	0.027	0.024
2007	100.0	0 (0)	0.034	0.004	0.030	0.028	0.026	0.022
2008	95.6	0 (0)	0.030	0.004	0.030	0.029	0.026	0.021
2009	99.7	0 (0)	0.030	0.004	0.029	0.027	0.024	0.021
2010	98.6	0 (0)	0.029	0.005	0.028	0.026	0.023	0.021
2011	97.8	0 (0)	0.032	0.004	0.027	0.027	0.023	0.021
2012	96.7	0 (0)	0.030	0.004	0.028	0.027	0.022	0.021
2013	99.7	0 (0)	0.031	0.004	0.029	0.026	0.023	0.020
2014	99.5	0 (0)	0.031	0.004	0.027	0.026	0.023	0.021
2015	100.0	0 (0)	0.030	0.003	0.027	0.024	0.021	0.019
2016	100.0	0 (0)	0.031	0.004	0.029	0.025	0.023	0.021
2017	99.7	0 (0)	0.044	0.004	0.032	0.032	0.027	0.023
2018	99.7	0 (0)	0.032	0.004	0.030	0.029	0.024	0.020
2019	99.7	0 (0)	0.035	0.004	0.028	0.027	0.024	0.019
2020	100.0	0 (0)	0.028	0.003	0.025	0.024	0.021	0.017
2021	99.7	0 (0)	0.026	0.003	0.022	0.022	0.020	0.019
2022	99.5	0 (0)	0.028	0.003	0.024	0.023	0.021	0.018
2023	100.0	0 (0)	0.035	0.005	0.034	0.031	0.028	0.025
2024	100.0	0 (0)	0.028	0.003	0.027	0.023	0.021	0.015

* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for NO_2 (until 2020): 0.12 ppm (1-hour average); 0.03 ppm (1-year average).
AAQ NEPM standards for NO_2 (from 2021): 0.08 ppm (1-hour average); 0.015 ppm (1-year average).
AAQ NEPM goal for NO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for NO_2 (from 2021): standards not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 26. Percentiles of daily peak 1-hour average NO_2 concentrations at Deception Bay (2000–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2000	99.5	0 (0)	0.053	0.005	0.038	0.034	0.029	0.025
2001	95.1	0 (0)	0.047	0.006	0.040	0.039	0.034	0.030
2002	87.4*	0 (0)	0.065	0.006	0.044	0.042	0.036	0.030
2003	94.5	0 (0)	0.053	0.006	0.036	0.033	0.030	0.028
2004	97.8	0 (0)	0.045	0.006	0.036	0.036	0.030	0.027
2005	95.3	0 (0)	0.034	0.006	0.033	0.030	0.028	0.026
2006	99.5	0 (0)	0.044	0.008	0.035	0.033	0.028	0.027
2007	94.2*	0 (0)	0.063	0.006	0.035	0.033	0.030	0.027
2008	84.7*	0 (0)	0.037	0.008	0.034	0.031	0.029	0.027
2009	100.0	0 (0)	0.036	0.005	0.030	0.028	0.026	0.024
2010	98.9	0 (0)	0.037	0.005	0.033	0.033	0.028	0.024
2011	99.5	0 (0)	0.035	0.006	0.033	0.030	0.029	0.027
2012	97.8	0 (0)	0.040	0.006	0.034	0.033	0.030	0.027
2013	*67.9**	*0 (0)*	*0.033*	*i.d.*	*0.033*	*0.031*	*0.029*	*0.025*
2014	98.9	0 (0)	0.041	0.005	0.035	0.034	0.030	0.026
2015	100.0	0 (0)	0.048	0.005	0.033	0.032	0.029	0.025
2016	100.0	0 (0)	0.037	0.005	0.035	0.034	0.030	0.026
2017	100.0	0 (0)	0.038	0.005	0.036	0.033	0.030	0.027
2018	99.7	0 (0)	0.041	0.005	0.034	0.031	0.029	0.026
2019	97.0	0 (0)	0.038	0.005	0.035	0.034	0.028	0.024
2020	99.5	0 (0)	0.037	0.004	0.032	0.029	0.028	0.023
2021	99.7	0 (0)	0.034	0.005	0.032	0.030	0.027	0.023
2022	98.9	0 (0)	0.033	0.004	0.030	0.028	0.025	0.022
2023	99.2	0 (0)	0.029	0.003	0.027	0.025	0.023	0.019
2024	98.9	0 (0)	0.033	0.004	0.031	0.028	0.024	0.022

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for NO_2 (until 2020): 0.12 ppm (1-hour average); 0.03 ppm (1-year average).
AAQ NEPM standards for NO_2 (from 2021): 0.08 ppm (1-hour average); 0.015 ppm (1-year average).
AAQ NEPM goal for NO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for NO_2 (from 2021): standards not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 27. Percentiles of daily peak 1-hour average NO_2 concentrations at Rocklea (2000–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2000	96.7	0 (0)	0.059	0.009	0.046	0.043	0.037	0.032
2001	98.4	0 (0)	0.049	0.009	0.042	0.041	0.035	0.032
2002	98.4	0 (0)	0.051	0.009	0.046	0.041	0.037	0.033
2003	97.0	0 (0)	0.050	0.009	0.039	0.038	0.033	0.030
2004	95.6	0 (0)	0.049	0.009	0.047	0.043	0.037	0.033
2005	98.6	0 (0)	0.046	0.009	0.042	0.041	0.036	0.031
2006	96.4	0 (0)	0.046	0.011	0.039	0.035	0.031	0.027
2007	100.0	0 (0)	0.044	0.008	0.041	0.040	0.035	0.031
2008	79.3*	0 (0)	0.047	0.008	0.041	0.034	0.030	0.027
2009	98.4	0 (0)	0.039	0.007	0.035	0.034	0.031	0.027
2010	98.4	0 (0)	0.039	0.007	0.037	0.033	0.028	0.023
2011	*2.7**	*0 (0)*	*0.020*	*i.d.*	*0.020*	*0.020*	*0.020*	*0.020*
2012	*63.9**	*0 (0)*	*0.039*	*i.d.*	*0.035*	*0.032*	*0.030*	*0.027*
2013	98.6	0 (0)	0.037	0.007	0.034	0.032	0.030	0.025
2014	99.5	0 (0)	0.047	0.007	0.040	0.037	0.032	0.027
2015	100.0	0 (0)	0.041	0.006	0.036	0.033	0.027	0.024
2016	99.5	0 (0)	0.057	0.007	0.037	0.034	0.028	0.025
2017	99.5	0 (0)	0.042	0.006	0.036	0.033	0.027	0.025
2018	100.0	0 (0)	0.045	0.007	0.042	0.040	0.034	0.029
2019	98.6	0 (0)	0.041	0.007	0.038	0.036	0.031	0.025
2020	99.7	0 (0)	0.033	0.006	0.031	0.029	0.025	0.022
2021	99.2	0 (0)	0.034	0.006	0.031	0.026	0.025	0.022
2022	75.9*	0 (0)	0.040	0.007	0.037	0.034	0.031	0.028
2023	99.4	0 (0)	0.042	0.007	0.039	0.037	0.032	0.027
2024	100	0 (0)	0.042	0.009	0.039	0.035	0.032	0.028

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for NO_2 (until 2020): 0.12 ppm (1-hour average); 0.03 ppm (1-year average).
AAQ NEPM standards for NO_2 (from 2021): 0.08 ppm (1-hour average); 0.015 ppm (1-year average).
AAQ NEPM goal for NO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for NO_2 (from 2021): standards not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 28. Percentiles of daily peak 1-hour average NO_2 concentrations at Flinders View (1998–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1998	96.4	0 (0)	0.048	0.009	0.041	0.039	0.034	0.030
1999	98.4	0 (0)	0.046	0.008	0.039	0.038	0.032	0.029
2000	99.2	0 (0)	0.042	0.008	0.040	0.038	0.034	0.031
2001	100.0	0 (0)	0.045	0.009	0.037	0.036	0.034	0.031
2002	88.8*	0 (0)	0.062	0.010	0.057	0.043	0.036	0.033
2003	94.0	0 (0)	0.046	0.009	0.039	0.037	0.033	0.029
2004	100.0	0 (0)	0.054	0.009	0.047	0.038	0.034	0.030
2005	100.0	0 (0)	0.055	0.008	0.046	0.038	0.032	0.028
2006	100.0	0 (0)	0.050	0.012	0.043	0.041	0.035	0.032
2007	96.2	0 (0)	0.039	0.008	0.036	0.035	0.031	0.029
2008	96.7	0 (0)	0.040	0.010	0.039	0.038	0.031	0.028
2009	99.5	0 (0)	0.042	0.008	0.038	0.036	0.034	0.030
2010	99.5	0 (0)	0.039	0.008	0.037	0.034	0.028	0.025
2011	99.5	0 (0)	0.040	0.008	0.036	0.034	0.031	0.028
2012	99.7	0 (0)	0.039	0.007	0.037	0.035	0.028	0.025
2013	100.0	0 (0)	0.043	0.008	0.038	0.037	0.032	0.029
2014	95.9	0 (0)	0.050	0.008	0.046	0.043	0.036	0.030
2015	100.0	0 (0)	0.041	0.006	0.038	0.036	0.031	0.026
2016	98.6	0 (0)	0.046	0.008	0.040	0.038	0.033	0.029
2017	98.9	0 (0)	0.044	0.007	0.040	0.040	0.032	0.030
2018	99.7	0 (0)	0.051	0.008	0.045	0.041	0.035	0.032
2019	99.2	0 (0)	0.043	0.007	0.038	0.038	0.033	0.028
2020	99.7	0 (0)	0.038	0.007	0.036	0.035	0.031	0.026
2021	100.0	0 (0)	0.040	0.006	0.034	0.033	0.030	0.027
2022	97.5	0 (0)	0.044	0.006	0.038	0.034	0.030	0.026
2023	96.4	0 (0)	0.032	0.005	0.028	0.028	0.025	0.024
2024	96.2	0 (0)	0.043	0.006	0.037	0.034	0.032	0.027

* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for NO_2 (until 2020): 0.12 ppm (1-hour average); 0.03 ppm (1-year average).
AAQ NEPM standards for NO_2 (from 2021): 0.08 ppm (1-hour average); 0.015 ppm (1-year average).
AAQ NEPM goal for NO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for NO_2 (from 2021): standards not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 29. Percentiles of daily peak 1-hour average NO_2 concentrations at North Toowoomba (2003–2010)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2003	*43.7**	*0 (0)*	*0.057*	*i.d.*	*0.042*	*0.038*	*0.032*	*0.029*
2004	98.4	0 (0)	0.054	0.007	0.041	0.039	0.035	0.031
2005	99.2	0 (0)	0.057	0.006	0.038	0.036	0.033	0.030
2006	94.8	0 (0)	0.042	0.005	0.037	0.033	0.031	0.027
2007	96.4	0 (0)	0.043	0.005	0.039	0.038	0.034	0.029
2008	98.1	0 (0)	0.041	0.007	0.035	0.033	0.031	0.029
2009	100.0	0 (0)	0.044	0.006	0.040	0.038	0.033	0.029
2010	93.2*	0 (0)	0.042	0.005	0.036	0.033	0.030	0.026

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for NO_2 (until 2020): 0.12 ppm (1-hour average); 0.03 ppm (1-year average).
AAQ NEPM standards for NO_2 (from 2021): 0.08 ppm (1-hour average); 0.015 ppm (1-year average).
AAQ NEPM goal for NO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for NO_2 (from 2021): standards not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 30. Percentiles of daily peak 1-hour average NO_2 concentrations at South Gladstone (1999–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1999	88.8*	0 (0)	0.034	0.003	0.029	0.029	0.025	0.021
2000	97.8	0 (0)	0.031	0.003	0.025	0.024	0.022	0.019
2001	96.4	0 (0)	0.048	0.004	0.033	0.031	0.026	0.023
2002	98.4	0 (0)	0.036	0.004	0.031	0.029	0.026	0.021
2003	95.3	0 (0)	0.035	0.004	0.030	0.027	0.024	0.022
2004	100.0	0 (0)	0.042	0.004	0.030	0.029	0.026	0.023
2005	99.7	0 (0)	0.035	0.004	0.030	0.028	0.024	0.022
2006	100.0	0 (0)	0.034	0.003	0.027	0.027	0.024	0.021
2007	98.4	0 (0)	0.035	0.005	0.030	0.029	0.027	0.024
2008	98.6	0 (0)	0.033	0.003	0.030	0.026	0.023	0.020
2009	97.5	0 (0)	0.033	0.006	0.029	0.028	0.025	0.022
2010	98.4	0 (0)	0.033	0.006	0.031	0.029	0.026	0.023
2011	96.7	0 (0)	0.035	0.006	0.034	0.032	0.029	0.026
2012	94.0*	0 (0)	0.042	0.007	0.037	0.035	0.032	0.029
2013	95.3	0 (0)	0.042	0.007	0.037	0.035	0.032	0.027
2014	99.7	0 (0)	0.046	0.005	0.033	0.032	0.029	0.025
2015	99.7	0 (0)	0.043	0.005	0.036	0.032	0.028	0.025
2016	100.0	0 (0)	0.037	0.005	0.035	0.032	0.029	0.026
2017	99.2	0 (0)	0.074	0.005	0.033	0.030	0.027	0.025
2018	95.3	0 (0)	0.034	0.005	0.033	0.031	0.027	0.025
2019	97.3	0 (0)	0.036	0.005	0.031	0.030	0.026	0.023
2020	98.9	0 (0)	0.032	0.005	0.030	0.029	0.027	0.022
2021	90.7*	0 (0)	0.032	0.005	0.028	0.027	0.024	0.022
2022	99.7	0 (0)	0.032	0.004	0.028	0.027	0.024	0.021
2023	99.2	0 (0)	0.038	0.005	0.033	0.032	0.029	0.027
2024	100	0 (0)	0.031	0.004	0.029	0.026	0.023	0.020

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for NO_2 (until 2020): 0.12 ppm (1-hour average); 0.03 ppm (1-year average).
AAQ NEPM standards for NO_2 (from 2021): 0.08 ppm (1-hour average); 0.015 ppm (1-year average).
AAQ NEPM goal for NO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for NO_2 (from 2021): standards not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 31. Percentiles of daily peak 1-hour average NO_2 concentrations at Pimlico (2004–2016)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2004	*59.0**	*0 (0)*	*0.034*	*i.d.*	*0.032*	*0.031*	*0.030*	*0.027*
2005	100.0	0 (0)	0.034	0.005	0.032	0.031	0.028	0.024
2006	98.6	0 (0)	0.034	0.006	0.032	0.029	0.025	0.022
2007	99.2	0 (0)	0.035	0.004	0.027	0.024	0.023	0.020
2008	100.0	0 (0)	0.030	0.006	0.028	0.027	0.025	0.023
2009	97.0	0 (0)	0.035	0.005	0.030	0.028	0.025	0.023
2010	99.5	0 (0)	0.032	0.005	0.028	0.026	0.023	0.020
2011	98.9	0 (0)	0.042	0.006	0.038	0.036	0.031	0.027
2012	99.5	0 (0)	0.034	0.005	0.031	0.028	0.026	0.022
2013	98.9	0 (0)	0.033	0.004	0.029	0.027	0.023	0.018
2014	99.7	0 (0)	0.031	0.004	0.030	0.029	0.026	0.020
2015	97.8	0 (0)	0.039	0.004	0.030	0.028	0.025	0.021
2016	*8.5**	*0 (0)*	*0.022*	*i.d.*	*0.022*	*0.022*	*0.020*	*0.015*

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for NO_2 (until 2020): 0.12 ppm (1-hour average); 0.03 ppm (1-year average).
AAQ NEPM standards for NO_2 (from 2021): 0.08 ppm (1-hour average); 0.015 ppm (1-year average).
AAQ NEPM goal for NO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for NO_2 (from 2021): standards not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 32. Percentiles of daily peak 1-hour average NO_2 concentrations at North Ward (2018–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2018	92.1*	0 (0)	0.023	0.002	0.022	0.021	0.018	0.014
2019	95.6	0 (0)	0.041	0.003	0.024	0.023	0.018	0.015
2020	96.2	0 (0)	0.024	0.002	0.020	0.018	0.014	0.011
2021	96.7	0 (0)	0.026	0.003	0.020	0.019	0.014	0.011
2022	99.7	0 (0)	0.024	0.003	0.020	0.019	0.015	0.013
2023	98.9	0 (0)	0.027	0.002	0.022	0.020	0.016	0.013
2024	96.5	0 (0)	0.025	0.002	0.020	0.018	0.015	0.012

* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for NO_2 (until 2020): 0.12 ppm (1-hour average); 0.03 ppm (1-year average).
AAQ NEPM standards for NO_2 (from 2021): 0.08 ppm (1-hour average); 0.015 ppm (1-year average).
AAQ NEPM goal for NO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for NO_2 (from 2021): standards not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Ozone

Table 33. 2024 percentiles of daily peak 8-hour average O_3 concentrations

Region/performance monitoring station	Data availability (% of days)	Maximum (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
South East Queensland								
North Coast sub-region								
Mountain Creek	97.3	0.047	0.041	0.041	0.038	0.035	0.031	0.025
Brisbane sub-region								
Deception Bay	98.9	0.052	0.049	0.043	0.040	0.036	0.032	0.026
Rocklea	99.2	0.061	0.048	0.046	0.041	0.037	0.030	0.025
Springwood	99.5	0.055	0.052	0.050	0.044	0.039	0.032	0.026
Gold Coast sub-region								
Southport	98.1	0.048	0.047	0.045	0.041	0.037	0.032	0.026
Ipswich sub-region								
Flinders View	95.9	0.058	0.050	0.047	0.044	0.040	0.033	0.026
AAQ NEPM standard for O_3: 0.065 ppm (8-hour average). AAQ NEPM goal for O_3: standard not to be exceeded.								

Table 34. Percentiles of daily peak 8-hour average O_3 concentrations at Mountain Creek (2002–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
2002	89.6*	0	0.048	0.043	0.041	0.037	0.034
2003	96.7	0	0.049	0.040	0.037	0.034	0.031
2004	98.6	0	0.045	0.040	0.039	0.034	0.032
2005	98.1	0	0.056	0.051	0.046	0.042	0.039
2006	98.6	0	0.056	0.045	0.042	0.039	0.037
2007	95.6	0	0.045	0.036	0.035	0.031	0.030
2008	93.7	0	0.048	0.040	0.038	0.034	0.032
2009	97.3	0	0.045	0.041	0.039	0.037	0.034
2010	96.7	0	0.050	0.037	0.036	0.034	0.032
2011	81.1*	0	0.059	0.050	0.044	0.037	0.033
2012	96.4	0	0.053	0.042	0.040	0.037	0.035
2013	97.0	0	0.045	0.041	0.040	0.038	0.035
2014	99.2	0	0.043	0.040	0.038	0.036	0.034
2015	94.8	0	0.047	0.039	0.037	0.035	0.033
2016	97.5	0	0.042	0.039	0.037	0.036	0.032
2017	98.4	0	0.053	0.045	0.043	0.040	0.037
2018	98.4	0	0.045	0.041	0.040	0.037	0.035
2019	99.2	0	0.054	0.048	0.045	0.040	0.036
2020	99.7	0	0.049	0.040	0.038	0.036	0.034
2021	97.0	0	0.049	0.038	0.037	0.034	0.032
2022	98.6	0	0.042	0.040	0.038	0.034	0.032
2023	99.2	0	0.046	0.040	0.039	0.035	0.033
2024	97.3	0	0.047	0.041	0.041	0.038	0.035

* Data availability less than 75% for one or more quarters.
AAQ NEPM standard for O_3 (from 2021): 0.065 ppm (8-hour average).
AAQ NEPM goal for O_3: standard not to be exceeded.

Table 35. Percentiles of daily peak 8-hour average O_3 concentrations at Deception Bay (1996–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
1996	96.2	1	**0.068**	0.055	0.052	0.045	0.041
1997	99.7	0	0.057	0.050	0.045	0.040	0.037
1998	94.0	0	0.051	0.046	0.042	0.041	0.037
1999	98.6	0	0.062	0.047	0.044	0.040	0.037
2000	98.7	0	0.056	0.044	0.043	0.039	0.036
2001	84.7*	1	**0.070**	0.051	0.045	0.040	0.038
2002	88.2*	0	0.062	0.051	0.048	0.042	0.038
2003	95.6	0	0.065	0.053	0.048	0.041	0.037
2004	96.4	0	0.054	0.049	0.045	0.040	0.038
2005	96.4	0	0.056	0.053	0.046	0.042	0.039
2006	97.5	0	0.056	0.046	0.043	0.040	0.037
2007	97.3	0	0.058	0.049	0.046	0.041	0.038
2008	98.4	0	0.061	0.053	0.049	0.040	0.037
2009	98.4	0	0.055	0.047	0.045	0.042	0.038
2010	97.3	0	0.044	0.042	0.040	0.037	0.035
2011	98.6	2	**0.073**	0.058	0.044	0.041	0.037
2012	98.9	0	0.053	0.048	0.046	0.041	0.039
2013	*67.7**	*0*	*0.052*	*0.052*	*0.046*	*0.044*	*0.041*
2014	97.8	0	0.047	0.044	0.042	0.039	0.037
2015	99.7	0	0.053	0.043	0.042	0.038	0.035
2016	99.5	0	0.050	0.045	0.044	0.040	0.036
2017	99.2	0	0.054	0.050	0.048	0.043	0.040
2018	98.9	0	0.049	0.044	0.041	0.038	0.036
2019	97.0	1	**0.069**	0.055	0.052	0.044	0.038
2020	99.2	0	0.054	0.045	0.043	0.040	0.036
2021	99.5	0	0.052	0.043	0.042	0.040	0.037
2022	98.9	0	0.057	0.050	0.047	0.039	0.037
2023	99.2	0	0.058	0.047	0.044	0.039	0.037
2024	98.9	0	0.052	0.049	0.043	0.040	0.036

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
AAQ NEPM standard for O_3 (from 2021): 0.065 ppm (8-hour average).
AAQ NEPM goal for O_3: standard not to be exceeded.

Table 36. Percentiles of daily peak 8-hour average O_3 concentrations at Rocklea (1996–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
1996	97.5	2	**0.087**	0.061	0.056	0.049	0.043
1997	96.4	0	0.059	0.057	0.052	0.046	0.039
1998	96.4	1	**0.066**	0.055	0.050	0.047	0.041
1999	93.4	1	**0.073**	0.057	0.049	0.042	0.038
2000	96.4	0	0.063	0.054	0.046	0.043	0.039
2001	97.0	0	0.056	0.050	0.046	0.043	0.038
2002	97.8	1	**0.079**	0.055	0.052	0.045	0.041
2003	97.3	0	0.054	0.045	0.043	0.040	0.037
2004	95.9	1	**0.066**	0.057	0.053	0.048	0.043
2005	97.0	0	0.057	0.051	0.049	0.045	0.042
2006	95.6	0	0.053	0.046	0.045	0.043	0.039
2007	93.2	0	0.053	0.050	0.045	0.042	0.039
2008	81.6*	0	0.053	0.047	0.045	0.042	0.036
2009	96.4	0	0.053	0.050	0.048	0.043	0.038
2010	97.3	0	0.062	0.049	0.044	0.039	0.035
2011	*2.7**	*0*	*0.027*	*0.027*	*0.027*	*0.027*	*0.024*
2012	*62.7**	*0*	*0.056*	*0.055*	*0.047*	*0.045*	*0.041*
2013	99.5	0	0.052	0.049	0.048	0.043	0.040
2014	99.5	0	0.060	0.054	0.048	0.044	0.041
2015	97.8	0	0.061	0.053	0.051	0.043	0.038
2016	97.8	0	0.048	0.046	0.045	0.041	0.037
2017	97.8	0	0.054	0.046	0.044	0.042	0.039
2018	98.9	0	0.058	0.053	0.050	0.043	0.038
2019	97.3	2	**0.079**	0.060	0.056	0.051	0.043
2020	99.5	0	0.050	0.047	0.045	0.043	0.039
2021	98.6	0	0.054	0.049	0.045	0.041	0.037
2022	77.0*	0	0.052	0.042	0.040	0.038	0.034
2023	99.2	0	0.051	0.049	0.045	0.039	0.035
2024	99.2	0	0.061	0.048	0.046	0.041	0.037

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
AAQ NEPM standard for O_3 (from 2021): 0.065 ppm (8-hour average).
AAQ NEPM goal for O_3: standard not to be exceeded.

Table 37. Percentiles of daily peak 8-hour average O_3 concentrations at Flinders View (1995–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
1995	92.6	0	0.056	0.052	0.049	0.044	0.040
1996	98.6	2	**0.082**	0.060	0.057	0.052	0.044
1997	97.3	1	**0.072**	0.061	0.056	0.048	0.042
1998	95.1	0	0.059	0.054	0.050	0.047	0.043
1999	98.1	1	**0.083**	0.054	0.052	0.044	0.038
2000	97.5	1	**0.079**	0.053	0.051	0.046	0.042
2001	95.9	0	0.065	0.057	0.051	0.044	0.040
2002	95.1	2	**0.067**	0.064	0.056	0.053	0.049
2003	94.8	0	0.056	0.051	0.046	0.042	0.038
2004	98.6	1	**0.083**	0.060	0.058	0.051	0.046
2005	98.4	0	0.057	0.055	0.052	0.048	0.044
2006	98.6	0	0.062	0.049	0.048	0.044	0.039
2007	98.9	0	0.056	0.051	0.049	0.044	0.040
2008	97.3	0	0.054	0.048	0.046	0.041	0.038
2009	96.7	0	0.054	0.049	0.048	0.044	0.040
2010	97.3	0	0.057	0.047	0.043	0.039	0.035
2011	95.6	1	**0.076**	0.059	0.052	0.043	0.040
2012	94.0	1	**0.071**	0.065	0.057	0.046	0.043
2013	98.1	0	0.057	0.050	0.050	0.045	0.043
2014	95.9	0	0.060	0.054	0.052	0.049	0.044
2015	99.2	0	0.062	0.059	0.051	0.046	0.040
2016	98.9	0	0.054	0.049	0.047	0.044	0.040
2017	98.9	0	0.057	0.053	0.052	0.046	0.043
2018	98.9	1	**0.071**	0.054	0.051	0.044	0.040
2019	99.5	3	**0.088**	0.060	0.054	0.051	0.046
2020	99.7	0	0.055	0.050	0.049	0.045	0.041
2021	98.6	0	0.050	0.047	0.045	0.041	0.037
2022	98.9	0	0.047	0.043	0.041	0.039	0.035
2023	98.4	0	0.055	0.049	0.048	0.044	0.040
2024	95.9	0	0.058	0.050	0.047	0.044	0.040

Bold text indicates a value greater than the AAQ NEPM standard.
AAQ NEPM standard for O_3 (from 2021): 0.065 ppm (8-hour average).
AAQ NEPM goal for O_3: standard not to be exceeded.

Table 38. Percentiles of daily peak 8-hour average O_3 concentrations at North Toowoomba (2003–2010)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
2003	*45.2**	*0*	*0.057*	*0.050*	*0.046*	*0.046*	*0.041*
2004	98.4	0	0.058	0.054	0.050	0.044	0.042
2005	97.0	0	0.051	0.049	0.047	0.044	0.040
2006	94.0	0	0.051	0.049	0.049	0.045	0.041
2007	97.3	0	0.054	0.051	0.048	0.043	0.041
2008	96.2	0	0.047	0.043	0.041	0.038	0.035
2009	97.0	0	0.052	0.051	0.049	0.045	0.042
2010	92.3*	0	0.052	0.045	0.041	0.037	0.034

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
AAQ NEPM standard for O_3 (from 2021): 0.065 ppm (8-hour average).
AAQ NEPM goal for O_3: standard not to be exceeded.

Table 39. Percentiles of daily peak 8-hour average O_3 concentrations at Targinie (2001–2006)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
2001	*71.2**	*0*	*0.042*	*0.037*	*0.036*	*0.030*	*0.029*
2002	89.0	0	0.043	0.039	0.035	0.033	0.029
2003	95.1	0	0.036	0.032	0.029	0.029	0.027
2004	78.1*	0	0.027	0.026	0.025	0.024	0.023
2005	93.4	0	0.029	0.028	0.026	0.025	0.024
2006	*33.4**	*0*	*0.028*	*0.028*	*0.024*	*0.023*	*0.019*

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
AAQ NEPM standard for O_3 (from 2021): 0.065 ppm (8-hour average).
AAQ NEPM goal for O_3: standard not to be exceeded.

Table 40. Percentiles of daily peak 8-hour average O_3 concentrations at Pimlico (2004–2016)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Percentiles (ppm)			
				99th	98th	95th	90th
2004	*58.4**	*0*	*0.042*	*0.042*	*0.040*	*0.038*	*0.037*
2005	98.4	0	0.042	0.039	0.038	0.035	0.033
2006	97.5	0	0.042	0.038	0.037	0.034	0.032
2007	98.6	0	0.043	0.038	0.036	0.035	0.033
2008	99.2	0	0.050	0.043	0.038	0.035	0.033
2009	90.1	0	0.047	0.046	0.046	0.040	0.036
2010	93.7	0	0.040	0.039	0.037	0.035	0.033
2011	94.5	0	0.061	0.057	0.046	0.042	0.037
2012	98.1	0	0.042	0.040	0.038	0.036	0.035
2013	84.7*	0	0.044	0.039	0.038	0.037	0.034
2014	98.9	0	0.045	0.042	0.039	0.037	0.035
2015	99.2	0	0.046	0.039	0.038	0.036	0.034
2016	*16.2**	*0*	*0.045*	*0.045*	*0.045*	*0.044*	*0.037*

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
AAQ NEPM standard for O_3 (from 2021): 0.065 ppm (8-hour average).
AAQ NEPM goal for O_3: standard not to be exceeded.

Sulfur dioxide

Table 41. 2024 percentiles of daily peak 1-hour average SO_2 concentrations

Region/performance monitoring station	Data availability (% of days)	Maximum (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
South East Queensland								
Brisbane sub-region								
Springwood	99.2	0.009	0.004	0.004	0.002	0.002	0.001	0.001
Ipswich sub-region								
Flinders View	95.1	0.004	0.003	0.003	0.002	0.002	0.001	0.001
Gladstone								
South Gladstone	99.5	0.070	0.052	0.043	0.033	0.026	0.014	0.007
Townsville								
North Ward	95.6	0.005	0.004	0.003	0.002	0.001	0.001	0.001
Mount Isa								
The Gap	99.7	**0.324**	**0.256**	**0.195**	**0.116**	0.068	0.014	0.001

Bold text indicates a value greater than the AAQ NEPM standard.
AAQ NEPM standard for SO_2: 0.10 ppm (1-hour average).
AAQ NEPM goal for SO_2: standard not to be exceeded.

Table 42. 2024 percentiles of daily 1-day average SO_2 concentrations

Region/performance monitoring station	Data availability (% of days)	Maximum (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
South East Queensland								
Brisbane sub-region								
Springwood	99.5	0.002	0.001	0.001	0.001	0.001	0.000	0.000
Ipswich sub-region								
Flinders View	95.1	0.001	0.001	0.001	0.001	0.001	0.000	0.000
Gladstone								
South Gladstone	99.5	0.011	0.010	0.009	0.006	0.004	0.002	0.001
Townsville								
North Ward	95.6	0.001	0.001	0.001	0.000	0.000	0.000	0.000
Mount Isa								
The Gap	99.7	**0.040**	**0.030**	**0.024**	0.015	0.008	0.002	0.000

Bold text indicates a value greater than the AAQ NEPM standard.
AAQ NEPM standard for SO_2: 0.02 ppm (1-day average).
AAQ NEPM goal for SO_2: standard not to be exceeded.

Table 43. Percentiles of daily peak 1-hour average SO_2 concentrations at Flinders View (1999–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1999	96.4	0 (0)	0.070	0.002	0.035	0.033	0.028	0.021
2000	89.9	0 (0)	0.081	0.002	0.049	0.036	0.027	0.022
2001	99.5	0 (0)	0.053	0.001	0.048	0.043	0.029	0.023
2002	97.0	0 (0)	0.057	0.001	0.035	0.033	0.025	0.018
2003	96.4	0 (0)	0.046	0.001	0.031	0.030	0.023	0.017
2004	99.5	0 (0)	0.063	0.001	0.036	0.031	0.021	0.016
2005	100.0	0 (0)	0.034	0.001	0.028	0.024	0.020	0.014
2006	100.0	0 (0)	0.040	0.001	0.037	0.027	0.023	0.018
2007	100.0	0 (0)	0.026	0.001	0.024	0.022	0.018	0.014
2008	100.0	0 (0)	0.042	0.001	0.030	0.028	0.019	0.016
2009	99.5	0 (0)	0.046	0.001	0.030	0.027	0.018	0.014
2010	99.4	0 (0)	0.034	0.001	0.022	0.018	0.015	0.012
2011	95.6	0 (0)	0.028	0.001	0.022	0.017	0.014	0.009
2012	100.0	0 (0)	0.015	0.001	0.014	0.012	0.009	0.007
2013	100.0	0 (0)	0.013	0.001	0.005	0.005	0.004	0.004
2014	96.4	0 (0)	0.008	0.000	0.005	0.004	0.003	0.003
2015	100.0	0 (0)	0.010	0.000	0.005	0.004	0.003	0.003
2016	99.7	0 (0)	0.007	0.001	0.005	0.004	0.003	0.003
2017	98.6	0 (0)	0.006	0.001	0.004	0.004	0.004	0.003
2018	98.9	0 (0)	0.005	0.001	0.005	0.004	0.003	0.003
2019	99.7	0 (0)	0.005	0.000	0.004	0.004	0.003	0.002
2020	99.7	0 (0)	0.004	0.000	0.003	0.003	0.002	0.002
2021	99.7	0 (0)	0.004	0.000	0.003	0.003	0.002	0.002
2022	100.0	0 (0)	0.008	0.000	0.003	0.003	0.002	0.002
2023	100.0	0 (0)	0.007	0.000	0.004	0.004	0.003	0.002
2024	95.1	0 (0)	0.004	0.000	0.003	0.003	0.002	0.001

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for SO_2 (until 2020): 0.20 ppm (1-hour average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.10 ppm (1-hour average).
AAQ NEPM goal for SO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 44. Percentiles of daily peak 1-hour average SO_2 concentrations at South Gladstone (1998–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1998	97.5	0 (0)	0.076	0.001	0.050	0.042	0.027	0.020
1999	94.2	0 (0)	0.051	0.002	0.042	0.039	0.027	0.022
2000	84.7*	0 (0)	0.092	0.001	0.071	0.045	0.034	0.024
2001	98.1	0 (0)	0.068	0.001	0.046	0.035	0.023	0.018
2002	94.5	1 (0)	**0.123**	0.001	0.040	0.031	0.025	0.020
2003	93.2	1 (0)	**0.112**	0.001	0.058	0.041	0.025	0.019
2004	96.4	0 (0)	0.064	0.001	0.040	0.032	0.022	0.017
2005	99.7	0 (0)	0.084	0.002	0.063	0.053	0.032	0.027
2006	100.0	0 (0)	0.093	0.002	0.071	0.064	0.049	0.034
2007	98.4	0 (0)	0.075	0.002	0.069	0.061	0.044	0.035
2008	98.6	1 (0)	**0.140**	0.002	0.065	0.056	0.042	0.026
2009	97.5	0 (0)	0.053	0.002	0.040	0.035	0.028	0.021
2010	98.4	0 (0)	0.052	0.002	0.038	0.035	0.028	0.022
2011	97.3	0 (0)	0.091	0.003	0.049	0.045	0.033	0.026
2012	99.5	0 (0)	0.059	0.002	0.050	0.045	0.030	0.024
2013	95.3	0 (0)	0.067	0.002	0.053	0.042	0.033	0.028
2014	99.7	0 (0)	0.068	0.002	0.060	0.059	0.040	0.033
2015	95.1	0 (0)	0.077	0.002	0.057	0.052	0.039	0.025
2016	97.8	0 (0)	0.061	0.002	0.053	0.051	0.038	0.030
2017	99.2	0 (0)	0.073	0.002	0.038	0.036	0.030	0.021
2018	97.3	0 (0)	0.058	0.002	0.048	0.045	0.034	0.026
2019	97.3	0 (0)	0.071	0.002	0.058	0.054	0.041	0.029
2020	98.6	0 (0)	0.076	0.002	0.045	0.043	0.037	0.028
2021	100.0	0 (0)	0.062	0.002	0.043	0.041	0.033	0.026
2022	100.0	0 (0)	0.078	0.002	0.058	0.055	0.044	0.035
2023	99.5	0 (0)	0.074	0.002	0.050	0.047	0.040	0.031
2024	99.5	0 (0)	0.070	0.002	0.052	0.043	0.026	0.026

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for SO_2 (until 2020): 0.20 ppm (1-hour average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.10 ppm (1-hour average).
AAQ NEPM goal for SO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 45. Percentiles of daily peak 1-hour average SO_2 concentrations at Pimlico (2005–2016)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2005	*18.6**	*0 (0)*	*0.003*	*i.d.*	*0.003*	*0.003*	*0.002*	*0.002*
2006	98.6	0 (0)	0.006	0.000	0.005	0.004	0.003	0.002
2007	98.1	0 (0)	0.005	0.001	0.005	0.004	0.003	0.003
2008	100.0	0 (0)	0.006	0.000	0.005	0.003	0.002	0.002
2009	97.0	0 (0)	0.006	0.000	0.005	0.004	0.003	0.002
2010	90.1*	0 (0)	0.007	0.000	0.006	0.004	0.003	0.002
2011	94.2	0 (0)	0.009	0.001	0.007	0.006	0.005	0.005
2012	99.5	0 (0)	0.006	0.001	0.004	0.004	0.003	0.003
2013	94.8	0 (0)	0.004	0.000	0.003	0.003	0.002	0.002
2014	99.7	0 (0)	0.005	0.001	0.004	0.003	0.003	0.002
2015	99.5	0 (0)	0.004	0.001	0.004	0.004	0.003	0.003
2016	*16.1**	*0 (0)*	*0.007*	*i.d.*	*0.007*	*0.007*	*0.005*	*0.004*

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for SO_2 (until 2020): 0.20 ppm (1-hour average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.10 ppm (1-hour average).
AAQ NEPM goal for SO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 46. Percentiles of daily peak 1-hour average SO_2 concentrations at North Ward (2018–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2018	95.3	0 (0)	0.009	0.001	0.005	0.005	0.004	0.003
2019	86.3*	0 (0)	0.010	0.000	0.007	0.005	0.003	0.003
2020	96.2	0 (0)	0.003	0.000	0.002	0.002	0.001	0.001
2021	97.0	0 (0)	0.009	0.000	0.005	0.004	0.002	0.002
2022	100.0	0 (0)	0.006	0.000	0.004	0.003	0.002	0.001
2023	98.1	0 (0)	0.005	0.000	0.003	0.002	0.001	0.001
2024	95.6	0 (0)	0.005	0.000	0.004	0.003	0.002	0.001

* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for SO_2 (until 2020): 0.20 ppm (1-hour average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.10 ppm (1-hour average).
AAQ NEPM goal for SO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 47. Percentiles of daily peak 1-hour average SO_2 concentrations at The Gap (2009–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2009	81.1*	30 (10)	**0.591**	0.004	**0.389**	**0.264**	**0.155**	**0.103**
2010	98.6	41 (19)	**0.608**	0.003	**0.421**	**0.267**	**0.206**	**0.114**
2011	97.3	56 (19)	**0.580**	0.005	**0.524**	**0.347**	**0.213**	**0.146**
2012	93.2	41 (19)	**0.627**	0.004	**0.426**	**0.341**	**0.227**	**0.145**
2013	89.9	43 (21)	**0.636**	0.005	**0.477**	**0.316**	**0.235**	**0.161**
2014	94.2	37 (13)	**0.613**	0.004	**0.376**	**0.284**	**0.176**	**0.102**
2015	99.7	45 (21)	**0.494**	0.004	**0.378**	**0.340**	**0.215**	**0.127**
2016	94.8	47 (24)	**0.504**	0.005	**0.328**	**0.278**	**0.228**	**0.138**
2017	97.0	51 (13)	**0.579**	0.005	**0.397**	**0.310**	**0.188**	**0.131**
2018	96.2	38 (13)	**0.366**	0.004	**0.317**	**0.240**	**0.167**	**0.109**
2019	98.1	25 (10)	**0.433**	0.002	**0.327**	**0.309**	**0.141**	0.068
2020	91.3	46 (14)	**0.401**	0.004	**0.309**	**0.254**	**0.174**	**0.122**
2021	96.2	48 (17)	**0.848**	0.006	**0.514**	**0.372**	**0.199**	**0.139**
2022	93.4	43 (15)	**0.698**	0.004	**0.381**	**0.295**	**0.194**	**0.125**
2023	77.8*	30 (8)	**0.546**	0.003	**0.265**	**0.207**	**0.162**	**0.104**
2024	99.7	24 (7)	**0.323**	0.003	**0.256**	**0.224**	**0.122**	0.070

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for SO_2 (until 2020): 0.20 ppm (1-hour average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.10 ppm (1-hour average).
AAQ NEPM goal for SO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 48. Percentiles of daily peak 1-hour average SO_2 concentrations at Menzies (1996–2020)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1996	98.6	49 (16)	**0.598**	0.005	**0.409**	**0.285**	**0.198**	**0.131**
1997	98.9	29 (7)	**0.300**	0.003	**0.256**	**0.216**	**0.128**	0.083
1998	*48.8**	*29 (16)*	***0.693***	*i.d.*	***0.548***	***0.368***	***0.265***	***0.190***
1999	90.4*	52 (17)	**0.675**	0.004	**0.366**	**0.269**	**0.202**	**0.141**
2000	96.4	61 (31)	**0.584**	0.006	**0.373**	**0.357**	**0.250**	**0.191**
2001	98.9	62 (41)	**0.581**	0.006	**0.438**	**0.422**	**0.295**	**0.222**
2002	91.2	82 (49)	**1.254**	0.009	**0.551**	**0.526**	**0.385**	**0.272**
2003	98.9	69 (42)	**0.658**	0.007	**0.503**	**0.493**	**0.312**	**0.217**
2004	97.5	61 (36)	**0.888**	0.007	**0.665**	**0.444**	**0.302**	**0.207**
2005	93.7*	78 (49)	**0.964**	0.009	**0.663**	**0.512**	**0.395**	**0.271**
2006	97.0	49 (25)	**0.567**	0.005	**0.398**	**0.356**	**0.246**	**0.176**
2007	96.7	60 (31)	**0.608**	0.007	**0.408**	**0.375**	**0.282**	**0.185**
2008	97.0	67 (38)	**0.751**	0.007	**0.528**	**0.482**	**0.289**	**0.203**
2009	96.7	42 (25)	**1.013**	0.006	**0.582**	**0.481**	**0.286**	**0.126**
2010	97.0	47 (19)	**0.669**	0.005	**0.413**	**0.392**	**0.248**	**0.146**
2011	84.1*	48 (22)	**0.502**	0.006	**0.426**	**0.348**	**0.236**	**0.173**
2012	99.5	57 (30)	**0.670**	0.005	**0.434**	**0.410**	**0.274**	**0.165**
2013	96.7	57 (34)	**0.594**	0.006	**0.398**	**0.375**	**0.311**	**0.191**
2014	97.0	48 (20)	**0.622**	0.005	**0.429**	**0.352**	**0.206**	**0.131**
2015	100.0	69 (30)	**0.577**	0.006	**0.466**	**0.371**	**0.260**	**0.164**
2016	100.0	67 (32)	**0.717**	0.007	**0.478**	**0.438**	**0.286**	**0.180**
2017	99.7	50 (24)	**0.958**	0.005	**0.384**	**0.319**	**0.254**	**0.136**
2018	98.6	66 (26)	**0.527**	0.006	**0.359**	**0.266**	**0.227**	**0.171**
2019	99.5	37 (15)	**0.508**	0.004	**0.350**	**0.256**	**0.196**	**0.116**
2020	*41.8**	*23 (8)*	***0.341***	*i.d.*	***0.277***	***0.235***	***0.153***	*0.040*

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for SO_2 (until 2020): 0.20 ppm (1-hour average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.10 ppm (1-hour average).
AAQ NEPM goal for SO_2 (until 2020): 1-hour standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-hour standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-hour standard in place until 2020.

Table 49. Percentiles of daily 1-day average SO_2 concentrations at Flinders View (1999–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1999	96.4	0 (0)	0.009	0.002	0.007	0.007	0.005	0.004
2000	89.9	0 (0)	0.013	0.002	0.012	0.008	0.006	0.005
2001	99.5	0 (0)	0.014	0.001	0.007	0.006	0.004	0.003
2002	97.0	0 (0)	0.006	0.001	0.006	0.005	0.003	0.003
2003	96.4	0 (0)	0.006	0.001	0.005	0.004	0.003	0.002
2004	99.5	0 (0)	0.007	0.001	0.006	0.005	0.003	0.003
2005	100.0	0 (0)	0.006	0.001	0.004	0.004	0.002	0.002
2006	99.7	0 (0)	0.007	0.001	0.006	0.004	0.004	0.003
2007	99.5	0 (0)	0.006	0.001	0.004	0.004	0.003	0.002
2008	98.6	0 (0)	0.006	0.001	0.005	0.004	0.003	0.002
2009	97.5	0 (0)	0.007	0.001	0.005	0.004	0.003	0.002
2010	99.5	0 (0)	0.008	0.001	0.004	0.003	0.003	0.002
2011	95.6	0 (0)	0.005	0.001	0.004	0.003	0.002	0.002
2012	100.0	0 (0)	0.004	0.001	0.003	0.003	0.002	0.002
2013	100.0	0 (0)	0.003	0.001	0.002	0.002	0.002	0.002
2014	96.4	0 (0)	0.002	0.000	0.001	0.001	0.001	0.001
2015	100.0	0 (0)	0.002	0.000	0.001	0.001	0.001	0.001
2016	99.7	0 (0)	0.002	0.001	0.002	0.002	0.001	0.001
2017	98.6	0 (0)	0.002	0.001	0.002	0.002	0.002	0.002
2018	98.9	0 (0)	0.003	0.001	0.002	0.002	0.002	0.002
2019	99.7	0 (0)	0.002	0.000	0.001	0.001	0.001	0.001
2020	99.7	0 (0)	0.001	0.000	0.001	0.001	0.001	0.001
2021	99.7	0 (0)	0.001	0.000	0.001	0.001	0.001	0.001
2022	100.0	0 (0)	0.001	0.000	0.001	0.001	0.001	0.001
2023	100.0	0 (0)	0.002	0.000	0.001	0.001	0.001	0.001
2024	95.1	0 (0)	0.001	0.000	0.001	0.001	0.001	0.001

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for SO_2 (until 2020): 0.08 ppm (1-day average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.02 ppm (1-day average).
AAQ NEPM goal for SO_2 (until 2020): 1-day standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-day standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-day standard in place until 2020.

Table 50. Percentiles of daily 1-day average SO_2 concentrations at South Gladstone (1998–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1998	97.5	0 (0)	0.012	0.001	0.010	0.007	0.005	0.003
1999	94.2	0 (0)	0.009	0.002	0.008	0.006	0.005	0.004
2000	84.7*	1 (0)	**0.022**	0.001	0.008	0.006	0.004	0.003
2001	98.1	0 (0)	0.006	0.001	0.005	0.004	0.003	0.002
2002	94.5	1 (0)	**0.029**	0.001	0.006	0.005	0.004	0.003
2003	93.2	0 (0)	0.013	0.001	0.011	0.007	0.005	0.003
2004	96.4	0 (0)	0.007	0.001	0.006	0.006	0.004	0.003
2005	98.9	0 (0)	0.011	0.002	0.009	0.006	0.004	0.004
2006	97.5	0 (0)	0.019	0.003	0.014	0.011	0.008	0.006
2007	97.5	1 (0)	**0.021**	0.002	0.012	0.010	0.007	0.005
2008	97.0	0 (0)	0.018	0.002	0.010	0.009	0.006	0.005
2009	93.7	0 (0)	0.009	0.002	0.008	0.007	0.006	0.004
2010	98.4	0 (0)	0.010	0.002	0.009	0.007	0.005	0.004
2011	97.3	0 (0)	0.011	0.003	0.011	0.009	0.008	0.005
2012	99.5	0 (0)	0.010	0.002	0.009	0.008	0.006	0.005
2013	95.3	0 (0)	0.013	0.002	0.010	0.008	0.006	0.004
2014	99.7	0 (0)	0.014	0.002	0.013	0.011	0.008	0.005
2015	95.1	0 (0)	0.013	0.002	0.012	0.010	0.008	0.005
2016	97.8	0 (0)	0.012	0.002	0.011	0.010	0.007	0.005
2017	99.2	0 (0)	0.011	0.002	0.009	0.008	0.005	0.004
2018	97.3	0 (0)	0.010	0.002	0.009	0.008	0.006	0.005
2019	97.3	0 (0)	0.013	0.002	0.010	0.010	0.007	0.006
2020	98.6	0 (0)	0.017	0.002	0.010	0.009	0.008	0.005
2021	100.0	0 (0)	0.012	0.002	0.009	0.009	0.006	0.004
2022	100.0	0 (0)	0.015	0.002	0.012	0.010	0.007	0.005
2023	99.5	0 (0)	0.013	0.002	0.011	0.010	0.007	0.005
2024	99.5	0 (0)	0.011	0.002	0.010	0.009	0.006	0.004

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for SO_2 (until 2020): 0.08 ppm (1-day average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.02 ppm (1-day average).
AAQ NEPM goal for SO_2 (until 2020): 1-day standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-day standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-day standard in place until 2020.

Table 51. Percentiles of daily 1-day average SO_2 concentrations at Pimlico (2005–2016)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2005	*18.1**	*0 (0)*	*0.001*	*i.d.*	*0.001*	*0.001*	*0.001*	*0.000*
2006	96.2	0 (0)	0.003	0.000	0.002	0.002	0.002	0.001
2007	97.0	0 (0)	0.003	0.001	0.003	0.002	0.002	0.001
2008	98.9	0 (0)	0.001	0.000	0.001	0.001	0.001	0.000
2009	95.1	0 (0)	0.003	0.000	0.002	0.001	0.001	0.001
2010	90.1*	0 (0)	0.003	0.000	0.003	0.003	0.002	0.001
2011	94.2	0 (0)	0.006	0.001	0.006	0.005	0.004	0.003
2012	99.5	0 (0)	0.003	0.001	0.002	0.002	0.002	0.001
2013	94.8	0 (0)	0.002	0.000	0.001	0.001	0.001	0.001
2014	99.7	0 (0)	0.002	0.001	0.002	0.002	0.001	0.001
2015	99.5	0 (0)	0.003	0.001	0.003	0.002	0.001	0.001
2016	*16.1*	*0 (0)*	*0.001*	*i.d.*	*0.001*	*0.001*	*0.001*	*0.001*

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for SO_2 (until 2020): 0.08 ppm (1-day average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.02 ppm (1-day average).
AAQ NEPM goal for SO_2 (until 2020): 1-day standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-day standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-day standard in place until 2020.

Table 52. Percentiles of daily 1-day average SO_2 concentrations at North Ward (2018–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2018	95.3	0 (0)	0.002	0.001	0.002	0.001	0.001	0.001
2019	86.3*	0 (0)	0.001	0.000	0.001	0.001	0.001	0.001
2020	96.2	0 (0)	0.001	0.000	0.001	0.001	0.001	0.001
2021	97.0	0 (0)	0.001	0.000	0.001	0.001	0.001	0.000
2022	100.0	0 (0)	0.001	0.000	0.001	0.001	0.000	0.000
2023	98.1	0 (0)	0.001	0.000	0.001	0.001	0.001	0.001
2024	95.6	0 (0)	0.001	0.000	0.001	0.001	0.000	0.000

* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for SO_2 (until 2020): 0.08 ppm (1-day average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.02 ppm (1-day average).
AAQ NEPM goal for SO_2 (until 2020): 1-day standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-day standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-day standard in place until 2020.

Table 53. Percentiles of daily 1-day average SO_2 concentrations at The Gap (2009–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2009	80.3*	13 (0)	**0.073**	0.004	**0.047**	**0.027**	0.018	0.011
2010	98.6	24 (0)	**0.060**	0.003	**0.043**	**0.035**	**0.024**	0.014
2011	97.3	28 (0)	**0.060**	0.005	**0.044**	**0.042**	**0.028**	0.017
2012	93.2	23 (0)	**0.075**	0.004	**0.052**	**0.042**	**0.027**	0.014
2013	89.9	25 (0)	**0.071**	0.005	**0.060**	**0.042**	**0.032**	0.017
2014	94.2	16 (0)	**0.059**	0.004	**0.041**	**0.031**	0.020	0.012
2015	99.7	30 (0)	**0.056**	0.004	**0.039**	**0.035**	**0.027**	0.015
2016	94.8	25 (0)	**0.058**	0.005	**0.046**	**0.036**	**0.027**	0.015
2017	97.0	21 (0)	**0.053**	0.005	**0.051**	**0.046**	**0.024**	0.014
2018	96.2	22 (0)	**0.054**	0.004	**0.044**	**0.035**	**0.023**	0.015
2019	98.1	10 (0)	**0.044**	0.002	**0.034**	**0.030**	0.015	0.008
2020	91.3	23 (0)	**0.055**	0.004	**0.044**	**0.035**	**0.026**	0.013
2021	96.2	33 (0)	**0.071**	0.006	**0.060**	**0.047**	**0.030**	0.020
2022	93.4	25 (0)	**0.058**	0.004	**0.051**	**0.043**	**0.027**	0.015
2023	77.8*	10 (0)	**0.039**	0.003	**0.030**	**0.027**	0.019	0.011
2024	99.7	10 (0)	**0.040**	0.003	**0.030**	**0.024**	0.015	0.010

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for SO_2 (until 2020): 0.08 ppm (1-day average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.02 ppm (1-day average).
AAQ NEPM goal for SO_2 (until 2020): 1-day standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-day standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-day standard in place until 2020.

Table 54. Percentiles of daily 1-day average SO_2 concentrations at Menzies (1995–2020)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1995	98.9	15 (0)	0.049	0.005	0.036	0.028	0.018	0.012
1996	98.6	26 (0)	0.049	0.005	0.043	0.040	0.024	0.015
1997	98.9	7 (0)	0.034	0.003	0.028	0.022	0.016	0.010
1998	*48.8**	*16 (0)*	*0.055*	*i.d.*	*0.041*	*0.037*	*0.029*	*0.019*
1999	90.4*	20 (0)	0.049	0.004	0.036	0.032	0.024	0.015
2000	96.4	31 (0)	0.078	0.006	0.070	0.055	0.032	0.019
2001	98.9	37 (0)	0.075	0.006	0.052	0.045	0.033	0.021
2002	91.2	55 (1)	**0.081**	0.009	0.057	0.055	0.043	0.033
2003	98.9	53 (2)	**0.093**	0.007	0.067	0.057	0.036	0.022
2004	97.5	30 (1)	**0.100**	0.007	0.069	0.050	0.034	0.017
2005	91.8*	53 (2)	**0.091**	0.009	0.069	0.060	0.044	0.032
2006	93.7	32 (0)	0.065	0.005	0.054	0.045	0.032	0.018
2007	94.5	42 (1)	**0.199**	0.007	0.060	0.046	0.036	0.023
2008	96.2	42 (1)	**0.089**	0.007	0.064	0.056	0.037	0.025
2009	95.1	25 (2)	**0.088**	0.006	0.056	0.051	0.032	0.015
2010	97.0	30 (1)	**0.094**	0.005	0.058	0.043	0.028	0.015
2011	84.1*	23 (0)	0.060	0.006	0.053	0.047	0.029	0.016
2012	99.5	27 (0)	0.063	0.005	0.056	0.055	0.031	0.016
2013	96.7	37 (1)	**0.091**	0.006	0.063	0.057	0.037	0.021
2014	97.0	31 (1)	**0.096**	0.005	0.048	0.039	0.030	0.017
2015	100.0	32 (2)	**0.106**	0.006	0.047	0.044	0.034	0.019
2016	100.0	46 (1)	**0.111**	0.007	0.062	0.056	0.038	0.025
2017	99.7	31 (0)	0.080	0.005	0.058	0.040	0.029	0.017
2018	98.6	37 (0)	0.066	0.006	0.051	0.041	0.033	0.021
2019	99.5	21 (0)	0.053	0.004	0.037	0.035	0.022	0.014
2020	*41.8**	*18 (0)*	*0.065*	*i.d.*	*0.047*	*0.044*	*0.021*	*0.005*

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for SO_2 (until 2020): 0.08 ppm (1-day average); 0.02 ppm (1-year average).
AAQ NEPM standard for SO_2 (from 2021): 0.02 ppm (1-day average).
AAQ NEPM goal for SO_2 (until 2020): 1-day standard exceeded on no more than one day per year.
AAQ NEPM goal for SO_2 (from 2021): standard not to be exceeded.
[a] First value shows number of exceedances of the 1-day standard adopted in 2021. Value in brackets shows number of exceedances of the previous 1-day standard in place until 2020.

PM_{10}

Table 55. 2024 percentiles of daily 1-day average PM_{10} concentrations

Region/performance monitoring station	Data availability (% of days)	Maximum (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
South East Queensland								
North Coast sub-region								
Mountain Creek	100.0	32.4	28.6	26.2	22.8	20.1	17.0	13.8
Brisbane sub-region								
Rocklea	97.0	40.9	30.3	27.1	23.2	20.1	17.1	13.3
Springwood	100.0	**66.1**	44.9	32.8	27.5	23.4	19.3	15.3
Gold Coast sub-region								
Southport	100.0	30.8	28.5	27.1	24.4	22.1	17.7	14.1
Ipswich sub-region								
Flinders View	96.2	44.5	32.4	29.9	26.1	21.2	17.0	13.7
Toowoomba								
Toowoomba	99.2	38.1	27.7	26.7	22.6	19.7	15.9	12.1
Maryborough – Hervey Bay								
Maryborough	95.6	33.8	28.7	24.5	21.2	20.1	17.2	14.0
Gladstone								
South Gladstone	100.0	**51.5**	36.1	29.4	25.4	22.5	19.0	15.3
Mackay								
West Mackay	99.7	35.6	30.0	27.5	25.6	23.4	19.7	17.1
Townsville								
North Ward	96.5	39.9	29.6	27.0	24.1	22.1	18.4	15.4
Cairns								
Woree	100.0	53.2	35.1	30.7	23.1	21.4	17.7	14.7
Mount Isa								
The Gap	100.0	**81.8**	**54.8**	**44.8**	29.6	24.4	18.2	12.9

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
† Monitoring by TEOM Model 1405DF instrumentation fitted with FDMS.
‡ Monitoring by TAPI T640X optical aerosol spectrometer.
AAQ NEPM standard for PM_{10}: 50 µg/m3 (1-day average).
AAQ NEPM goal for PM_{10}: standard not to be exceeded (excluding exceptional events).

Table 56. Percentiles of daily 1-day average PM_{10} concentrations at Mountain Creek (2001–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2001	*47.9**	*1*	***50.8***	*i.d.*	*39.9*	*38.1*	*27.2*	*23.8*
2002	88.2*	8	**146.9**	19.1	**76.0**	**56.3**	36.6	28.1
2003	99.5	1	**69.0**	15.1	37.0	32.4	27.4	22.4
2004	96.7	1	**66.6**	15.4	39.2	34.6	29.1	23.3
2005	95.9	2	**62.9**	14.5	37.6	29.7	24.4	20.3
2006	98.9	0	39.8	14.6	33.3	28.4	23.9	20.9
2007	98.9	0	41.9	14.6	34.4	31.1	24.0	21.1
2008	93.4	1	**53.3**	15.8	42.4	35.3	27.6	23.4
2009	97.5	8	**863.8**	20.2	**116.25**	**63.0**	35.6	24.7
2010	97.0	0	33.7	13.1	25.2	23.8	21.3	18.9
2011	97.0	0	49.5	13.2	29.5	28.3	21.7	19.3
2012	95.1	1	**57.1**	13.7	37.8	31.1	24.7	20.9
2013	98.6	1	**78.1**	15.8	38.7	30.6	26.6	24.0
2014	97.8	1	**59.5**	14.5	32.8	28.4	25.1	21.2
2015	98.4	0	44.8	13.8	29.6	26.6	21.8	19.5
2016	97.5	0	38.8	16.0	31.7	28.3	25.6	23.0
2017	96.7	0	37.5	17.5	34.7	31.0	28.8	25.2
2018	98.4	5	**94.6**	19.6	**65.5**	39.7	32.7	29.2
2019	98.9	15	**259.1**	22.9	**80.9**	**66.0**	47.1	36.0
2020	98.6	3	**77.6**	16.0	49.2	33.0	27.1	23.4
2021	99.7	0	27.8	14.9	26.5	25.6	22.7	20.0
2022	99.7	0	36.9	15.5	33.9	30.7	25.7	21.9
2023	100.0	0	45.0	14.9	31.5	27.4	23.1	20.5
2024	100.0	0	32.4	14.5	28.6	26.2	22.8	20.1

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for PM_{10}: 50 µg/m^3 (1-day average); 25 µg/m^3 (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 57. Percentiles of daily 1-day average PM_{10} concentrations at Rocklea (1998–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1998	91.2	0	32.8	17.0	30.6	28.1	25.4	23.3
1999	96.4	1	**56.7**	15.7	31.4	27.9	25.4	22.2
2000	92.6	0	47.5	17.8	40.5	37.1	31.4	26.5
2001	97.3	1	**70.8**	16.8	34.8	32.1	26.5	24.2
2002	99.2	8	**177.3**	20.2	**82.2**	49.0	32.9	29.6
2003	98.1	2	**119.9**	16.4	40.4	33.4	28.3	24.2
2004	92.6	0	47.3	19.1	40.8	38.1	33.3	28.2
2005	89.9	2	**52.6**	16.9	39.8	36.2	27.0	23.3
2006	96.2	0	39.5	16.1	31.5	29.4	26.8	23.8
2007	99.2	1	**53.4**	17.5	39.1	36.6	31.7	26.3
2008	95.1	1	**86.8**	16.7	39.6	36.4	28.9	24.8
2009	97.3	9	**1033.4**	**25.2**	**109.2**	**64.6**	40.3	35.1
2010	96.7	0	38.0	16.7	30.5	27.8	25.3	22.6
2011	*2.7**	*0*	*20.4*	*i.d.*	*20.3*	*20.2*	*19.9*	*19.3*
2012	*56.3**	*0*	*41.0*	*i.d.*	*34.8*	*34.6*	*26.7*	*22.8*
2013	85.8	0	32.2	14.2	29.8	27.3	24.0	21.0
2014	94.8	0	31.6	14.0	30.4	29.7	23.4	21.1
2015	96.2	0	44.0	14.9	31.1	27.4	24.2	21.5
2016	90.7	0	31.2	15.1	29.5	27.1	24.4	21.7
2017	99.7	0	43.2	14.3	30.2	27.7	25.1	21.0
2018	96.2	5	**137.2**	15.0	**55.2**	34.9	27.1	22.7
2019	98.1	16	**225.7**	19.8	**130.1**	**68.3**	49.1	34.7
2020	94.0	2	**72.4**	13.1	32.0	28.3	21.7	18.6
2021	98.9	0	26.5	10.1	21.1	19.1	17.4	15.2
2022	77.5*	0	30.9	12.8	27.5	25.3	22.9	20.2
2023	100.0	0	37.6	16.5	33.4	31.7	27.2	23.2
2024	97.0	0	40.9	13.7	30.3	27.1	23.2	20.1

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for PM_{10}: 50 µg/m^3 (1-day average); 25 µg/m^3 (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 58. Percentiles of daily 1-day average PM_{10} concentrations at Flinders View (1999–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1999	95.3	0	44.2	12.3	27.4	25.1	19.7	17.5
2000	97.3	1	**62.8**	16.6	39.2	36.2	31.3	26.0
2001	99.7	0	42.5	15.1	36.5	32.9	25.4	22.4
2002	97.3	7	**197.2**	19.8	**92.1**	47.0	36.2	30.3
2003	94.8	1	**119.1**	15.7	35.3	30.6	26.1	23.1
2004	99.2	3	**64.1**	18.5	39.1	37.4	32.2	28.5
2005	97.0	3	**64.3**	16.1	43.5	40.1	26.8	23.6
2006	100.0	0	35.7	14.7	29.4	28.5	25.3	22.4
2007	99.2	0	44.6	15.7	38.4	34.3	27.5	23.3
2008	99.2	2	**68.5**	14.6	44.7	36.0	26.3	21.1
2009	98.6	8	**1001.8**	21.2	**100.7**	**54.0**	32.1	26.9
2010	99.2	0	33.9	12.2	25.5	24.2	20.2	18.3
2011	99.2	2	**67.0**	14.1	32.8	29.7	22.2	19.9
2012	98.4	2	**73.8**	15.0	42.2	35.3	27.2	23.1
2013	99.2	0	42.2	15.0	32.3	29.8	24.9	22.0
2014	94.8	0	38.8	15.9	35.7	33.3	28.9	24.6
2015	99.7	0	44.5	14.6	34.5	31.4	24.5	21.8
2016	98.6	0	34.0	13.1	31.4	28.1	24.2	20.2
2017	99.5	0	41.2	16.2	33.1	31.2	27.2	24.0
2018	97.3	6	**189.7**	20.0	**76.8**	50.0	37.7	29.1
2019	100.0	21	**271.2**	24.3	**141.8**	**84.6**	**57.1**	40.8
2020	98.9	4	**96.2**	17.6	**53.6**	39.1	28.9	25.6
2021	99.2	1	**59.3**	14.5	29.3	26.4	22.6	19.9
2022	98.9	0	29.2	14.1	26.7	25.3	22.9	19.8
2023	100.0	1	**84.9**	16.1	35.5	34.0	26.4	22.5
2024	96.2	0	44.5	14.7	32.4	29.9	26.1	21.1

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for PM_{10}: 50 µg/m³ (1-day average); 25 µg/m³ (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 59. Percentiles of daily 1-day average PM_{10} concentrations at North Toowoomba (2003–2010)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2003	*41.1**	*1*	***139.8***	*i.d.*	*42.0*	*35.2*	*33.2*	*30.1*
2004	98.9	1	**54.5**	17.0	47.8	42.1	35.4	29.7
2005	95.9	3	**111.7**	15.3	43.1	34.6	28.5	24.6
2006	92.9	1	**55.6**	15.8	39.3	33.2	30.0	25.9
2007	97.5	1	**51.5**	13.8	43.0	36.6	27.2	24.0
2008	95.9	4	**105.2**	14.7	**51.9**	46.5	30.2	25.8
2009	97.5	11	**1131.0**	23.3	**127.8**	**87.8**	41.7	32.2
2010	90.7*	0	35.1	12.6	31.8	27.1	23.1	20.9

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for PM_{10}: 50 µg/m^3 (1-day average); 25 µg/m^3 (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 60. Percentiles of daily 1-day average PM_{10} concentrations at South Gladstone (2000–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2000	*63.1**	*4*	***65.2***	*i.d.*	***54.8***	*44.5*	*32.0*	*28.2*
2001	95.6	4	**66.7**	17.7	47.4	35.9	30.4	25.8
2002	98.1	5	**197.1**	18.2	**75.1**	46.0	33.6	25.8
2003	96.4	0	41.3	15.5	36.1	33.4	26.2	23.6
2004	99.7	0	42.7	16.3	34.5	29.1	25.3	22.4
2005	97.8	4	**196.7**	16.9	48.5	32.7	26.4	22.8
2006	98.4	1	**54.6**	16.7	37.0	34.1	27.9	23.1
2007	96.7	0	38.8	15.7	29.5	28.3	25.1	22.7
2008	93.7	2	**65.6**	17.0	42.3	36.8	29.5	25.5
2009	83.0*	7	**252.3**	23.2	**80.8**	**54.1**	38.1	29.9
2010	78.4*	0	35.6	16.5	32.1	30.3	26.5	23.5
2011	76.7*	3	**136.7**	14.0	40.7	32.1	27.6	23.2
2012	88.5*	1	**63.0**	14.6	31.8	28.4	25.1	21.9
2013	95.3	0	37.6	16.8	30.3	28.8	25.5	23.0
2014	95.1	0	49.3	16.2	34.4	30.3	27.9	23.5
2015	93.4	0	31.5	12.9	26.6	25.9	22.0	19.8
2016	97.8	0	32.1	14.5	27.6	25.8	23.3	21.9
2017	92.1	0	40.2	13.9	27.3	25.3	21.6	19.5
2018	94.2	5	**80.3**	13.9	**70.0**	42.6	25.4	22.0
2019	97.3	10	**130.4**	15.9	**70.8**	**56.9**	36.9	26.6
2020	97.5	0	32.3	13.0	31.0	29.5	25.0	19.5
2021	97.0	0	27.5	12.1	25.0	23.2	19.4	17.9
2022	91.2	0	24.9	11.0	24.0	20.1	18.6	16.2
2023	99.5	1	**106.6**	18.0	42.9	38.8	30.5	25.9
2024	100	1	51.5	16.1	36.1	29.4	25.4	22.5

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for PM_{10}: 50 µg/m^3 (1-day average); 25 µg/m^3 (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 61. Percentiles of daily 1-day average PM_{10} concentrations at West Mackay (1999–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1999	93.2	1	**50.4**	17.3	37.6	32.2	27.7	25.6
2000	98.9	2	**51.6**	18.9	48.4	43.0	34.0	29.9
2001	98.6	2	**52.6**	22.0	48.5	42.8	37.9	33.5
2002	98.6	5	**475.4**	24.6	**51.2**	46.4	37.4	33.1
2003	92.3	7	**85.0**	21.5	**53.2**	49.1	38.9	32.2
2004	97.3	0	45.3	20.7	39.6	37.7	33.6	29.6
2005	97.0	7	**146.0**	22.0	**105.1**	**52.6**	36.3	31.1
2006	95.6	1	**106.0**	19.8	41.5	36.2	31.7	28.4
2007	95.6	2	**61.1**	21.6	49.1	46.1	38.5	33.1
2008	98.4	9	**94.0**	23.6	**61.4**	**53.1**	43.9	36.4
2009	97.5	18	**514.8**	**28.6**	**202.6**	**89.8**	**50.9**	40.8
2010	83.0*	0	44.0	18.5	41.4	35.8	30.7	27.1
2011	92.9	1	**65.8**	19.9	41.8	39.4	36.2	30.2
2012	98.9	1	**64.9**	17.8	40.0	37.4	27.6	24.3
2013	96.4	0	42.4	18.5	36.4	30.1	26.4	24.5
2014	91.2	0	34.3	18.2	29.0	27.9	25.2	24.0
2015	91.8	0	46.5	22.0	41.9	37.8	34.1	29.5
2016	97.5	0	44.5	19.8	34.4	33.1	28.4	27.0
2017	90.4	3	69.0	21.6	45.4	42.4	37.0	32.7
2018	94.5	5	**127.3**	22.4	**54.9**	44.2	35.9	29.7
2019	98.1	10	**238.5**	24.1	**85.3**	**75.6**	36.3	31.0
2020	100.0	0	39.4	17.0	31.8	30.0	25.4	23.7
2021	100.0	0	43.5	16.8	34.5	28.1	25.2	22.8
2022	98.9	0	33.9	16.7	28.2	27.3	23.4	22.3
2023	96.7	0	48.6	18.3	34.7	33.0	27.8	24.2
2024	99.7	0	35.6	17.2	30.1	27.5	25.6	23.4

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for PM_{10}: 50 µg/m^3 (1-day average); 25 µg/m^3 (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 62. Percentiles of daily 1-day average PM_{10} concentrations at Pimlico (2004–2016)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2004	*52.2**	*0*	*28.1*	*i.d.*	*27.0*	*25.9*	*23.2*	*21.4*
2005	91.8	5	**141.9**	16.1	**113.0**	31.7	23.4	20.5
2006	89.6*	2	**61.5**	14.6	28.3	24.0	22.2	20.1
2007	94.0	0	29.1	12.9	26.9	24.2	20.5	18.3
2008	97.0	1	**50.6**	16.4	36.1	32.6	29.3	23.9
2009	93.4	9	**460.4**	21.2	**302.2**	**121.5**	33.9	23.6
2010	80.3*	0	31.5	13.9	29.3	25.6	22.8	19.4
2011	93.7	1	**64.9**	15.4	33.9	31.8	27.7	22.3
2012	92.1	0	30.0	12.9	26.3	23.6	21.5	18.8
2013	95.1	0	27.6	15.1	27.0	26.1	24.4	22.5
2014	98.4	0	29.4	15.1	27.7	26.2	23.1	20.6
2015	91.2	0	42.0	17.6	36.6	32.6	26.7	24.1
2016	*11.7**	*0*	*33.4*	*i.d.*	*33.4*	*33.4*	*32.5*	*24.5*

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for PM_{10}: 50 µg/m^3 (1-day average); 25 µg/m^3 (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 63. Percentiles of daily 1-day average PM_{10} concentrations at North Ward (2018–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2018	94.5	0	42.3	15.0	37.6	26.8	23.5	20.4
2019	94.0	8	**277.4**	20.2	**79.9**	**56.1**	34.7	26.6
2020	92.3	0	35.6	16.2	32.7	30.6	26.7	23.7
2021	100.0	1	**60.0**	16.3	31.1	30.1	25.9	23.4
2022	100.0	0	41.1	15.2	28.7	26.8	24.2	21.4
2023	98.6	0	47.3	16.3	34.5	29.8	27.2	22.8
2024	96.5	0	39.9	15.6	29.6	27.0	24.1	22.1

Bold text indicates a value greater than the AAQ NEPM standard.
AAQ NEPM standards for PM_{10}: 50 µg/m^3 (1-day average); 25 µg/m^3 (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 64. Percentiles of daily 1-day average PM_{10} concentrations at The Gap (2009–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2009	*63.3**	*19*	***508.5***	*i.d.*	***283.6***	***135.6***	***67.8***	*45.8*
2010	75.1*	0	32.1	8.9	25.7	23.9	18.8	15.8
2011	87.4*	13	**124.0**	17.3	**91.2**	**71.5**	42.6	32.4
2012	99.2	16	**74.5**	19.5	**59.3**	**56.7**	49.2	38.8
2013	79.7*	13	**154.1**	23.1	**137.0**	**67.7**	45.9	37.5
2014	96.7	12	**153.7**	20.4	**80.0**	**57.7**	43.4	33.6
2015	98.1	6	**153.3**	19.5	**56.9**	50.0	39.5	31.5
2016	95.6	1	**350.8**	16.8	43.3	41.1	31.5	26.5
2017	98.1	3	**89.7**	18.2	43.3	37.9	32.3	27.6
2018	96.7	15	**389.9**	23.9	**124.2**	**84.7**	47.3	38.4
2019	96.2	33	**390.5**	**29.5**	**79.9**	**56.1**	34.7	26.6
2020	98.6	14	**184.2**	20.2	**70.3**	**58.1**	48.5	32.7
2021	98.9	6	**153.5**	18.4	**75.1**	48.3	35.2	28.5
2022	98.4	1	**52.1**	13.4	37.4	31.3	24.1	20.5
2023	100.0	9	**76.9**	17.0	**64.1**	**56.1**	33.8	26.0
2024	100.0	7	**81.8**	15.4	**54.8**	**44.8**	29.6	24.4

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standards for PM_{10}: 50 µg/m³ (1-day average); 25 µg/m³ (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 65. Percentiles of daily 1-day average PM_{10} concentrations at Woree (2023-2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2023	78.9*	0	32.2	15.2	30.8	26.6	22.8	19.8
2024	100.0	1	53.2	15.6	35.1	30.7	23.1	21.4

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
AAQ NEPM standards for PM_{10}: 50 µg/m^3 (1-day average); 25 µg/m^3 (1-year average).
AAQ NEPM goal for PM_{10} (prior to 2016): 1-year standard not to be exceeded; 1-day standard exceeded on no more than five days per year.
AAQ NEPM goal for PM_{10} (from 2016): standards not to be exceeded (excluding exceptional events for 1-day standard).

$PM_{2.5}$

Table 66. 2024 percentiles of daily 1-day average $PM_{2.5}$ concentrations

Region/performance monitoring station	Data availability (% of days)	Maximum (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
South East Queensland								
North Coast sub-region								
Mountain Creek	100.0	14.3	12.1	11.0	9.5	8.2	6.6	5.2
Brisbane sub-region								
Rocklea	96.7	22.3	18.5	177	12.6	9.8	7.5	5.7
Springwood	100.0	**50.5**	29.4	16.5	13.3	9.9	7.3	5.7
Gold Coast sub-region								
Southport	100.0	18.8	14.9	13.6	9.5	8.5	6.4	5.3
Ipswich sub-region								
Flinders View	96.2	**28.3**	18.6	17.2	14.0	10.1	7.2	5.4
Toowoomba								
Toowoomba	99.2	25.2	16.4	14.6	11.0	9.0	6.5	4.9
Maryborough – Hervey Bay								
Maryborough	95.6	24.4	13.9	11.2	9.8	8.4	7.1	5.6
Gladstone								
South Gladstone	100.0	14.2	11.6	10.4	8.9	8.0	6.5	5.4
Mackay								
West Mackay	99.7	11.7	11.0	10.8	9.4	8.2	7.0	5.8
Townsville								
North Ward	96.4	14.5	12.8	10.3	8.5	7.8	6.7	5.5
Cairns								
Woree	100.0	**34.2**	16.6	10.7	8.7	8.0	6.5	5.6
Mount Isa								
The Gap	100.0	**65.6**	**31.1**	**26.6**	16.6	10.5	6.5	4.3

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
† Monitoring by TEOM Model 1405DF instrumentation fitted with FDMS.
‡ Monitoring by TAPI T640X optical aerosol spectrometer.
AAQ NEPM standard for $PM_{2.5}$: 25 µg/m^3 (1-day average).
AAQ NEPM goal for $PM_{2.5}$: 1-day standard not to be exceeded (excluding exceptional events).

Table 67. Percentiles of daily 1-day average $PM_{2.5}$ concentrations at Rocklea (1998–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1998	80.8*	0	16.1	3.5	11.1	9.2	7.7	6.0
1999	88.8*	0	14.5	5.0	13.3	12.4	10.3	8.3
2000	95.6	3	**37.4**	5.8	20.2	17.7	13.3	10.9
2001	98.6	3	**95.4**	5.5	18.4	17.1	12.3	9.2
2002	96.4	3	**45.3**	6.1	22.0	17.1	12.8	10.9
2003	87.7*	1	**34.7**	5.1	23.3	13.9	10.6	8.6
2004	93.7	5	**32.9**	6.5	**28.7**	24.4	17.9	11.6
2005	90.1*	0	15.3	4.6	13.0	12.2	9.6	8.1
2006	95.3	0	14.2	4.1	13.7	11.1	8.6	7.1
2007	99.7	0	20.5	4.4	17.6	13.5	10.6	8.5
2008	95.3	0	11.6	3.8	9.8	9.5	7.8	6.9
2009	92.6	7	**163.6**	**10.9**	**34.3**	**25.7**	21.5	18.0
2010	96.7	0	23.2	**8.2**	17.4	15.3	13.6	12.0
2011	*2.7**	*0*	*8.8*	*i.d.*	*8.8*	*8.8*	*8.8*	*8.8*
2012	*56.3**	*0*	*23.7*	*i.d.*	*22.8*	*16.7*	*13.9*	*11.3*
2013	85.8	0	17.2	6.6	16.4	14.7	12.0	10.3
2014	94.8	0	21.9	5.8	19.1	15.5	13.0	9.6
2015	96.2	0	20.3	7.3	16.6	15.8	13.5	11.5
2016	90.7	0	19.9	6.5	16.7	15.2	13.4	10.7
2017	99.7	1	**28.9**	7.3	19.5	17.3	13.8	11.9
2018	96.2	2	**34.7**	6.4	23.5	16.0	14.0	11.1
2019	98.1	17	**108.6**	**8.7**	**43.0**	**37.3**	24.7	15.6
2020	94.0	0	22.6	6.0	18.5	16.4	11.4	9.3
2021	98.4	0	17.9	4.6	11.8	10.4	9.2	7.6
2022	77.8*	0	17.5	6.1	16.0	14.9	13.2	10.7
2023	100.0	0	24.6	8.0	17.4	16.3	15.3	12.6
2024	97.0	0	22.3	6.2	18.5	17.7	12.6	9.8

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
Monitoring by TEOM Model 1400 instrumentation in accordance with Technical Paper on Monitoring for Particles as $PM_{2.5}$ from 1998 to 2008. Monitoring by TEOM Model 1405 instrumentation fitted with FDMS since 2009.
AAQ NEPM standards for $PM_{2.5}$: 25 µg/m^3 (1-day average); 8 µg/m^3 (1-year average).
AAQ NEPM goal for $PM_{2.5}$: standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 68. Percentiles of daily 1-day average $PM_{2.5}$ concentrations at Springwood (1999–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
1999	82.7*	0	22.3	4.3	12.9	11.8	8.7	7.1
2000	96.7	6	**35.4**	6.4	**28.9**	23.6	17.3	13.2
2001	97.0	0	19.4	5.3	18.0	16.2	11.8	9.1
2002	95.9	5	**38.9**	6.2	**28.4**	20.1	14.9	11.7
2003	96.2	0	20.5	5.5	16.6	15.4	10.9	9.2
2004	98.4	0	21.7	5.5	16.9	15.4	11.7	9.5
2005	96.4	0	15.2	4.7	14.9	13.3	10.3	8.6
2006	94.0	1	**25.5**	4.8	20.1	15.3	9.3	7.9
2007	98.4	0	17.8	4.3	14.0	12.0	9.4	7.8
2008	96.7	0	10.9	4.1	9.9	8.8	7.9	6.7
2009	91.5	3	**150.6**	5.5	**25.3**	18.0	11.4	9.0
2010	83.3	0	19.4	4.4	12.8	10.7	8.4	7.4
2011	92.9	3	**51.2**	4.6	**29.3**	11.5	8.7	6.8
2012	98.1	0	23.7	4.4	15.6	13.3	10.2	7.5
2013	96.7	0	14.2	4.5	11.9	11.6	10.1	8.6
2014	97.3	0	17.6	4.9	14.8	13.1	10.0	8.0
2015	*71.0**	*0*	*12.6*	*i.d.*	*10.9*	*9.8*	*7.5*	*6.5*
2016	95.6	0	20.1	5.7	16.0	13.6	10.9	9.3
2017	100.0	0	23.9	5.4	15.0	13.8	11.6	9.8
2018	96.4	0	24.7	5.9	20.1	17.6	13.5	11.1
2019	96.4	13	**101.1**	6.7	**44.8**	**31.4**	19.3	13.0
2020	91.0	1	**28.1**	4.7	13.7	12.9	9.9	8.2
2021	98.1	0	15.6	4.8	11.5	10.7	9.8	8.0
2022	91.2	0	17.8	5.6	16.0	12.2	10.5	8.5
2023	98.9	0	24.1	6.2	20.2	16.8	11.9	9.1
2024	100.0	5	50.5	6.6	29.4	16.5	13.3	9.9

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
Monitoring by TEOM Model 1400 instrumentation in accordance with Technical Paper on Monitoring for Particles as $PM_{2.5}$ until 25 February 2016. From 25 February 2016, monitoring by TEOM Model 1405 instrumentation fitted with FDMS.
AAQ NEPM standards for $PM_{2.5}$: 25 µg/m^3 (1-day average); 8 µg/m^3 (1-year average).
AAQ NEPM goal for $PM_{2.5}$: standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 69. Percentiles of daily 1-day average $PM_{2.5}$ concentrations at North Toowoomba (2003–2007)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2003	*34.8**	*1*	***28.1***	*i.d.*	*19.0*	*17.1*	*15.3*	*12.1*
2004	98.6	1	**33.2**	5.1	19.1	17.3	14.6	11.7
2005	97.3	0	24.8	4.7	14.7	13.6	10.9	8.6
2006	93.2	0	16.0	4.1	15.3	12.0	9.6	7.9
2007	92.9	0	17.8	3.6	11.9	10.8	8.7	6.8

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
Monitoring by TEOM Model 1400 instrumentation in accordance with Technical Paper on Monitoring for Particles as $PM_{2.5}$.
AAQ NEPM standards for $PM_{2.5}$: 25 µg/m³ (1-day average); 8 µg/m³ (1-year average).
AAQ NEPM goal for $PM_{2.5}$: standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 70. Percentiles of daily 1-day average $PM_{2.5}$ concentrations at South Gladstone (2008–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2008	*13.9**	*0*	*15.2*	*i.d.*	*12.6*	*12.6*	*12.3*	*11.1*
2009	83.0*	7	**50.8**	**9.2**	**29.8**	**26.9**	17.7	13.8
2010	78.4*	0	17.5	6.2	16.3	14.8	12.9	9.9
2011	90.4*	9	**126.7**	7.6	**62.2**	**33.5**	16.4	12.0
2012	88.5*	1	**49.6**	5.2	21.4	12.1	9.5	7.5
2013	95.3	0	18.3	5.6	16.9	12.1	10.3	8.6
2014	95.1	1	**44.0**	6.0	14.6	12.8	10.9	9.4
2015	93.4	0	13.8	4.3	10.1	9.4	8.0	6.7
2016	97.8	0	15.9	5.7	14.8	13.2	10.3	8.4
2017	92.1	1	**28.6**	5.6	13.4	10.6	9.3	8.4
2018	94.2	7	**55.0**	5.5	**37.7**	**28.2**	9.8	8.4
2019	97.3	5	**40.2**	6.4	**31.8**	22.9	17.8	12.5
2020	97.5	0	18.1	5.6	16.0	14.4	11.2	9.0
2021	97.0	0	17.1	5.0	12.0	10.8	8.3	7.6
2022	98.4	0	11.7	4.4	10.7	8.5	7.4	6.4
2023	97.0	1	**47.4**	4.7	15.0	11.0	8.8	7.0
2024	100.0	0	14.2	5.6	11.6	10.4	8.9	8.0

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
Monitoring by TEOM Model 1405 instrumentation fitted with FDMS.
AAQ NEPM standards for $PM_{2.5}$: 25 µg/m^3 (1-day average); 8 µg/m^3 (1-year average).
AAQ NEPM goal for $PM_{2.5}$: standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 71. Percentiles of daily 1-day average $PM_{2.5}$ concentrations at North Ward (2018–2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2018	94.5	2	**30.7**	5.6	17.6	13.5	9.3	7.6
2019	94.0	4	**51.5**	7.0	**28.3**	19.6	13.8	10.3
2020	92.3	0	17.4	5.8	12.8	11.8	9.4	8.1
2021	100.0	0	15.3	5.8	13.7	10.9	9.2	8.1
2022	100.0	1	**26.3**	5.8	11.0	9.8	8.9	7.9
2023	98.6	1	**27.2**	6.2	15.4	13.2	10.7	9.1
2024	96.5	0	14.5	5.7	12.8	10.3	8.5	7.8

Bold text indicates a value greater than the AAQ NEPM standard.
Monitoring by TAPI T640X optical aerosol spectrometer.
AAQ NEPM standards for $PM_{2.5}$: 25 µg/m^3 (1-day average); 8 µg/m^3 (1-year average).
AAQ NEPM goal for $PM_{2.5}$: standards not to be exceeded (excluding exceptional events for 1-day standard).

Table 72. Percentiles of daily 1-day average $PM_{2.5}$ concentrations at Woree (2023-2024)

Year	Data availability (% of days)	No. of exceedances[a] (days)	Maximum (ppm)	Annual average (ppm)	Percentiles (ppm)			
					99th	98th	95th	90th
2023	78.9*	0	18.1	6.3	15.9	13.7	11.0	8.8
2024	100.0	1	34.2	5.8	16.6	10..6	8.7	8.0

Bold text indicates a value greater than the AAQ NEPM standard.
Monitoring by TAPI T640X optical aerosol spectrometer.
AAQ NEPM standards for $PM_{2.5}$: 25 µg/m^3 (1-day average); 8 µg/m^3 (1-year average).
AAQ NEPM goal for $PM_{2.5}$: standards not to be exceeded (excluding exceptional events for 1-day standard).

Lead

Table 73. Annual average lead concentrations at Woolloongabba (1980–2002)

Year	Data availability (% of days)	Annual average (µg/m³)
1980	91.8	**2.21**
1981	85.2*	**2.69**
1982	96.7	**2.34**
1983	96.7	**2.21**
1984	93.4	**2.56**
1985	86.9*	**2.40**
1986	100.0	**1.90**
1987	96.7	**1.91**
1988	98.4	**2.13**
1989	98.4	**1.64**
1990	98.4	**1.47**
1991	100.0	**0.97**
1992	90.2	**0.63**
1993	93.4	**0.57**
1994	96.7	0.48
1995	100.0	0.38
1996	98.4	0.25
1997	100.0	0.27
1998	*65.6**	*i.d.*
1999	98.3	0.19
2000	88.5	0.14
2001	93.4	0.03
2002	96.7	0.02

Bold text indicates a value greater than the AAQ NEPM standard.
* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standard for lead: 0.5 µg/m³ (1-year average).
AAQ NEPM goal for lead: standard not to be exceeded.

Table 74. Annual average lead concentrations at Townsville Coast Guard (2011–2023)

Year	Data availability (% of days)	Annual average (µg/m³)
2011	85.0*	0.14
2012	96.7	0.12
2013	88.5	0.24
2014	96.7	0.29
2015	91.8	0.16
2016	100.0	0.05
2017	91.8	0.09
2018	98.4	0.10
2019	100.0	0.18
2020	96.7	0.13
2021	95.0	0.17
2022	95.1	0.07
2023	62.7*	0.04

* Data availability less than 75% for one or more quarters.
AAQ NEPM standard for lead: 0.5 µg/m³ (1-year average).
AAQ NEPM goal for lead: standard not to be exceeded.

Table 75. Annual average lead concentrations at Townsville North Ward (2024)

Year	Data availability (% of days)	Annual average (µg/m³)
2024	100.0	0.01

AAQ NEPM standard for lead: 0.5 µg/m³ (1-year average).
AAQ NEPM goal for lead: standard not to be exceeded.

Table 76. Annual average lead concentrations at The Gap (2009–2024)

Year	Data availability (% of days)	Annual average (µg/m³)
2009	77.0*	0.13
2010	95.0	0.13
2011	96.7	0.14
2012	91.8	0.10
2013	*73.8**	*i.d.*
2014	91.8*	0.11
2015	100.0	0.09
2016	80.3*	0.06
2017	91.8	0.08
2018	98.3	0.10
2019	98.4	0.10
2020	100.0	0.09
2021	95.1	0.12
2022	100.0	0.10
2023	96.6	0.07
2024	100.0	0.11

* Data availability less than 75% for one or more quarters.
Years shown in italics have less than 75% annual data availability.
i.d. = insufficient data to calculate value.
AAQ NEPM standard for lead: 0.5 µg/m³ (1-year average).
AAQ NEPM goal for lead: standard not to be exceeded.

Section E – Population exposure

Clause 17 of the AAQ NEPM[10] requires jurisdictions to evaluate and report population exposures to particles as $PM_{2.5}$ from June 2018, and nitrogen dioxide and photochemical oxidants (as ozone) from June 2021.

Pending the development of a nationally consistent methodology for reporting annual population exposure, DETSI has adopted the following approach to determining population exposure:

Within a region individual sites where the pollutant is monitored (including non-AAQ NEPM reporting sites) are assigned a classification based on Australian/New Zealand Standard 3580.1.1:2016, being:

- peak (e.g. industry, roadside);
- neighbourhood (e.g. residential); or
- background (e.g. rural).

For $PM_{2.5}$ and nitrogen dioxide, the annual average concentrations from individual sites having the same classification are averaged to provide an indicative measure of annual population exposure for locations of this type within the region.

For ozone, the maximum 8-hour average ozone concentration measured across individual sites having the same classification for each day of the year is first determined. These values are then averaged to provide an indicative measure of annual population exposure for locations of this type within the region. The maximum 8-hour average ozone concentration measured during the year at sites of the same classification is also reported.

In some regions, DETSI's current monitoring network locations do not cover all three site classifications.

Queensland had a population of 5.609 million at 30 September 2024[11]. In 2024 $PM_{2.5}$ monitoring was undertaken in the following regions: South East Queensland (3.757 million residents), Gladstone (68,065 residents), Central Highlands (20,018 residents), Mackay (75,166 residents), Moranbah (9,973 residents), Townsville (204,541 residents), Cairns (178,104 residents) and Mount Isa (18,356 residents)[12].

$PM_{2.5}$

During 2024 DETSI undertook continuous $PM_{2.5}$ monitoring at 29 locations in Queensland where annual data availability was greater than 75 per cent. Monitoring was conducted using either a Thermo Scientific TEOM® 1405DF oscillating microbalance or a Teledyne API T640X optical

[10] available from www.legislation.gov.au/Details/F2021C00475.

[11] Queensland Government Statistician's Office, Population growth, Queensland, September quarter 2024. Accessed from www.qgso.qld.gov.au/statistics/theme/population/population-estimates/state-territories#current-release-population-growth-qld

[12] Queensland Government Statistician's Office, Population estimates - Regions - Estimated resident population (ERP). Accessed from www.qgso.qld.gov.au/statistics/theme/population/population-estimates/regions.

aerosol spectrometer instrument. Both instruments have US EPA equivalent method designation for measurement of $PM_{2.5}$.

The indicative annual exposure to $PM_{2.5}$ particles for residents in the different location classifications in the nine regions where $PM_{2.5}$ monitoring was conducted during 2024 is summarised in Table 77.

Table 77. Indicative annual population exposure to $PM_{2.5}$ for Queensland regions in 2024.

Region / Classification	Annual average population exposure		Number of monitoring stations	Air monitoring station locations
	µg/m³	% of standard		
South East Queensland				
Peak	6.2	77.5	4	Brisbane CBD‡, Cannon Hill‡, South Brisbane‡, Woolloongabba‡
Neighbourhood	5.9	73.8	9	Coomera‡, Deagon‡, Deception Bay‡, Flinders View†, Mountain Creek†, Parkwood‡, Rocklea†, Southport†, Springwood†
Background	6.7	83.8	2	Mutdapilly‡, North Maclean‡
Toowoomba				
Neighbourhood	5.5	68.8	1	Toowoomba†
Gladstone				
Peak	5.3	66.3	2	Boat Creek‡, Clinton‡
Neighbourhood	5.4	67.5	2	Boyne Island‡, South Gladstone†
Background	4.9	61.3	1	Targinie‡
Central Highlands				
Neighbourhood	5.7	71.3	2	Blackwater‡, Emerald‡
Mackay				
Neighbourhood	6.0	75.0	1	West Mackay†
Moranbah				
Neighbourhood	6.5	81.3	2	Moranbah (Cunningham Way)‡, Moranbah (Utah Drive)‡
Townsville				
Neighbourhood	5.6	70.0	1	North Ward†
Cairns				
Neighbourhood	5.8	72.5	1	Woree†
Mount Isa				
Neighbourhood	6.1	72.5	1	The Gap†

† AAQ NEPM performance monitoring site
‡ Non-AAQ NEPM performance monitoring site

Nitrogen dioxide

During 2024 DETSI undertook nitrogen dioxide monitoring at 21 locations in Queensland where annual data availability was greater than 75 per cent. At all locations except Memorial Park in Gladstone, monitoring was conducted using a chemiluminescence analyser operated in accordance with Australian Standard AS 3580.5.1. At Memorial Park, monitoring was conducted using a differential optical absorption spectroscopy (DOAS) instrument operated in accordance with Australian/New Zealand Standard AS/NZS 3580.15.

The indicative annual exposure to nitrogen dioxide for residents in the different location classifications in the three regions where nitrogen dioxide monitoring was conducted during 2024 is summarised in Table 78.

Table 78. Indicative annual population exposure to nitrogen dioxide for Queensland regions in 2024.

Region / Classification	Annual average population exposure		Number of monitoring stations	Air monitoring station locations
	ppm	% of standard		
South East Queensland				
Peak	0.009	60.0	4	Cannon Hill‡, South Brisbane‡, Parkwood‡, Woolloongabba‡
Neighbourhood	0.005	33.3	8	Coomera‡, Deagon‡, Deception Bay‡, Flinders View†, Mountain Creek†, Rocklea‡, Southport†, Springwood†
Background	0.002	13.3	2	Mutdapilly‡, North Maclean‡
Gladstone				
Peak	0.005	33.3	2	Boat Creek‡, Clinton‡
Neighbourhood	0.003	20.0	3	Boyne Island‡, Memorial Park†, South Gladstone†
Background	0.003	20.0	1	Targinie‡
Townsville				
Neighbourhood	0.002	13.3	1	North Ward†

† AAQ NEPM performance monitoring site
‡ Non-AAQ NEPM performance monitoring site

Photochemical oxidants (as ozone)

During 2024 DETSI undertook ozone monitoring at 11 locations in Queensland where annual data availability was greater than 75 per cent. At all locations except Memorial Park in Gladstone, monitoring was conducted using a UV-absorption analyser operated in accordance with Australian Standard AS 3580.6.1. At Memorial Park, monitoring was conducted using a differential optical absorption spectroscopy (DOAS) instrument operated in accordance with Australian/New Zealand Standard AS/NZS 3580.15.

The indicative annual and maximum 8-hour exposure to ozone for residents in the different location classifications in the two regions where ozone monitoring was conducted during 2024 is summarised in Table 79.

Table 79. Indicative annual population exposure to ozone for Queensland regions in 2024.

Region / Classification	Average 8-hour population exposure		Maximum 8-hour population exposure		Number of monitoring stations	Air monitoring station locations
	ppm	% of standard	ppm	% of standard		
South East Queensland						
Peak	0.026	40.0	0.054	83.1	1	Cannon Hill‡
Neighbourhood	0.031	47.7	0.062	95.4	7	Deagon‡, Deception Bay†, Flinders View†, Mountain Creek†, Rocklea†, Southport†, Springwood†
Background	0.031	47.7	0.063	96.9	2	Mutdapilly‡, North Maclean‡
Gladstone						
Neighbourhood	0.022	33.8	0.049	75.4	1	Memorial Park‡

† AAQ NEPM performance monitoring site
‡ Non-AAQ NEPM performance monitoring site

The Department of the Environment, Tourism, Science and Innovation acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Owners and custodians of the land.

We recognise their connection to land, sea and community, and pay our respects to Elders past and present.

Queensland Government