

CRINGILA PUBLIC SCHOOL
INDOOR AIR QUALITY RISK ASSESSMENT

Summary Report
24/02/2020 – 06/03/2020

NSW Department
of Education

Cringila Public School

35 Sheffield Street
Cringila NSW 2502

March 2020
C107471: J153825-03: TO/RC

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Air Monitoring Risk Assessment - IAQ

Cringila Public School

Table of Contents

1.	Introduction.....	1
2.	Objectives.....	1
3.	Assessment Criteria.....	1
3.1	Carbon Dioxide (CO ₂).....	1
3.2	Carbon Monoxide (CO).....	2
4.	Indoor Air Quality Monitoring Methodology	2
4.1	Indoor Air Quality Monitoring	2
4.2	Data Analysis and Reporting	2
5.	Indoor Air Quality Monitoring Results.....	3
5.1	Carbon Dioxide (CO ₂).....	3
5.2	Carbon Monoxide (CO).....	3
6.	Discussion.....	4
6.1	Carbon Dioxide (CO ₂).....	4
6.2	Carbon Monoxide (CO).....	4
7.	Conclusion	4
	Appendix A: Site Map and Sampling Locations.....	5
	Appendix B: Calibration Certificates	7

1. INTRODUCTION

At the request of the Department of Education, Greencap were engaged to undertake indoor air monitoring utilising real-time monitoring devices at Cringila Public School, 35 Sheffield Street Cringila NSW 2502. The aim of this monitoring program was primarily to investigate concerns raised by school employees and the Department of Education regarding the potential exposure to elevated concentrations of air pollutants, specifically carbon dioxide (CO₂) and Carbon Monoxide (CO), during the normal occupation of rooms within the school.

2. OBJECTIVES

Based on the correspondence provided by the NSW Department of Education, the objective of this assessment is to undertake an assessment of the indoor air quality to determine the concentrations of CO₂ and CO within buildings at Cringila Public School.

This report presents the results relating to the weekly indoor air quality monitoring investigation carried out within the Reception Area (Room 6R0021) between 24th February 2020 and 6th March 2020 at Cringila Public School. The locations of the monitoring are displayed in **Appendix A: Site Map and Sample Locations**.

3. ASSESSMENT CRITERIA

The following paragraphs list the relevant standards and guidelines used as a reference in this assessment. These reference sources included Approved Methods for Modelling and Assessment of Air Pollutants in NSW (NSW EPA 2016), Workplace Exposure Standards for Airborne Contaminants (SWA, 2013), ASHRAE Standard 62.1 Ventilation for Acceptable Indoor Air Quality (2016), or equivalent publications as a point of reference. For the purpose of this assessment, these criteria values will be referenced as they are deemed to be the most conservative levels based on the monitoring works undertaken.

3.1 Carbon Dioxide (CO₂)

Carbon Dioxide (CO₂) measurements are compared against the ASHRAE Standard 62-2010 *Ventilation for Acceptable Indoor Air Quality* (American Society of Heating, Refrigeration and Air-Conditioning Engineers).

CO₂ measurements provide an indication of the adequacy of fresh air levels supplied to rooms within a building. A person's comfort and health may be affected by high concentrations of CO₂.

For the purpose of this assessment, the recorded CO₂ measurements will be referenced against the ASHRAE Guideline value of 1,000 parts per million (ppm). This criterion is set for human comfort factors and is deemed to be the most conservative level to adopt.

CO₂ is a normal constituent of exhaled breath and is commonly measured as a screening tool to evaluate whether adequate volumes of fresh outdoor air are being introduced into indoor air.

The outdoor level of CO₂ usually ranges from 300 ppm to 400 ppm. The CO₂ level is usually greater inside a building than outside, even in buildings with few complaints about indoor air quality. If indoor carbon dioxide levels are more than 1,000 ppm, there is probably inadequate ventilation; and complaints such as headaches, fatigue, and eye and throat irritation may be prevalent.

3.2 Carbon Monoxide (CO)

Sampling for carbon monoxide provides an indication of the level of combustion by-products that may impinge on air quality.

The National Environment Protection (Ambient Air Quality) Measure (EPA 2016) specifies an indoor air quality standard of 9.0 parts per million (ppm) as a maximum concentration. This is considered the most relevant concentration for carbon monoxide and is consistent with other international guidelines such as the World Health Organisation (WHO).

4. INDOOR AIR QUALITY MONITORING METHODOLOGY

4.1 Indoor Air Quality Monitoring

Indoor air quality monitoring was conducted at a single location over the course of a school day to study the concentrations of CO₂ and CO within school buildings while they are occupied. Weekly monitoring was conducted within the Reception Area (Room 6R0021) in Building B006.

In this assessment, RAE Systems Multi RAE Gas Detectors were used with a specific sensor configuration to target CO₂ and CO concentrations to be assessed against the relevant guidelines as detailed above.

4.2 Data Analysis and Reporting

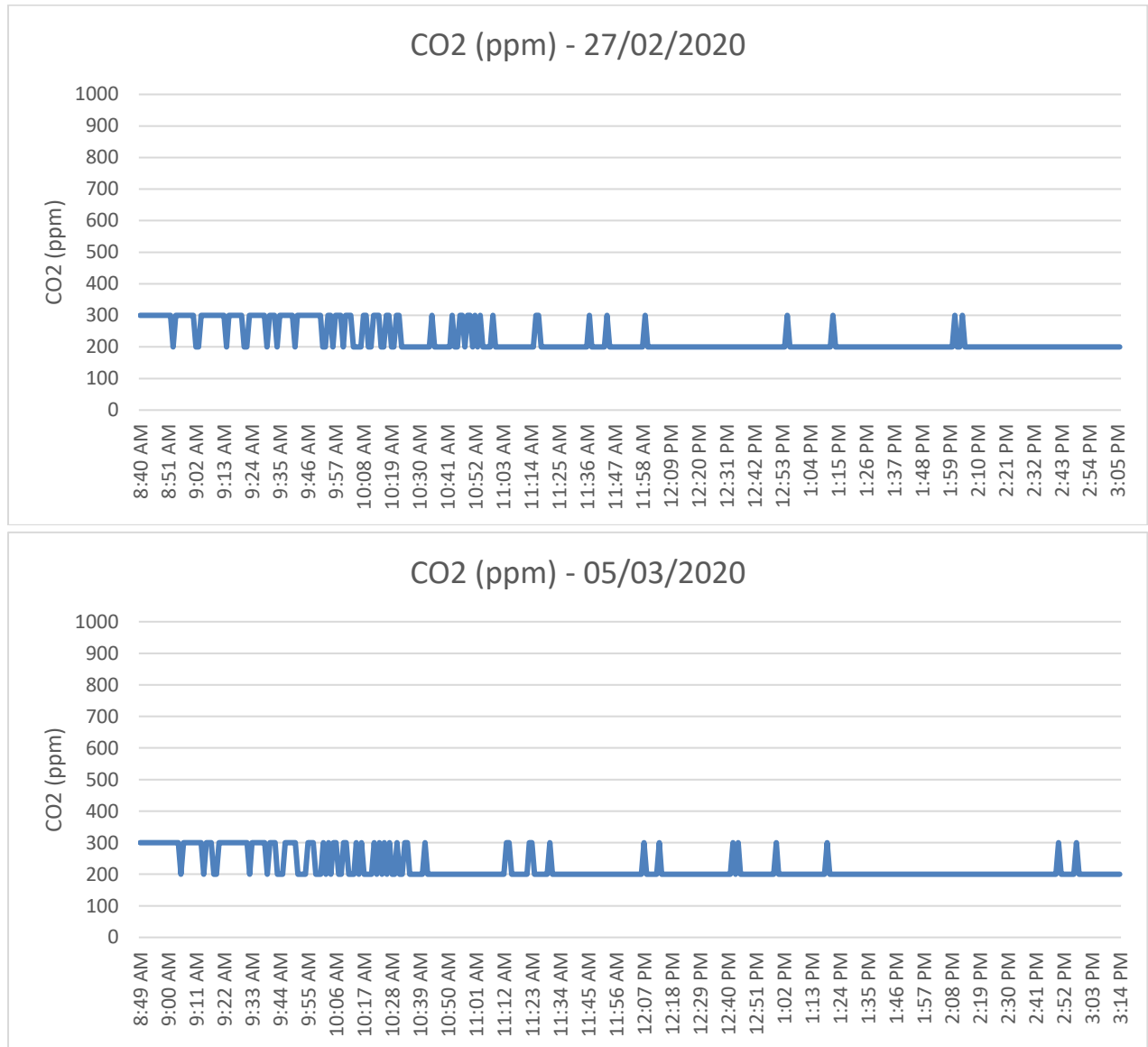
The MultiRAE Gas Detector units are configured to log data at one-minute intervals and run throughout the course of the school day. Logged data was downloaded from the device and tabulated in this report to present the results. Refer to **Section 5: Indoor Air Quality Monitoring Results**.

5. INDOOR AIR QUALITY MONITORING RESULTS

5.1 Carbon Dioxide (CO₂)

The Carbon Dioxide (CO₂) concentration results for the monitoring conducted between 24th February 2020 and 6th March 2020 is summarised below in **Figure 1**. Monitoring locations are displayed in **Appendix A: Site Map and Sampling Locations**.

Figure 1: Carbon Dioxide (CO₂) monitoring results



5.2 Carbon Monoxide (CO)

The Carbon Monoxide (CO) concentration results for the monitoring conducted between 24th February 2020 and 6th March 2020 were consistently 0ppm.

6. DISCUSSION

6.1 Carbon Dioxide (CO₂)

The monitoring results for CO₂ within the Reception Area (Room 6R0021) at Cringila Public School ranged between 200ppm and 300ppm during the period of monitoring. All results were below the ASHRAE guideline level of 1,000 ppm. It should be noted that the adopted ASHRAE Guideline of 1,000 ppm is set for comfort only. A time weighted average (TWA) of 5,000 ppm has been set by Safe Work Australia for health purposes.

It should be noted that short term static monitoring results cannot be compared to exposure monitoring criteria and therefore may be used as guidance only with regard to concentrations of CO₂ in these locations.

Adequate supply of fresh air is required to dilute CO₂ and other pollutants to acceptable levels for human comfort and health considerations.

6.2 Carbon Monoxide (CO)

The peak monitoring results for CO within the Reception Area (Room 6R0021) at Cringila Public School were consistently 0ppm during each period of monitoring. All results were below the adopted maximum guideline level of 9 ppm.

7. CONCLUSION

This concludes the indoor air quality monitoring summary report for monitoring conducted 24th February 2020 and 6th March 2020. It is recommended that weekly assessments are continued in order to gain firm and reliable data sets regarding the concentration of CO₂ and CO within indoor environments at the school whilst further investigation of the site is undertaken.

Indoor Air Quality Risk Assessment

Cringila Public School

Appendix A: Site Map and Sampling Location



Legend:

- ✘ Air Quality Monitoring Location
- Northwest Hotspot Investigation Area

Site	Cringila Public School
Monitoring Location	Reception Area (6R0021)
Consultant	Tom Oyston
Date	24th February 2020 - 6th March 2020
Job Number	J153825-03
Report	AMR-IAQ-18
Version	1.0

Indoor Air Quality Risk Assessment

Cringila Public School

Appendix B: Calibration Certificate

Company: Active Environmental Solutions Hire
Contact: William Pak/Milenko Sisc
Address: Unit 16, 191 Parramatta Road
 AUBURN NSW 2144
Phone: 02 9716 5966 | **Fax:** 02 9716 5988
Email: hire@aesolutions.com.au

Manufacturer: RAE Systems
Instrument: MultiRAE Lite
Model: PGM6208
Configuration: O2, CO, NO, NO2, VOC
Wireless: N/A

Serial #: MAA30065R4
Hire #: 88
Client: Tom Oysten
Company: Greencap
Project #: PO269858
Notes:

Item	Test	Pass/Fail	Comments
Battery	Li Ion	✓	
Charger	Charger, Power supply	✓	
	Cradle	✓	
Pump	Flow	✓	>300 mL/min
Filter	Filter, fitting, etc	✓	
Alarms	Audible, visual, vibration	✓	
Display	Operation	✓	
PCB	Operation	✓	
Connectors	Condition	✓	
Firmware	Version	✓	1.40
Datalogger	Operation	✓	
Monitor Housing	Condition	✓	
Case	Condition/Type	✓	
Sensors			
Oxygen	O2	✓	
LEL		-	
PID	10.6eV	✓	
Toxic 1	CO	✓	
Toxic 2	NO	✓	
Toxic 3	NO2	✓	
Toxic 4		-	
Toxic 5		-	

Engineer's Report

Setup, service and calibration for hire

Calibration Certificate

Sensor	Type	Serial No:	Span Gas	Concentration	Traceability Lot #	CF	Reading	
							Zero	Span
Oxygen	O2		Fresh Air	20.9%	WO177842-6	-	20.9%	
			Oxygen	18.0%				18.0%
LEL								
PID	10.6eV		Isobutylene	100ppm	A0442963	1.00	0ppm	100ppm
Toxic 1	CO		Carbon Monoxide	50ppm	WO177842-6	-	0ppm	50ppm
Toxic 2	NO		Nitric Oxide	25ppm	WO201822-2	-	0ppm	25ppm
Toxic 3	NO2		Nitrogen Dioxide	5ppm	WO230796-1	-	0ppm	5ppm
Toxic 4								
Toxic 5								

Calibrated/Repaired by: William Pak

Date: 24.01.2020

Next due: 24.07.2020

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Company: Active Environmental Solutions Hire
Contact: William Pak/Milenko Sisc
Address: Unit 16, 191 Parramatta Road
 AUBURN NSW 2144
Phone: 02 9716 5966 | **Fax:** 02 9716 5988
Email: hire@aesolutions.com.au

Manufacturer: RAE Systems
Instrument: MultiRAE Lite
Model: PGM6208
Configuration: H2S, LEL, SO2, CO, CO2
Wireless: N/A

Serial #: M01C005769
Hire #: 88
Client: Tom Oysten
Company: Greencap
Project #: PO269858
Notes:

Item	Test	Pass/Fail	Comments
Battery	Li Ion	✓	
Charger	Charger, Power supply	✓	
	Cradle	✓	
Pump	Flow	✓	>300 mL/min
Filter	Filter, fitting, etc	✓	
Alarms	Audible, visual, vibration	✓	
Display	Operation	✓	
PCB	Operation	✓	
Connectors	Condition	✓	
Firmware	Version	✓	1.40
Datalogger	Operation	✓	
Monitor Housing	Condition	✓	
Case	Condition/Type	✓	
Sensors			
Oxygen		-	
LEL	LEL	✓	
PID		-	
Toxic 1	CO	✓	
Toxic 2	H2S	✓	
Toxic 3	CO2	✓	
Toxic 4	SO2	✓	
Toxic 5		-	

Engineer's Report

Setup, service and calibration for hire

Calibration Certificate

Sensor	Type	Serial No:	Span Gas	Concentration	Traceability Lot #	CF	Reading	
							Zero	Span
Oxygen								
LEL	LEL		Methane	2.5% (50% LEL)	WO177842-6	-	0%	50%
PID								
Toxic 1	CO		Carbon Monoxide	50ppm	WO177842-6	-	0ppm	50ppm
Toxic 2	H2S		Hydrogen Sulfide	10ppm	WO177842-6	-	0ppm	10ppm
Toxic 3	CO2		Carbon Dioxide	5000ppm	WO209627-1	-	0ppm	5000ppm
Toxic 4	SO2		Sulfur Dioxide	5ppm	WO201825-2	-	0ppm	5ppm
Toxic 5								

Calibrated/Repaired by: William Pak

Date: 24.01.2020

Next due: 24.07.2020

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