

AIR MONITORING RISK ASSESSMENT - IAQ-03
CRINGILA PUBLIC SCHOOL
35 SHEFFIELD STREET
CRINGILA NSW 2502

Summary Report
27/07/2019 – 09/08/2019

NSW Department
of Education

Cringila Public School

35 Sheffield Street
Cringila NSW 2502

August 2019
C107741: J153825-03: RC

Statement of Limitations

All and any Services proposed by Greencap to the Client are subject to the Terms and Conditions listed on the Greencap website at: www.greencap.com.au/about-greencap/terms-and-conditions. Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services are to be carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services are to be carried out in accordance with Commonwealth, State or Territory legislation, regulations and/or guidelines. The Client will be deemed to have accepted these Terms when the Client signs the Proposal (where indicated) or when the Company commences the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledges and agrees that proposed investigations rely on information provided to Greencap by the Client or other third parties. Greencap makes no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap.

The Client will ensure that Greencap has access to all sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services is not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.



Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at www.greencap.com.au/about-greencap/terms-and-conditions

The Report is provided for the exclusive use of the Client for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorised in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorised in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorise the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole sets out the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Document Control

Document Quality Management Details.		
Job Reference:	J153825-03	
Report Name:	AMR-IAQ-03 Air Monitoring Risk Assessment (IAQ)	
Site Details:	Cringila Public School, 35 Sheffield Street, Cringila NSW 2502	
Client Name:	NSW Department of Education	
Client Number:	C107741	
Signatures:	Prepared By:  Tom Oyston Property Risk Consultant	Authorised By:  Rowan Clark Senior Consultant - Property Risk & Environment

Document Circulation

No	Type	Customer Name	Position & Title
1	Electronic	NSW Department of Education	Greg Mott Senior Group Leader – School Infrastructure NSW

Air Monitoring Risk Assessment - IAQ

Cringila Public School, 35 Sheffield Street, Cringila NSW 2502

Table of Contents

1. Introduction	1
2. Objectives.....	1
3. Assessment Criteria	1
3.1 Carbon Dioxide (CO₂).....	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 (CO₂).....	3
5.2 Carbon Monoxide (CO)	3
6. Discussion.....	4
6.1 Carbon Dioxide (CO₂).....	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 27th July 2019 & 9th August 2019 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

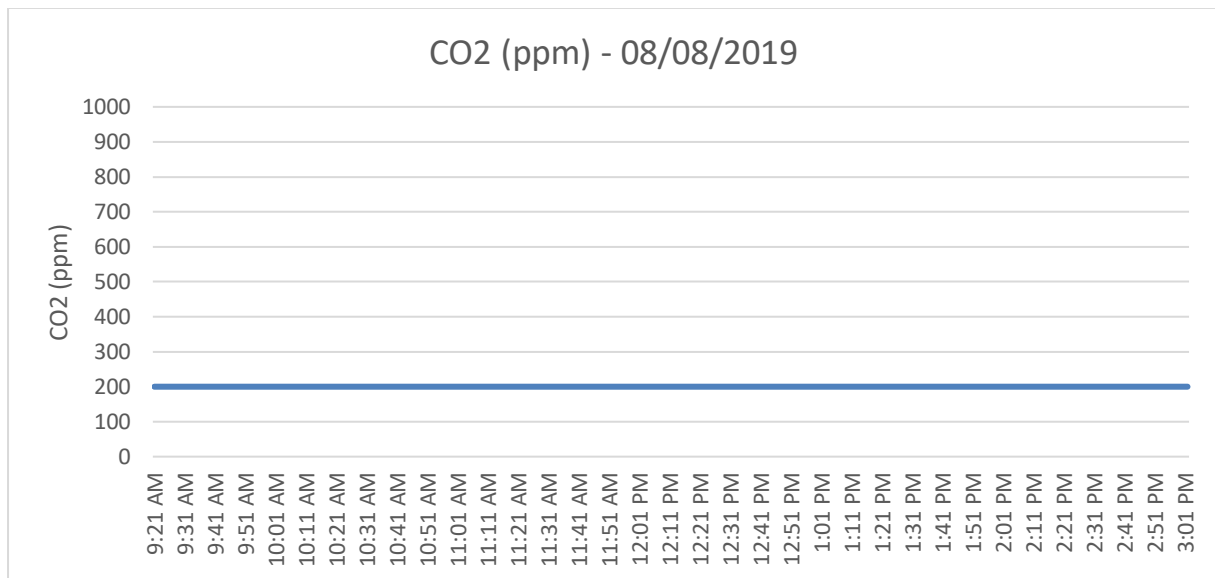
The MultiRAE Gas Detector units are configured to log data at one-minute intervals and run throughout the course of the school day. Logged data was downloaded from the device and tabulated in this report to present the results. Refer to **Section 5: Indoor Air Quality Monitoring Results**.

5. INDOOR AIR QUALITY MONITORING RESULTS

5.1 CARBON DIOXIDE (CO₂)

The Carbon Dioxide (CO₂) concentration results for the monitoring conducted between 27th July and 9th August 2019 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



CO₂ data was not available for the week of the 29th of July, due to operational constraints.

5.2 CARBON MONOXIDE (CO)

The Carbon Monoxide (CO) concentration results for the monitoring conducted between 27th July and 9th August 2019 were consistently 0ppm.

CO data was not available for the week of the 29th of July, due to operational constraints.

6. DISCUSSION

6.1 CARBON DIOXIDE (CO₂)

Generally, the peak monitoring results for CO₂ within the Reception Area (Room 6R0021) at Cringila Public School ranged between 200ppm and 900ppm during the periods 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 between 27th July and 9th August 2019. 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.

Air Monitoring Risk Assessment

Cringila Public School NW Hotspot – 35 Sheffield Street, Cringila NSW 2502

Appendix A: Site Map and Sampling Locations



Legend:

- ✘ Air Quality Monitoring Location
- North West Hotspot Investigation Area

Site	Cringila Public School
Monitoring Location	Reception Area (6R0021)
Consultant	Rowan Clark
Date	27 th July - 9 th August 2019
Job Number	J153825-03
Report	AMR-IAQ-03
Version	1.0

Air Monitoring Risk Assessment

Cringila Public School NW Hotspot – 35 Sheffield Street, Cringila NSW 2502

Appendix B: Calibration Certificates

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, NO, NO2, CO, PID
Wireless: N/A

Serial #: MAA30065R4
Hire #: BN2215
Client: Tom Oyston
Company: Greencap
Project #: PO257461

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	NO	✓	
Toxic 2	NO2	✓	
Toxic 3	CO	✓	
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%	D753454		20.9%	
			Oxygen	18.0%				18.0%
LEL								
PID	10.6eV	-	Isobutylene	100ppm	WO148384-1		0	100ppm
Toxic 1	NO	-	Nitric Oxide	25ppm	WO153855-2		0	25ppm
Toxic 2	NO2	-	Nitrogen Dioxide	5ppm	WO198058-1		0	5ppm
Toxic 3	CO	-	Carbon Monoxide	50ppm	D753454		0	50ppm
Toxic 4								
Toxic 5								

Calibrated/Repaired by: William Pak

Date: 06.06.2019

Next due: 06.12.2019

Alemir International Pty Ltd t/a Active Environmental Solutions

ABN 14 080 228 708

Head Office – Melbourne
 2 Merchant Avenue
 Thomastown VIC 3074 Australia
 T: +61 3 9464 2300

NSW Office – Auburn
 Unit 16, 191 Parramatta Road
 Auburn NSW 2144 Australia
 T: +61 2 9716 5966

WA Office – Malaga
 Unit 6, 41 Holder Way
 Malaga WA 6090 Australia
 T: +61 8 9249 5663

QLD Office – Banyo
 Unit 17, 23 Ashtan Place
 Banyo QLD 4014 Australia
 T: +61 7 3267 1433

sales@aesolutions.com.au



www.aesolutions.com.au

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 #: BN2215
Client: Tom Oyston
Company: Greencap
Project #: PO257461

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	H2S	✓	
Toxic 2	SO2	✓	
Toxic 3	CO	✓	
Toxic 4	CO2	✓	
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)	D753454		0	50%
PID								
Toxic 1	H2S	-	Hydrogen Sulfide	10ppm	D753454		0	10ppm
Toxic 2	SO2	-	Sulfur Dioxide	5ppm	WO182522-2		0	5ppm
Toxic 3	CO	-	Carbon Monoxide	50ppm	D753454		0	50ppm
Toxic 4	CO2	-	Carbon Dioxide	5000ppm	WO169824-1		0	5000ppm
Toxic 5								

Calibrated/Repaired by: William Pak

Date: 06.06.2019

Next due: 06.12.2019

Alemir International Pty Ltd t/a Active Environmental Solutions

ABN 14 080 228 708

Head Office – Melbourne
 2 Merchant Avenue
 Thomastown VIC 3074 Australia
 T: +61 3 9464 2300

NSW Office – Auburn
 Unit 16, 191 Parramatta Road
 Auburn NSW 2144 Australia
 T: +61 2 9716 5966

WA Office – Malaga
 Unit 6, 41 Holder Way
 Malaga WA 6090 Australia
 T: +61 8 9249 5663

QLD Office – Banyo
 Unit 17, 23 Ashtan Place
 Banyo QLD 4014 Australia
 T: +61 7 3267 1433

sales@aesolutions.com.au



www.aesolutions.com.au