

# **VRX Silica**

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## ***Arrowsmith North Access Route***

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Phytophthora Dieback occurrence assessment – Version 0.4



|                    |                                      |
|--------------------|--------------------------------------|
| <i>Client</i>      | <i>VRX Silica</i>                    |
| <i>Report name</i> | <i>Arrowsmith North Access Route</i> |

*This report has been prepared following the scope of work agreed between VRX Silica and Glevan Consulting and contains results and recommendations specific to the agreement; therefore, results and recommendations in this report should not be referenced for other projects without the written consent of Glevan Consulting.*

## **Executive Summary**

VRX Silica is developing silica sand deposits at Arrowsmith North (Figure 1).

This site has previously been assessed for the presence of Phytophthora Dieback within the proposed development envelope. The current assessment was to determine the occurrence of Phytophthora Dieback within the proposed access route to the development envelope.

The Arrowsmith North access route traverses remnant vegetation from the development envelope to Brand Highway. A small section abuts private property along an existing track (Figure 2).

The southern end of the Arrowsmith North access route was classified as Uninterpretable. This section encompasses a low-lying area of vegetation with limited Phytophthora Dieback indicating species and evidence of off-road vehicle activity.

- All vehicles and machinery are cleaned of soil and plant materials before entering the site.
- Vehicles and machinery should be cleaned of soil and plant material if exiting the Uninfested section of Arrowsmith North before entering the Uninfested section.
- All raw materials must be obtained from Uninfested sources.

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## ***Table of Contents***

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|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b><i>Introduction</i></b>                     | <b>1</b>  |
| 1.1      | The assessment areas                           | 1         |
| <b>2</b> | <b><i>Background</i></b>                       | <b>4</b>  |
| <b>3</b> | <b><i>Materials and methods</i></b>            | <b>5</b>  |
| 3.1      | The assessment method                          | 5         |
| 3.2      | Collection of evidence of Phytophthora Dieback | 6         |
| <b>4</b> | <b><i>Results</i></b>                          | <b>7</b>  |
| 4.1      | Allocation of categories                       | 7         |
| 4.2      | Disease distribution                           | 7         |
| 4.3      | Ecosystem health                               | 7         |
| 4.4      | Uninterpretable                                | 7         |
| <b>5</b> | <b><i>Discussion</i></b>                       | <b>8</b>  |
| <b>6</b> | <b><i>Recommendations</i></b>                  | <b>9</b>  |
| <b>7</b> | <b><i>Bibliography</i></b>                     | <b>10</b> |
| <b>8</b> | <b><i>Appendices</i></b>                       | <b>11</b> |
| 8.1      | Phytophthora Dieback Occurrence map            | 11        |

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## ***List of Figures***

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|   |    |
|---|----|
| Figure 1 – Location Map, Arrowsmith .....                   | 2  |
| Figure 2 - Arrowsmith North Project Area .....              | 3  |
| Figure 3 - Phytophthora occurrence - Arrowsmith North ..... | 12 |

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## ***List of Tables***

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|  |   |
|--|---|
| Table 1 - Phytophthora Dieback occurrence categories ..... | 6 |
| Table 2 - Assessment area statement .....                  | 7 |

# **1 Introduction**

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VRX Silica is developing silica sand deposits at Arrowsmith North (Figure 1).

This site has previously been assessed for the presence of Phytophthora Dieback within the proposed development envelope. The current assessment was to determine the occurrence of Phytophthora Dieback within the proposed access route to the development envelope.

## **1.1 The assessment areas**

The Arrowsmith North access route traverses remnant vegetation from the development envelope to Brand Highway. A small section abuts private property along an existing track (Figure 2).

## Location Map - Arrowsmith

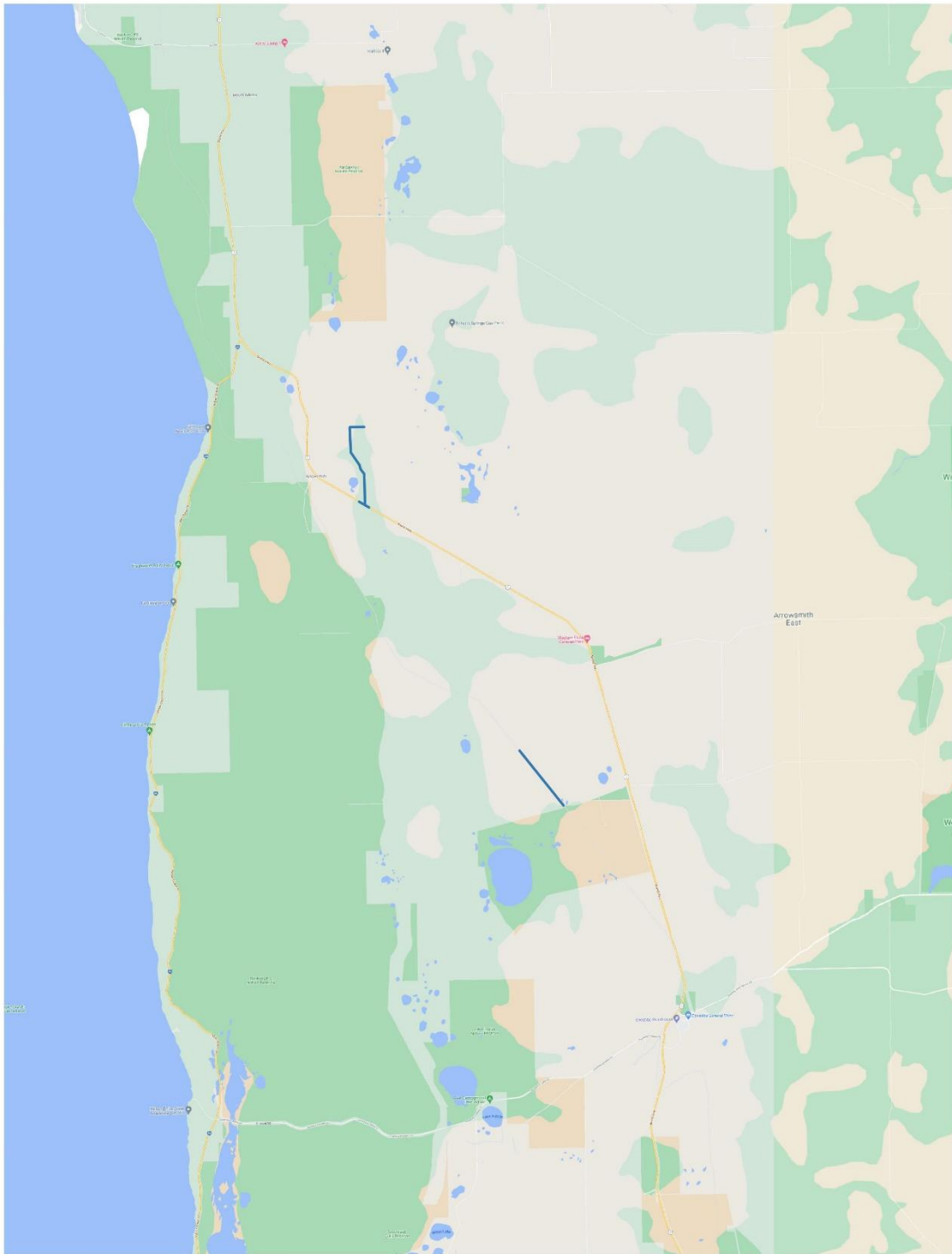


Figure 1 – Location Map, Arrowsmith

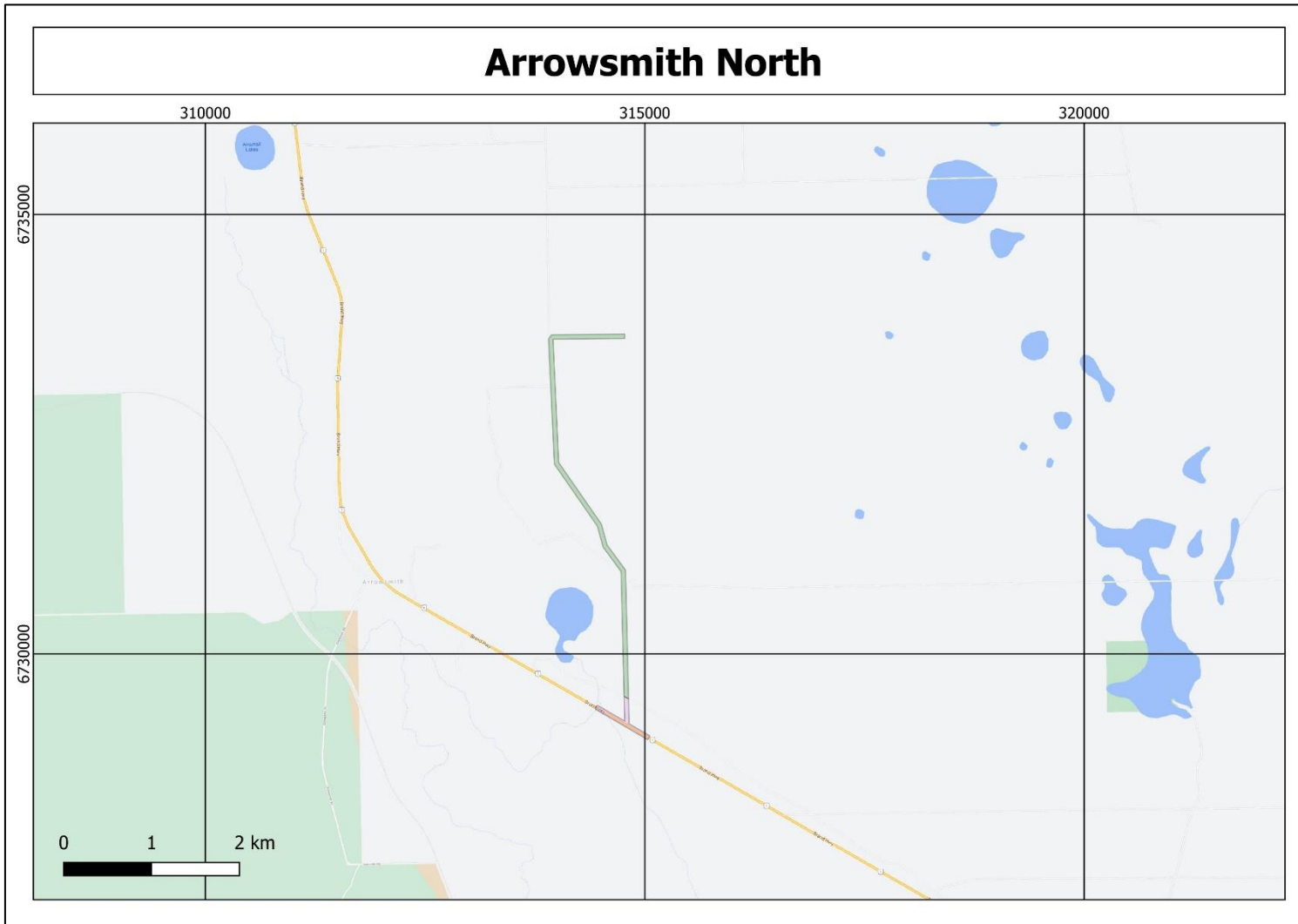


Figure 2 - Arrowsmith North Project Area



## 2 Background

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Thousands of Australian native plant species are susceptible to Phytophthora Dieback—a destructive disease caused by the pathogenic *Phytophthora cinnamomi* and other *Phytophthora* species. This disease is a significant threat to Australia's biodiversity, placing important plant species at risk of death, local extirpation, or extinction. Its dramatic impact on plant communities can also result in significant declines in some insect, bird and animal species due to the loss of shelter, nesting sites and food sources. Phytophthora dieback can cause permanent damage to ecosystems. Once an area is infested with the pathogen, eradication is usually impossible. Awareness that human activity can quickly spread the pathogen . . . will help prevent an increase in the extent of this disease. (Commonwealth of Australia, 2018)

*Phytophthora* is a microscopic water mould that belongs to the class Oomycetes. Oomycetes organisms are filamentous and absorptive and reproduce both sexually and asexually. *Phytophthora*'s are considered parasitic. It behaves mainly as a necrotrophic pathogen causing damage to the host plant's root tissues because of infection and invasion. (Department of Parks and Wildlife, 2015) The pathogen infects a host when it enters at a cellular level and damages the cell structure.

Phytophthora Dieback results from the interaction between three physical components forming a 'disease triangle': the pathogen (*Phytophthora species*), the environment and the host. All three elements are needed for the disease to develop over time.

The relationship between the presence of *Phytophthora* and the development of Phytophthora Dieback disease is variable based on the susceptibility of native plant species and the different environmental characteristics, landform types and rainfall zones across bioregions.

### 3 Materials and methods

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Procedures and guidelines stipulated in "Phytophthora Dieback Interpreters Manual for lands managed by the Department" (DBCA) are applied as the base methodology used by Glevan Consulting in the delivery of the services and products required by this scope of work. These guidelines and overarching peer review and quality standards ensure that all results are presented to the highest standard.

Glevan Consulting has assessed areas based on existing evidence presented at the time of assessment. The Phytophthora pathogen may live in the soil as an incipient disease. Methods have been devised and utilised that compensate for this phenomenon; however, very new centres of infestation that do not present any visible evidence may remain undetected during the assessment.

#### 3.1 The assessment method

All Phytophthora Dieback detection, diagnosis and mapping were performed to standards and procedures defined in the interpretation manual. These procedures are grounded on the presence in the vegetation of Indicator Species and the observance of deaths in these plants. An indicator species is a plant species that is reliably susceptible to *Phytophthora cinnamomi*. Indicator species deaths (ISDs) alone do not necessarily indicate disease presence, and it was necessary to consider all environmental and ecological factors that were present. These other factors included:

- Chronology of deaths;
- A pattern of deaths;
- Topographical position;
- Vectoring – causal agencies, and;
- Biomass and biological diversity reduction.

Other causes of plant deaths considered when determining the presence of Phytophthora Dieback included:

- drought, wind scorch and frost;
- fire and lightning;
- senescence and competition, and;
- physical damage.

Before the assessment, all relevant information relevant to the project was assembled to assist the interpretation process. This information included previous assessments of the area and history of burning.

### 3.2 Collection of evidence of Phytophthora Dieback

During the assessment process, the collection of evidence to support the field diagnosis was recorded using a GPS-enabled tablet running the ESRI Collector application. Waypoints were recorded at locations to show proof of:

- where field diagnosis is confident or almost certain of Phytophthora Dieback infestation;
- healthy indicator species where field diagnosis is practically certain of the site being uninfested;
- sites with too few or devoid of indicator species, thus supporting uninterpretable classification, and
- areas of disturbance, which are temporarily uninterpretable or excluded from the assessment.

The evidence collection confirmed the Project Areas could be segregated into the following categories (Table 1).

**Table 1 - Phytophthora Dieback occurrence categories**

| Phytophthora occurrence category  |
|---|
| Uninfested - Determined to be free of plant disease symptoms that indicate the presence of <i>P. cinnamomi</i>  |
| Uninterpretable - Undisturbed areas where susceptible plants are absent, or too few to make a determination of the presence or absence of <i>P. cinnamomi</i> . |

## 4 Results

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### 4.1 Allocation of categories

Table 2 - Assessment area statement

| Category                    | Area (ha) | Protectable Area (ha) | % of total area |
|-----------------------------|-----------|-----------------------|-----------------|
| Infested                    |           | 0.00                  |                 |
| Uninfested                  | 25.77     | 25.77                 | 84%             |
| Uninterpretable             | 4.84      | 4.84                  | 16%             |
| Temporarily Uninterpretable |           |                       |                 |
| Assessed Area               | 30.61     | 30.61                 |                 |
| Excluded                    |           |                       |                 |

### 4.2 Disease distribution

No Phytophthora Dieback was observed at the Arrowsmith sites.

### 4.3 Ecosystem health

No significant issues were observed in the vegetation that may mask the symptoms of Phytophthora Dieback if present.

### 4.4 Uninterpretable

The southern end of the Arrowsmith North access route was classified as Uninterpretable. This section encompasses a low-lying area of vegetation with limited Phytophthora Dieback indicating species and evidence of off-road vehicle activity.

## 5 Discussion

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The access route to the Arrowsmith North development envelope traverses remnant vegetation, with a small section following a firebreak adjacent to private property.

The northeastern section that traverses east from the private property has been developed with the vegetation cleared and a track installed.

From Brand Highway to the parallel firebreak track (approximately 250 metres linear distance), the southern section has been classified as Uninterpretable. The vegetation contained few *Phytophthora* Dieback indicating species. Therefore, no demarcation was installed as the track may be used to delineate the Uninterpretable from the Uninfested section.

## 6 Recommendations

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- All vehicles and machinery are cleaned of soil and plant materials before entering the site.
- Vehicles and machinery should be cleaned of soil and plant material if exiting the Uninfested section of Arrowsmith North before entering the Uninfested section.
- All raw materials must be obtained from Uninfested sources.

## 7 Bibliography

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Commonwealth of Australia. (2018). *Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi*.

Department of Parks and Wildlife. (2015). *FEM047 Phytophthora Dieback Interpreter's Manual for lands managed by the department*. Unpublished.

## 8 Appendices

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### 8.1 Phytophthora Dieback Occurrence map

The provided map is the Phytophthora Dieback occurrence map.

The project area is displayed as a blue boundary line. In addition, the following categories are also shown (if present in the project area):

- Excluded (shown as uncoloured). Areas of a high disturbance where natural vegetation has been cleared and is unlikely to recover to an interpretable level.
- Infested (shown as a red). Determined from the assessment to have plant disease Phytophthora Dieback.
- Uninfested (shown as green). Determined from the assessment to be free of plant disease Phytophthora Dieback.
- Uninterpretable (shown as purple). Undisturbed areas where susceptible plants are absent, or too few to decide the presence or absence of Phytophthora Dieback.

Phytophthora Dieback is a dynamic disease with the autonomous spread of the pathogen not expected to be more than three metres a year upslope in average conditions. In unusual circumstances, such as heavy spring, summer or autumn rainfall, the spread of the disease may be rapid and breach the buffers. However, these buffers provide the best chance of hygienic operating conditions within protectable areas over a set twelve-month period. The information on Phytophthora occurrence maps then becomes obsolete.



# Phytophthora Dieback Occurrence Map (includes hygiene categories)

VRX Silica

**Arrowsmith  
and Mueha  
access routes**
















Arrowsmith North

Project No: GC-21-1288

Scale (@A3) = 20000

## LEGEND

### PHYTOPHTHORA DIEBACK OCCURRENCE CATEGORIES

-  Project boundary
  -  Infected  
Determined to a significant degree to have plant disease symptoms consistent with the presence of a dieback
  -  Uninfected  
Determined to a significant degree to be free of plant disease symptoms but include the presence of P. caninervis
  -  Uninfected, hyperparasitic
  -  Uninterpretable  
Uninfected areas where susceptible plants are absent, or too few to make a determination of the presence or absence of P. caninervis
  -  Uninterpretable, hyperparasitic
  -  Temporarily uninterpretable  
Areas of disturbance where natural vegetation is likely to recover
  -  Temporarily uninterpretable, hyperparasitic
  -  Not Yet Resolved  
The high P. caninervis dieback cannot be ruled out at the time of assessment because of insufficient or inconclusive evidence (including satellite imagery)
  -  Not Yet Resolved, hyperparasitic
  -  Fenced  
Areas of high disturbance where natural vegetation has been cleared or is unable to recover to a level that is interpretable
  -  Inexposed, hyperparasitic
- ### HYGIENE POINT CATEGORIES
-  Clean and free of plant
  -  Where one of the key assessment points of track
  -  FID detector or track

|                       |         |
|-----------------------|---------|
| Assessment Completion | 10/2021 |
| Interpreter(s)        | EB      |
| Map expiry date       | 10/2022 |

| Phytophthora Dieback Occurrence Category | Area Statement                    |                                     |
|--|-----------------------------------|-------------------------------------|
|  | Protectable Vegetation (hectares) | Unprotectable Vegetation (hectares) |
| Infected                                 | 14.3                              | 14.3                                |
| Uninfected                               | 28.8                              | 0                                   |
| Uninterpretable                          | 24.9                              | 0                                   |
| Temporarily Uninterpretable              | 0                                 | 0                                   |
| Not Yet Resolved                         | 0                                 | 0                                   |
| Assessed Area Total                      | 67.9                              | 0                                   |
| Excluded Area                            | 13.3                              | 0                                   |
| Project Area Total                       | 81.2                              | 0                                   |

Map produced by Evan Brown, Projection UTM Zone 50, Datum GDA94

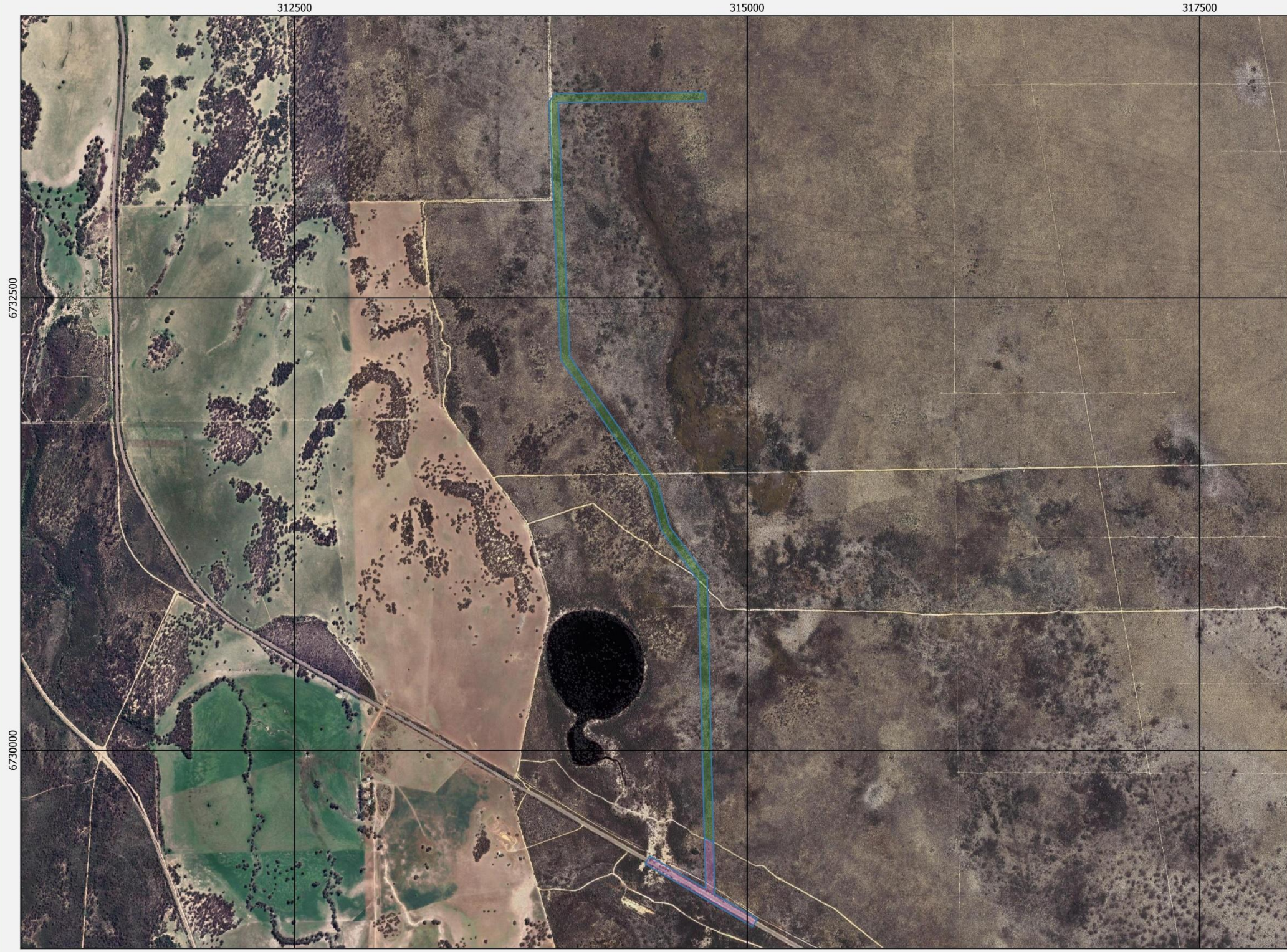


Figure 3 - Phytrophthora occurrence - Arrowsmith North