

AIR MONITORING RISK ASSESSMENT  
CRINGILA PUBLIC SCHOOL - NW HOTSPOT  
35 SHEFFIELD STREET  
CRINGILA NSW 2502

Summary Report  
16/12/19 - 27/12/19

NSW Department  
of Education

Cringila Public School

35 Sheffield Street  
Cringila NSW 2502

December 2019  
C107471: J153825-03: TO/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](http://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](http://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.		
<b>Job Reference:</b>	J153825-03	
<b>Report Name:</b>	AMR-13 Ambient Air Monitoring Risk Assessment	
<b>Site Details:</b>	Cringila PS NW Hotspot – 35 Sheffield Street, Cringila NSW 2502	
<b>Client Name:</b>	NSW Department of Education	
<b>Client Number:</b>	C107471	
<b>Signatures:</b>	Prepared By:  Tom Oyston Property Risk Consultant	Authorised By:  Scott McIlwain Regional Manager

## Document Circulation

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

# Air Monitoring Risk Assessment

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

## Table of Contents

<b>1. Introduction .....</b>	<b>1</b>
<b>2. Assessment Criteria .....</b>	<b>1</b>
<b>3. Air Quality Monitoring Methodology .....</b>	<b>3</b>
<b>3.1 Spot Check / Real Time Air Quality Monitoring.....</b>	<b>3</b>
<b>3.2 Monitoring Locations.....</b>	<b>3</b>
<b>4. Spot Check / Real Time Air Monitoring Results.....</b>	<b>4</b>
<b>5. Discussion .....</b>	<b>8</b>
<b>Appendix A: Site Map and Sampling Locations .....</b>	<b>9</b>
<b>Appendix B: Calibration Certificates.....</b>	<b>11</b>

## 1. INTRODUCTION

At the request of the Department of Education, Greencap were engaged to undertake 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 those of the public regarding the potential exposure to air pollutants originating from the pre-identified subsurface hotspot occurring in this particular area of the school.

Based on the correspondence provided by the NSW Department of Education, the objectives of this assessment are as follows:

- Undertake an assessment of the air quality at the source of the subsurface hotspot and to determine the extent of associated atmospheric pollutants (gases) distribution within Cringila Public School;
- Pollutants to be monitored using real-time monitors to provide a profile of air quality i.e. carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), volatile organic compounds, sulphur dioxide (SO<sub>2</sub>), hydrogen sulphide (H<sub>2</sub>S), methane (CH<sub>4</sub> – LEL), oxygen (O<sub>2</sub>), nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>).
- Real time monitoring was to provide a snapshot to determine the extent of atmospheric pollutant levels on School grounds.

This report presents the results relating to an ongoing air monitoring investigation carried out in the North-Western Hotspot between 16<sup>th</sup> December 2019 and 27<sup>th</sup> December 2019, situated on the Cringila Public School grounds, located at 35 Sheffield Street, Cringila NSW 2502.

## 2. ASSESSMENT CRITERIA

As demonstrated in **Table 1** below, the assessment criteria referenced as part of this project is based on several sources as this monitoring assessment had to consider numerous factors including outside air exposure, indoor air quality exposure and personal worker exposure. 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 in this report as they are deemed to be the most conservative levels based on the multifaceted monitoring works undertaken. It is however important to note that WES do not apply to children. Reference to WES is purely for guidance purposes only.

**Table 1 Air Quality Monitoring Assessment Criteria**

<b>POLLUTANT</b>	<b>AVERAGING PERIOD</b>	<b>CRITERIA</b>	<b>SOURCE</b>
<i>Carbon monoxide (CO)</i>	8-hours	9 ppm	NSW EPA 2016 <sup>a</sup>
		9 ppm	ASHRAE Standard 62.1-2016
		30 ppm	SWA 2013 <sup>b</sup>
<i>Carbon dioxide (CO<sup>2</sup>)</i>	8-hours	5000 ppm	SWA 2013 <sup>b</sup>
		Not greater than 700 ppm above local outdoor concentration levels	ASHRAE Standard 62.1-2016
<i>Sulphur dioxide (SO<sup>2</sup>)</i>	24-hours	0.08 ppm (8 ppm)	NSW EPA 2016 <sup>a</sup>
	8-hours	2 ppm (5 ppm STEL) <sup>d</sup>	SWA 2013 <sup>b</sup>
<i>Hydrogen sulphide (H<sup>2</sup>S)</i>	8-hour	10 ppm (15 ppm STEL) <sup>d</sup>	SWA 2013
		0.9 ppm (Peak)	NSW EPA 2016
<i>Nitric oxide (NO)</i>	8-hour	25 ppm	SWA 2013
<i>Nitrogen dioxide (NO<sup>2</sup>)</i>	1-hour	0.12 ppm (12 ppm)	NSW EPA 2016 <sup>a</sup>
	8-hours	3 ppm (5 ppm STEL) <sup>d</sup>	SWA 2013 <sup>b</sup>
<i>Oxygen (O<sup>2</sup>)</i>	-	19.5-23.5%	SWA 2011 <sup>c</sup>
<i>Volatile organic compounds (VOC)</i>	-	Contaminant specific	-
<i>Methane (as LEL)</i>	-	<5%	SWA 2011 <sup>c</sup>

**Sources:**

a - NSW EPA 2016, Approved methods for the Modelling and Assessment of Air Pollutants in New South Wales, NSW Environment Protection Authority.

b - SWA 2013, Workplace Exposure Standards for Airborne Contaminants, Safe Work Australia. These concentrations are based on Time Weighted Averages (TWA) for an 8-hour shift.

c - SWA 2011, Confined Spaces Code of Practice, Safe Work Australia. These concentrations are based on conditions that do not pose an immediate risk to human health.

d - Short term exposure limit (STEL) means the average airborne concentration of a substance calculated over a 15-minute period. The STEL should not be exceeded at any time during a normal eight hour working day.

### 3. AIR QUALITY MONITORING METHODOLOGY

#### 3.1 SPOT CHECK / REAL TIME AIR QUALITY MONITORING

‘Spot-check’ air quality monitoring at locations within the vicinity of the subsurface hotspot area was conducted to determine the extent of atmospheric pollutants (gases) associated with the hotspot. Pollutants monitored using real-time Multi-Gas Detectors provided and continue to provide a profile of air quality which include: carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), volatile organic compounds (VOCs), sulphur dioxide (SO<sub>2</sub>), hydrogen sulphide (H<sub>2</sub>S), methane (CH<sub>4</sub>) as LEL, oxygen (O<sub>2</sub>), nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>).

These air quality parameters were recorded at specific nominated locations within the northwest hotspot area over an interval of up to 15 minutes at each location. Monitoring included sensitive receptors such as locations within the school boundary and adjacent neighbouring residences in order to effectively delineate the extent and distribution of these atmospheric pollutants. This will be performed at the digression of the Greencap Consultant on site.

In this assessment, RAE Systems Multi RAE Gas Detectors were used with specific sensor configurations to target the nominated pollutants/gases to be assessed against the Air Quality Monitoring Criteria detailed below in **Table 2**. Each unit will be configured to log data at one second intervals, and upper and lower alarm limits will be set to reflect the adopted air monitoring criteria.

**Table 2 Multi-Gas Detector Sensor Specifications**

<b>UNIT</b>	<b>SENSOR</b>	<b>RANGE</b>	<b>RESOLUTION</b>
<i>Multi RAE Lite – Unit 1</i>	SO <sub>2</sub>	0 to 20 ppm	0.1 ppm
	NO	0 to 250 ppm	0.5 ppm
	NO <sub>2</sub>	0 to 20 ppm	0.1 ppm
	O <sub>2</sub>	To 30% (Volume)	0.1% (Volume)
	VOCs	0 to 1,000 ppm	1 ppm
<i>Multi RAE Lite – Unit 2</i>	CO	0 to 200 ppm	0.1 ppm
	CO <sub>2</sub>	0 to 50,000 ppm	100 ppm
	H <sub>2</sub> S	0 to 100 ppm	0.1 ppm
	LEL (Methane)	0 to 100%	1%

#### 3.2 MONITORING LOCATIONS

Spot measurements were taken within the North-Western Hotspot area and at surrounding locations to determine whether potential air pollutants from the subsurface hotspot were present. These monitoring locations included the following:

- A-01 General Background
- A-02 NW Hotspot – Concrete Cap Surface
- A-03 NW Hotspot – Small Mound
- A-04 NW Hotspot – NE fence line
- A-05 Exclusion Area Fence Line East of Hotspot (Approx. 10m)
- A-06 Exclusion Area Fence Line Southeast of Hotspot (Approx. 15m)
- A-07 Exclusion Area Fence Line South of Hotspot (Approx. 30m)
- A-08 Exclusion Area Fence Line Northwest of Hotspot, adjacent 17 Lackawanna Street (Approx. 50m)

#### 4. SPOT CHECK / REAL TIME AIR MONITORING RESULTS

The atmospheric pollutant results for each monitoring event are summarised in the tables below, and monitoring locations can be viewed in **Appendix A**.

<b>Date of Monitoring: Tuesday 17<sup>th</sup> December 2019</b>											
<b>Location</b>		Carbon monoxide (CO) (ppm)	Carbon dioxide (CO <sup>2</sup> ) (ppm)	Sulphur dioxide (SO <sup>2</sup> ) (ppm)	Hydrogen sulphide (H <sup>2</sup> S) (ppm)	Nitric oxide (NO) (ppm)	Nitrogen dioxide (NO <sup>2</sup> ) (ppm)	Oxygen (O <sup>2</sup> ) (%)	Volatile organic compounds (VOC) (ppm)	Methane (as LEL) (%)	<b>Within Acceptable Limits?</b>
A-01	<i>General Background – West of Site Fence</i>	0	200	0	0	0	0	20.9	0	0	✓
A-02	<i>NW Hotspot – Adjacent Concrete Cap</i>	0	200	0	0	0	0	20.9	0	0	✓
A-03	<i>NW Hotspot – Small Mound</i>	0	200	0	0	0	0	20.9	0	0	✓
A-04	<i>NE Fence Line Adjacent Hotspot</i>	0	200	0	0	0	0	20.9	0	0	✓
A-05	<i>Exclusion Area Fence Line East of Hotspot (Approx. 10m)</i>	0	200	0	0	0	0	20.9	0	0	✓
A-06	<i>Exclusion Area Fence Line Southeast of Hotspot (Approx. 15m)</i>	0	200	0	0	0	0	20.9	0	0	✓
A-07	<i>Exclusion Area Fence Line South of Hotspot (Approx. 30m)</i>	0	200	0	0	0	0	20.9	0	0	✓
A-08	<i>Exclusion Area Fence Line Northwest of Hotspot, adjacent 17 Lackawanna Street (Approx. 50m)</i>	0	200	0	0	0	0	20.9	0	0	✓



<b>Date of Monitoring: Wednesday 18<sup>th</sup> December 2019</b>											
<b>Location</b>		Carbon monoxide (CO) (ppm)	Carbon dioxide (CO <sup>2</sup> ) (ppm)	Sulphur dioxide (SO <sup>2</sup> ) (ppm)	Hydrogen sulphide (H <sup>2</sup> S) (ppm)	Nitric oxide (NO) (ppm)	Nitrogen dioxide (NO <sup>2</sup> ) (ppm)	Oxygen (O <sup>2</sup> ) (%)	Volatile organic compounds (VOC) (ppm)	Methane (as LEL) (%)	<b>Within Acceptable Limits?</b>
A-01	General Background – West of Site Fence	0	200	0	0	0	0	20.9	0	0	✓
A-02	NW Hotspot – Adjacent Concrete Cap	0	200	0	0	0	0	20.9	0	0	✓
A-03	NW Hotspot – Small Mound	0	200	0	0	0	0	20.9	0	0	✓
A-04	NE Fence Line Adjacent Hotspot	0	200	0	0	0	0	20.9	0	0	✓
A-05	Exclusion Area Fence Line East of Hotspot (Approx. 10m)	0	200	0	0	0	0	20.9	0	0	✓
A-06	Exclusion Area Fence Line Southeast of Hotspot (Approx. 15m)	0	200	0	0	0	0	20.9	0	0	✓
A-07	Exclusion Area Fence Line South of Hotspot (Approx. 30m)	0	200	0	0	0	0	20.9	0	0	✓
A-08	Exclusion Area Fence Line Northwest of Hotspot, adjacent 17 Lackawanna Street (Approx. 50m)	0	200	0	0	0	0	20.9	0	0	✓

<b>Date of Monitoring: Monday 23<sup>rd</sup> December 2019</b>											
<b>Location</b>		Carbon monoxide (CO) (ppm)	Carbon dioxide (CO <sup>2</sup> ) (ppm)	Sulphur dioxide (SO <sup>2</sup> ) (ppm)	Hydrogen sulphide (H <sup>2</sup> S) (ppm)	Nitric oxide (NO) (ppm)	Nitrogen dioxide (NO <sup>2</sup> ) (ppm)	Oxygen (O <sup>2</sup> ) (%)	Volatile organic compounds (VOC) (ppm)	Methane (as LEL) (%)	<b>Within Acceptable Limits?</b>
A-01	General Background – West of Site Fence	0	200	0	0	0	0	20.9	0	0	✓
A-02	NW Hotspot – Adjacent Concrete Cap	0	200	0	0	0	0	20.9	0	0	✓
A-03	NW Hotspot – Small Mound	0	200	0	0	0	0	20.9	0	0	✓
A-04	NE Fence Line Adjacent Hotspot	0	200	0	0	0	0	20.9	0	0	✓
A-05	Exclusion Area Fence Line East of Hotspot (Approx. 10m)	0	200	0	0	0	0	20.9	0	0	✓
A-06	Exclusion Area Fence Line Southeast of Hotspot (Approx. 15m)	0	200	0	0	0	0	20.9	0	0	✓
A-07	Exclusion Area Fence Line South of Hotspot (Approx. 30m)	0	200	0	0	0	0	20.9	0	0	✓
A-08	Exclusion Area Fence Line Northwest of Hotspot, adjacent 17 Lackawanna Street (Approx. 50m)	0	200	0	0	0	0	20.9	0	0	✓

<b>Date of Monitoring: Tuesday 24<sup>th</sup> December 2019</b>											
<b>Location</b>		Carbon monoxide (CO) (ppm)	Carbon dioxide (CO <sup>2</sup> ) (ppm)	Sulphur dioxide (SO <sup>2</sup> ) (ppm)	Hydrogen sulphide (H <sup>2</sup> S) (ppm)	Nitric oxide (NO) (ppm)	Nitrogen dioxide (NO <sup>2</sup> ) (ppm)	Oxygen (O <sup>2</sup> ) (%)	Volatile organic compounds (VOC) (ppm)	Methane (as LEL) (%)	<b>Within Acceptable Limits?</b>
A-01	General Background – West of Site Fence	0	200	0	0	0	0	20.9	0	0	✓
A-02	NW Hotspot – Adjacent Concrete Cap	0	200	0	0	0	0	20.9	0	0	✓
A-03	NW Hotspot – Small Mound	0	200	0	0	0	0	20.9	0	0	✓
A-04	NE Fence Line Adjacent Hotspot	0	200	0	0	0	0	20.9	0	0	✓
A-05	Exclusion Area Fence Line East of Hotspot (Approx. 10m)	0	200	0	0	0	0	20.9	0	0	✓
A-06	Exclusion Area Fence Line Southeast of Hotspot (Approx. 15m)	0	200	0	0	0	0	20.9	0	0	✓
A-07	Exclusion Area Fence Line South of Hotspot (Approx. 30m)	0	200	0	0	0	0	20.9	0	0	✓
A-08	Exclusion Area Fence Line Northwest of Hotspot, adjacent 17 Lackawanna Street (Approx. 50m)	0	200	0	0	0	0	20.9	0	0	✓

## 5. DISCUSSION

Based on the air quality monitoring data obtained as part of this monitoring assessment, the inhalation risk to human health as a result of the subsurface hotspot remains low. The reasons for this conclusion is as follows:

- Real time monitoring results did not indicate the presence of gas in elevated concentrations; even at the source (i.e. the subsurface hotspot vent source). Concentrations of gases commonly associated with combustion (e.g. carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), volatile organic compounds, sulphur dioxide (SO<sub>2</sub>), hydrogen sulphide (H<sub>2</sub>S), methane (CH<sub>4</sub> – LEL), oxygen (O<sub>2</sub>), nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>), were not detected at concentrations that pose a risk to human health in the North-Western Hotspot area, including locations surrounding the hotspot.

This concludes the air quality monitoring summary report from 16<sup>th</sup> December 2019 and 27<sup>th</sup> December 2019. It is recommended that weekly assessments are conducted to continually monitor the potential risk to human health 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:	
	Sampling Location
<b>A-00</b>	Sample Location ID
.....	Fence-line

Site	Cringila Public School
Area	Northwest Hotspot
Consultant	Tom Oyston
Date	Friday, 27 December 2019
Job Number	J153825-03
Report	AMR-13
Version	1.0