

NEAR-SURFACE TEMPERATURE MONITORING INVESTIGATION CRINGILA PUBLIC SCHOOL - NW HOTSPOT

Summary Report
03/06/2019 - 14/06/2019

NSW Department
of Education
Cringila Public School

35 Sheffield Street
Cringila NSW 2502

June 2019
C107826: J153825: RC/TO

Statement of Limitations

All and any Services proposed by Greencap to the Client were 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 were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced 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 acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made 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. 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 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.

The Client was to ensure that Greencap had access to all information, 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 was 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.



Unless otherwise expressly agreed to in writing and signed by Greencap, 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-andconditions.

The Report is provided for the exclusive use of the Client and 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 authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized 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 authorize 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. | | |
|--------------------------------------|---|---|
| Document Name: | TI – 11 – Near-Surface Temperature Monitoring – Cringila Public School | |
| Site Details: | Cringila PS NW Hotspot – 35 Sheffield Street, Cringila NSW 2502 | |
| Client Name: | Department of Education | |
| Client Number: | C107826 | |
| Signatures: | Prepared By:  Tom Oyston Property Risk Consultant | Authorised By:  Rowan Clark Property Risk Consultant |

Document Circulation

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

Near-Surface Temperature Monitoring

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

Table of Contents

| | | |
|------|--|---|
| 1. | Introduction..... | 1 |
| 2. | Temperature Monitoring Methodology..... | 1 |
| 2.1. | Visual Observations | 1 |
| 2.2. | Near Surface Temperature Monitoring..... | 1 |
| 3. | Temperature monitoring Results..... | 1 |
| 3.1. | Near-Surface Temperature Graph – Selected Points (Historical)..... | 2 |
| 3.2. | Near-Surface Temperature Graph – Selected Points (Fortnightly) | 3 |
| 4. | Analysis of Isotherm map data..... | 4 |
| 5. | Discussion..... | 4 |
| | Appendix A: Area of Concern – Northwest Hotspot Map | 5 |
| | Appendix B: Near-Surface Temperature Isotherm Map (0.5m) | 7 |

1. INTRODUCTION

At the request of the NSW Department of Education, Greencap were engaged to undertake 'spot-check' near-surface temperature monitoring utilising real-time monitoring devices at Cringila Public School, 35 Sheffield Street Cringila NSW 2502. The aim of this investigation was primarily to investigate near-surface temperatures associated with the pre-identified subsurface hotspot located in the northwest grounds at the school.

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

- Conduct spot checks, to gather near-surface temperature readings via the use of heat sensing equipment; and
- Gather data at various points across the site to aid in the spatial delineation of the near-surface hotspot.

This report presents the results of Greencap's historical data relating to near-surface temperatures as well as the results of the ongoing temperature monitoring investigation carried out between on a weekly basis, between 3rd June 2019 and 14th June 2019 in the northwest Hotspot, situated on the Cringila Public School grounds.

2. TEMPERATURE MONITORING METHODOLOGY

2.1. Visual Observations

Visual site observations such as evidence of vegetation stress and associated surface combustion hazards are recorded. Meteorological data such as wind and ambient temperature is also recorded.

2.2. Near Surface Temperature Monitoring

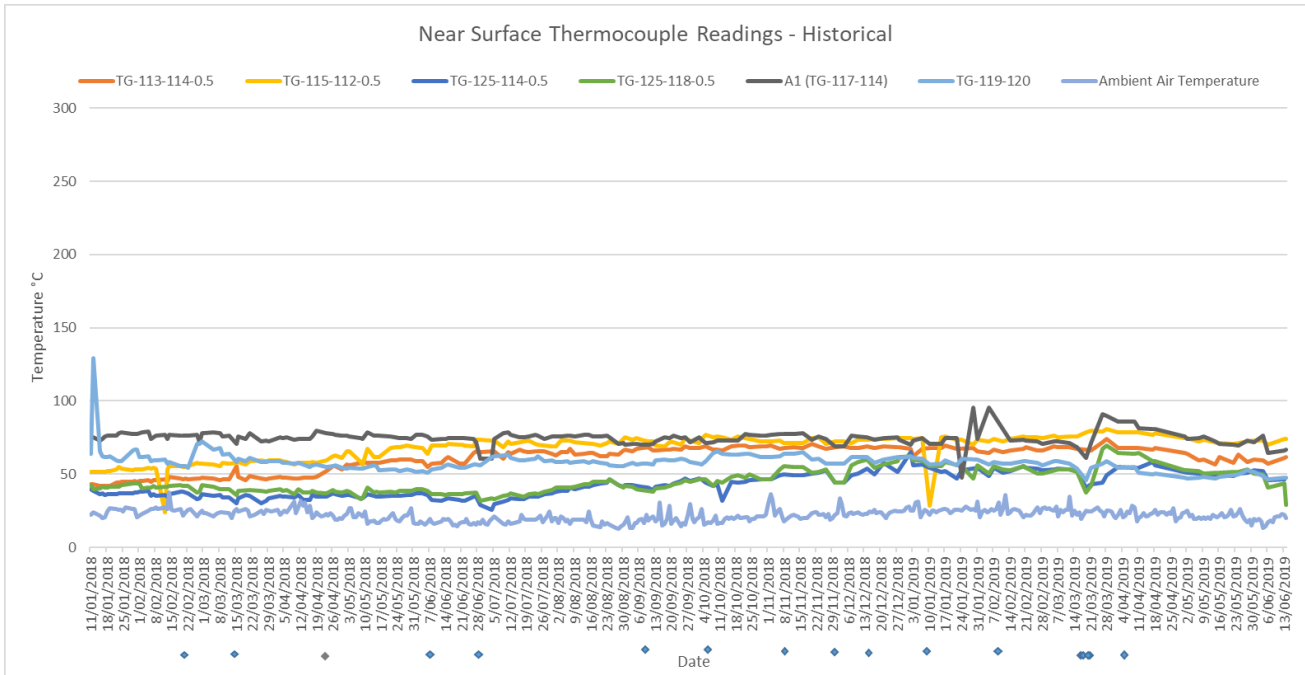
Across the northwest hotspot, a grid system has been established in order to provide a near-surface temperature profile for the hotspot and the immediate surrounding area. Grid locations have been determined by Greencap Consultants following initial surface temperature spot checks. Thermocouple monitoring points have been installed at depths of 0.3m and 0.5m across the northwest hotspot. Temperature measurements are taken at each grid point location using digital thermometers with 'K type' thermocouples designed for continuous temperature measurement. Near surface temperature data has been extrapolated to produce subsurface temperature isotherm maps for the hotspot.

3. TEMPERATURE MONITORING RESULTS

The near-surface temperatures for representative monitoring locations, spread across the northwest Hotspot, are presented in the tables below. Temperature isotherms have been plotted on a site map to show an illustration of the near-surface temperatures in a spatial context. Refer to **Appendix B: Near Surface Temperature Isotherm Map (0.5m)**.

3.1. Near-Surface Temperature Graph – Selected Points (Historical)

Near surface temperature measurements for key thermocouple locations, progressive from Thursday 11th January 2018 to present.



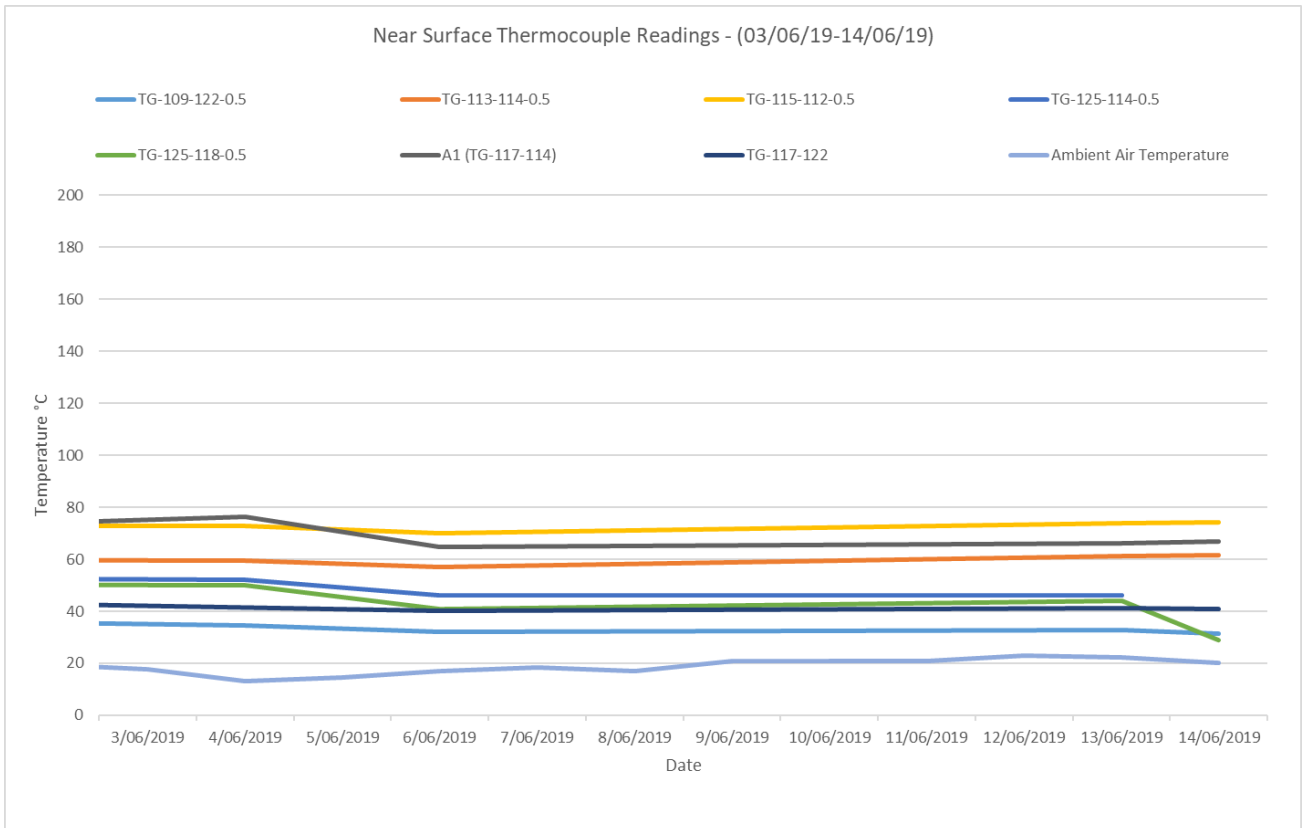
◆ = Rain Event (>20mm) ◆ = Sand Placement

The near surface temperature appears to be trending downwards following the placement of sand (approximately 100mm) across the surface of the northwest hotspot grid monitoring area.

Fluctuations in near-surface temperature are evident following significant rain events (i.e. over 20mm rain).

3.2. Near-Surface Temperature Graph – Selected Points (Fortnightly)

Near-surface temperature measurements for key thermocouple locations, over the monitoring period – 3rd June 2019 to 14th June 2019.



The near-surface temperature at selected points across the northwest hotspot over the period of monitoring appear to remain consistent.

4. ANALYSIS OF ISOTHERM MAP DATA

The isotherm map shows the general zone of influence for temperatures between 30°C and 75°C at 0.5m, coloured orange. The isotherm map suggests that the hotspot may extend deeper than 0.5m and that the increased temperature in these areas is a result of heat venting to the surface.

It is noted that temperature at the near-surface may be variable across the hotspot due to inconsistencies in the consolidation and compaction of subsurface materials.

5. DISCUSSION

The near-surface temperature monitoring conducted between 3rd June 2019 and 14th June 2019 indicates that the spatial extent of the northwest hotspot appears to remain localised.

There were no significant near-surface temperature variations identified during the period of monitoring.

There were significant rainfall events during the period of monitoring; 30.8mm recorded on 4th June and 33.4mm recorded on 5th June.

It is recommended that weekly site inspections and recording are continued to monitor the near-surface temperatures surrounding the subsurface hotspot identified at the site.

Near-Surface Temperature Investigation

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

Appendix A: Area of Concern – Northwest Hotspot Map



Near-Surface Temperature Investigation

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

Appendix B: Near-Surface Temperature Isotherm Map (0.5m)

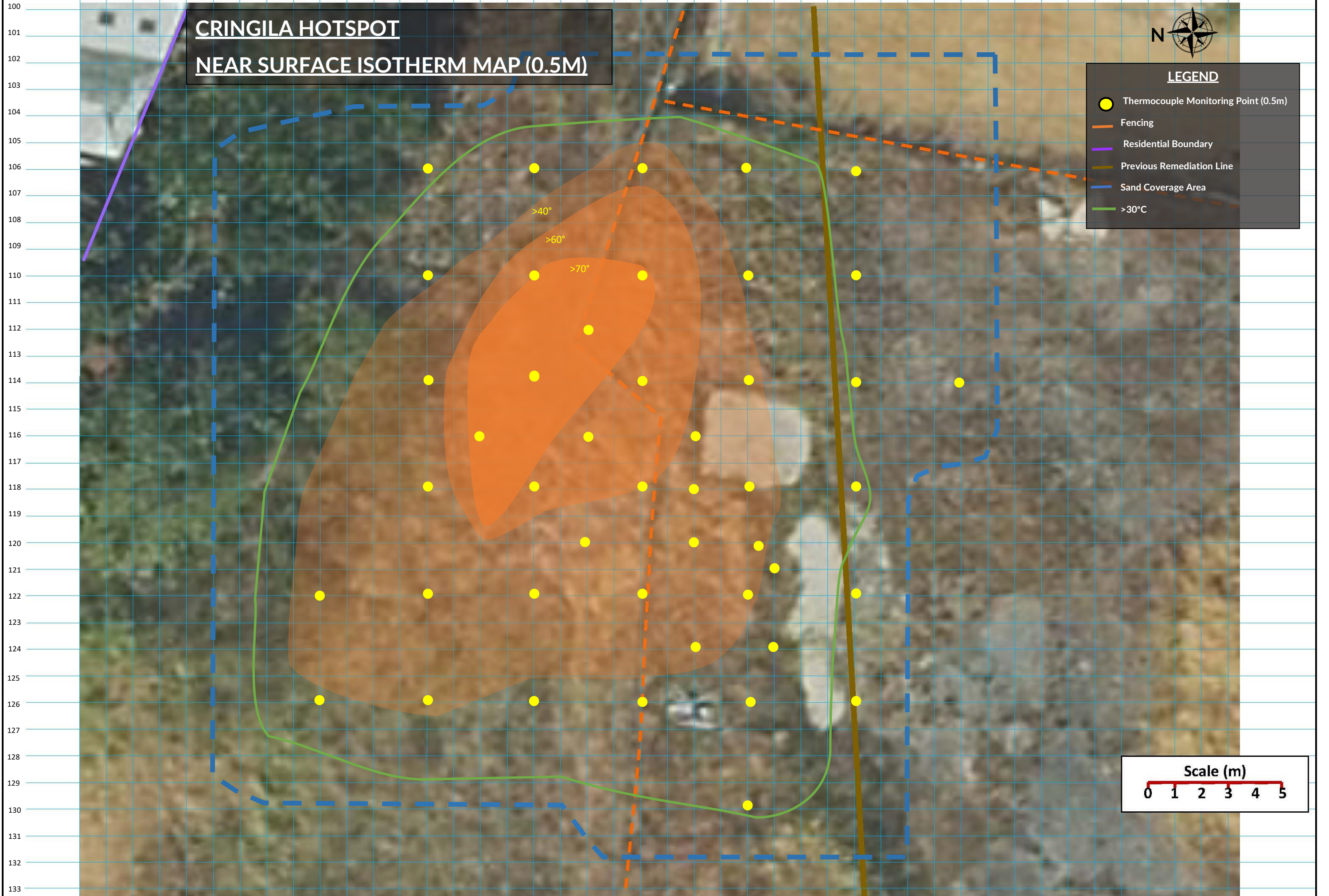
100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143

CRINGILA HOTSPOT NEAR SURFACE ISOTHERM MAP (0.5M)



LEGEND

- Thermocouple Monitoring Point (0.5m)
- Fencing
- Residential Boundary
- Previous Remediation Line
- Sand Coverage Area
- >30°C



>40°
>60°
>70°

