

WESTERN AREAS LTD



DIEBACK MANAGEMENT PLAN

VERSION 1



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1.0 INTRODUCTION

1.1 Forrestania Nickel Operation (FNO)

The Forrestania Nickel Operation (FNO) is owned and operated by Western Areas Limited (WSA) and is located approximately 450 km East of Perth in the Shire of Kondinin (Figure 1). The FNO is situated in the Mallee bioregion, described by Beard (1990), and has a warm dry Mediterranean climate with winter precipitation and an average rainfall between 300 and 500 mm. The FNO consists of the mines Flying Fox and Spotted Quoll, as well as a concentrator and camp at Cosmic Boy.

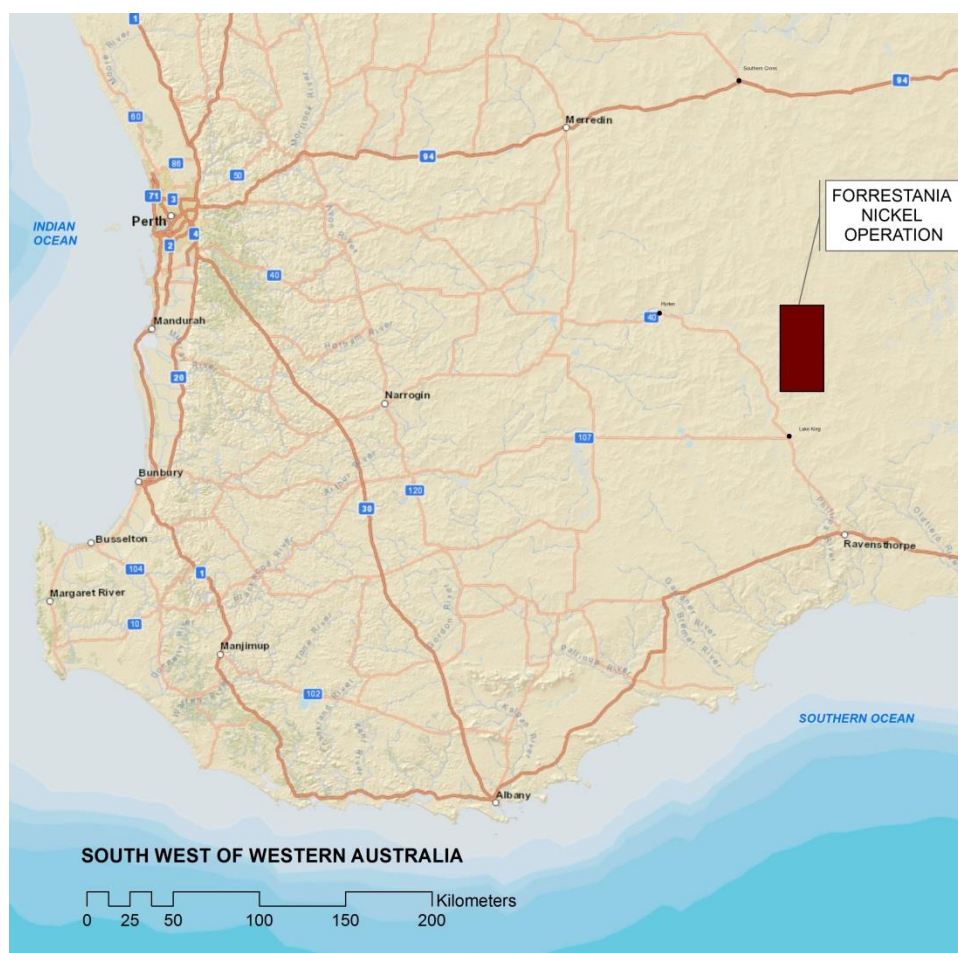


Figure 1: Forrestania Location

1.2 Dieback occurrence

In July 2017, during quarterly declared rare flora (DRF) monitoring, a noticeable decline in vegetation health was observed within two vegetation monitoring points at the FNO. Environmental staff took samples of soil, root and collar tissue and sent them for analysis to the Vegetation Health Service (VHS). The VHS is a dedicated specialist scientific service of the Department of Biodiversity, Conservation and Attractions (DBCA) and is utilised for the detection and identification of *Phytophthora* species from samples across Western Australia.

A novel soil pathogen, *Phytophthora boodjera* (*P. boojera*) was detected within the samples sent to the VHS in July 2017 and subsequent investigation by dieback specialists Southern Ecology, confirmed the pathogen as partially responsible for contributing to plant health decline. Southern Ecology were engaged to undertake dieback occurrence mapping for the Forrestania management area, which includes the proposed New Morning open pit mine and associated infrastructure, in order to establish a baseline dieback health condition and develop a Dieback Management Plan to manage the risk of further infestation at the FNO.

Many of the (new) *Phytophthora* species recently uncovered in Australia's native ecosystems are newly described and until more is known, caution must be employed with regard to the spread and conservation management of these new species in Australia's unique ecosystems.

2.0 PURPOSE

The purpose of this plan is to identify and implement strategies to manage the risk of introduction and spread of the plant pathogen *P. boodjera* and other potential *Phytophthora* species at the FNO.

3.0 SCOPE

The scope of this document includes all current and future exploration, construction, operation, closure and decommissioning activities within dieback infected and dieback risk areas as shown in Figure 2, Appendix 1.

Should additional dieback infestation or risk areas be identified across the FNO, the plan and associated mapping shall be updated and made available to all contractors and staff.

4.0 DEFINITIONS AND ACRONYMS

Table 1: Acronyms and abbreviations

Abbreviation or Acronym	Definition
DBCA	Department of Biodiversity Conservation and Attractions
Dieback	Dieback attributed to <i>Phytophthora</i> species
DRF	Declared rare flora (conservation listed taxa)
FNO	Forrestania Nickel Operation
<i>P. boodjera</i>	<i>Phytophthora boodjera</i>
VHS	Vegetation Health Service
WSA	Western Areas Limited

5.0 RESPONSIBILITIES AND ACCOUNTABILITIES

Table 2: Responsibility table

Role	Responsibility
Mine General Manager	• Ensure all staff have access to this document and any related procedures. • Ensure that all contractors and staff are fully inducted and are aware of responsibilities and obligations. • Allocate resources to ensure commitments are met.
Group Environmental Manager	• Ensure that any approvals required under State or Commonwealth legislation are obtained. • Ensure environmental risks are managed through development and implementation of management plans/management systems.
Environmental Superintendent/ Environmental advisor	• Implementing and maintaining this Dieback Management Plan and Procedure (FNO-WHS-PRO-Dieback Hygiene). • Providing advice to site on dieback and developing specific dieback and hygiene controls for relevant works through the FNO Ground Disturbance Permit Process. • Undertaking inspections of vehicles and machinery entering the FNO for ground disturbing purposes. • Coordinating dieback assessments and occurrence mapping at agreed intervals. • Provide required training and education to all employees, contractors and site visitors.
Environmental Technician	• Maintenance of dieback infested area signage. • Undertaking inspections of vehicles and machinery entering the FNO for ground disturbing purposes. • Undertaking soil sampling for dieback detection.
All employees, contractors and site visitors	• Attend mandatory inductions and specific dieback awareness training as required. • Adhere to dieback and hygiene controls as specified in this management plan, associated procedure (FNO-WHS-PRO-Dieback Hygiene) and specific controls developed through the FNO Ground Disturbance Permit process. • Reporting of non-compliances to FNO Environmental Department.

6.0 MANAGEMENT PLAN

6.1 Objective

The objective of this Dieback Management Plan is to prevent the spread of *P. boodjera* and other potential *Phytophthora* species into areas currently not infested at the FNO.

The following key strategies will be utilised to carry out this objective.

6.2 Risk Management

A risk assessment has been undertaken for mining activities with potential to introduce or spread *P. boodjera* and other potential *Phytophthora* species at the FNO and this is located in Appendix 2. The risk assessment has been undertaken on the basis of impacts to Steedman's Gum (*Eucalyptus steedmanii*) populations in proximity to known infested and dieback risk areas.

6.3 Management Strategies

- **Occurrence mapping** – showing infested, uninfested 'at risk' areas and 'protectable areas (Figure 2)
- **Clean on entry (COE), Clean on exit approach** – all works within the scope of this management plan to follow hygiene protocols described in Dieback Hygiene Procedure (FNO-WHS-PRO-Dieback Hygiene)
- **Monitor and review** – Undertake further *Phytophthora* surveys if additional areas suspected
- **Continuous improvement** – promote continuous improvement in dieback and hygiene management through the FNO Environmental Management System including awareness training, strict hygiene controls for proposed works, and further dieback survey where necessary.

6.3.1 Occurrence Mapping

To ensure the currency of information on dieback occurrence, WSA will undertake a review of dieback occurrence mapping using a suitably qualified professional at least every two years. The dieback occurrence map will be updated according to this review.

6.3.2 Demarcation/Signage

No unauthorised entry signs have been placed at the entrance of tracks leading known positive sample locations in dieback infested Areas (Figure 3). If amendments to occurrence mapping occur, then additional signage will be installed where necessary and the management plan updated.

6.3.3 Access management

Access to known infested areas will be limited to the FNO Environmental Department or under permit through the FNO Ground Disturbance Permit process. Access to dieback risk areas will be managed using controls within the Dieback Hygiene Procedure (FNO-WHS-PRO-Dieback Hygiene).

6.3.4 Training and Awareness

All staff and contractors will be made aware of dieback and hygiene requirements during inductions, prior to working within the FNO. Specific hygiene controls for relevant works will also be communicated by the FNO Environmental Department to relevant site supervisors and senior personnel through the FNO Ground Disturbance Permit process. Information pertaining to the dieback management will also be communicated periodically to site via education material and toolbox meetings.

6.3.5 EMS - Administrative controls

WSA has an Environmental Management System (EMS) designed to prevent activities or conditions that negatively impact the environment through identifying environmental issues, reporting on environmental performance, implementing remedial actions and striving for continuous improvement. The EMS ensures that environmental risks are addressed by implementing controls.



Activities associated with significant environmental risks are managed in accordance with a range of administrative controls including operational procedures to ensure environmental management requirements are met. Management system documentation is updated and communicated when planned changes to processes are made. Uncontrolled changes (or incidents) are managed in accordance with WSA's Incident Reporting and Investigation Procedure.

A Dieback Hygiene Procedure (FNO-WHS-PRO-Dieback Hygiene) has been developed and will be implemented and maintained in order to outline necessary controls for the management of dieback at the FNO.

6.3.6 Continuous improvement

WSA are committed to continuous improvements as part of its EMS. The following measures for continuous improvement are relevant to hygiene and dieback:

- Review of dieback occurrence mapping using a suitably qualified professional at least every two years;
- Further dieback surveys by qualified professionals where necessary or where additional infestation/vegetation health declines are observed;
- Internal inspections and audits to monitor adherence to hygiene and dieback controls during relevant works;
- Maintain up to date knowledge of *P. boodjera* research in order to inform management decisions; and
- Provide additional training and education to employees and contractors where appropriate (i.e., Green card training).

7.0 MONITORING AND MEASUREMENT

Table 3: Summary of monitoring requirements

Monitoring Activity	Frequency	Location
<i>E. steedmanii</i> health monitoring	Quarterly	Populations 1, 2, 3 and 7 4 and 5 Annually
Vegetation Tissue sampling	Annual (3 rd quarter) Ad Hoc after summer rain events	Known infested areas
Signage condition	Annually (3 rd quarter)	Access tracks to infested areas
Occurrence mapping	Validate at least every 2 years or sooner if addition infestations suspected.	New Morning/Spotted Quoll

Quarterly monitoring of *E. steedmanii* health and reproductive status along transects in populations 1, 2, 3A/3B and 7, and annual monitoring of *E. steedmanii* health in Populations 4 and 5 is to be conducted by the FNO Environmental Department as per Steedman's Gum Conservation Management Plan. Results of this monitoring are stored internally and updated and analysed after monitoring occurs.

The FNO Environmental Department is to conduct vegetation tissue sampling annually for analysis at the VHS lab for *Phytophthora*. Sampling is to be conducted in known infested area boundaries to determine spread and for any unplanned incidents resulting in soil movement across these area boundaries. The Environmental team will adhere to the VHS guide for collecting samples to test for *Phytophthora* (VHS, 2015). Results from this testing are stored internally within Environmental programs and GIS maps will be updated reflecting the infection status of new results (Figure 5 & 6)

Internal review of the validity of occurrence mapping to occur annually in the third quarter.

7.1 Management response

Currently no external reporting requirement exists, however all instances of non-compliance to this management plan and hygiene protocols need to be reviewed promptly and reported to the registered manager within 24 hours. Any such occurrences will be raised as incidents and reported site wide as per the FNO Environmental Management Plan.

In the event that any adverse change is detected in the *E. steedmanii* condition or population size, WSA will advise DoE, DBCA and DMIRS. The cause of the change will be further investigated to determine if the change is a result of the FNO operations.

If the cause of the change is attributable to FNO operations, a contingency plan will be developed outlining proposed actions to reduce, mitigate or offset impacts on *E. steedmanii* populations within the FNO. The contingency plan will be submitted to DoE and DBCA for approval, WSA will continue to liaise with DBCA.

The monitoring schedule will be adapted depending on monitoring results or circumstances.

8.0 REFERENCE DOCUMENTS

Crane, C.E. and Rathbone, D.A. (2018) *Phytophthora boodjera* occurrence map, Western Areas. Unpublished report Western Areas Ltd, Forrestania by Southern Ecology.

Department of Biodiversity, Conservation and Attractions, 2017, *Phytophthora Dieback Management Manual*, October 2017, Department of Biodiversity, Conservation and Attractions, Perth.

Department of Forest and Ecosystem Management Division (2015) *Guide for collecting samples to test for Phytophthora*. Department of Parks and Wildlife: Perth.

Department of Forest and Ecosystem Management Division (2015) *Phytophthora Dieback interpreter's manual for lands managed by the department*. Department of Parks and Wildlife: Perth.

APPENDIX 1 - MAPS

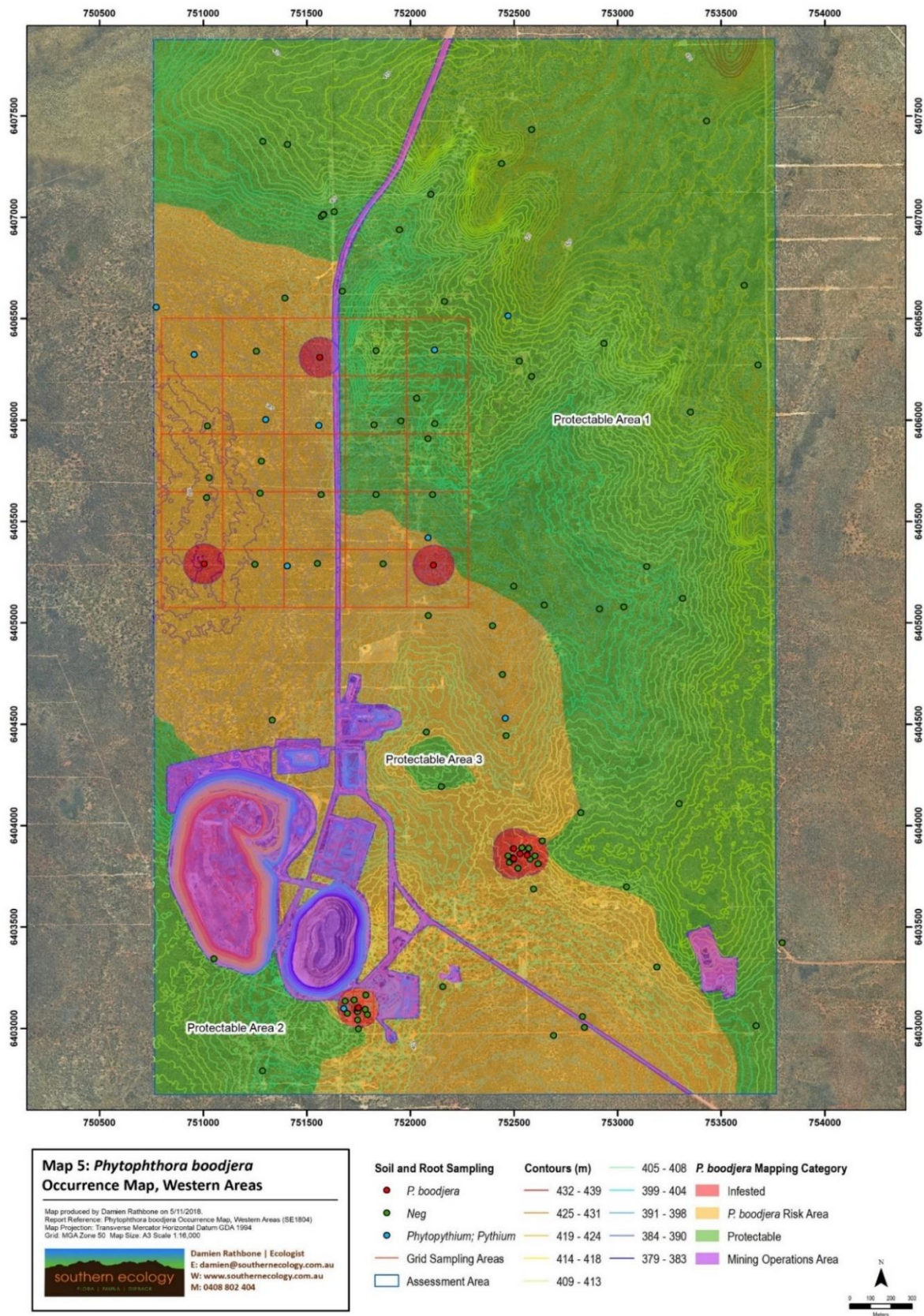


Figure 2: *Phytophthora boodjera* occurrence map (Verified by Southern Ecology in June 2020)

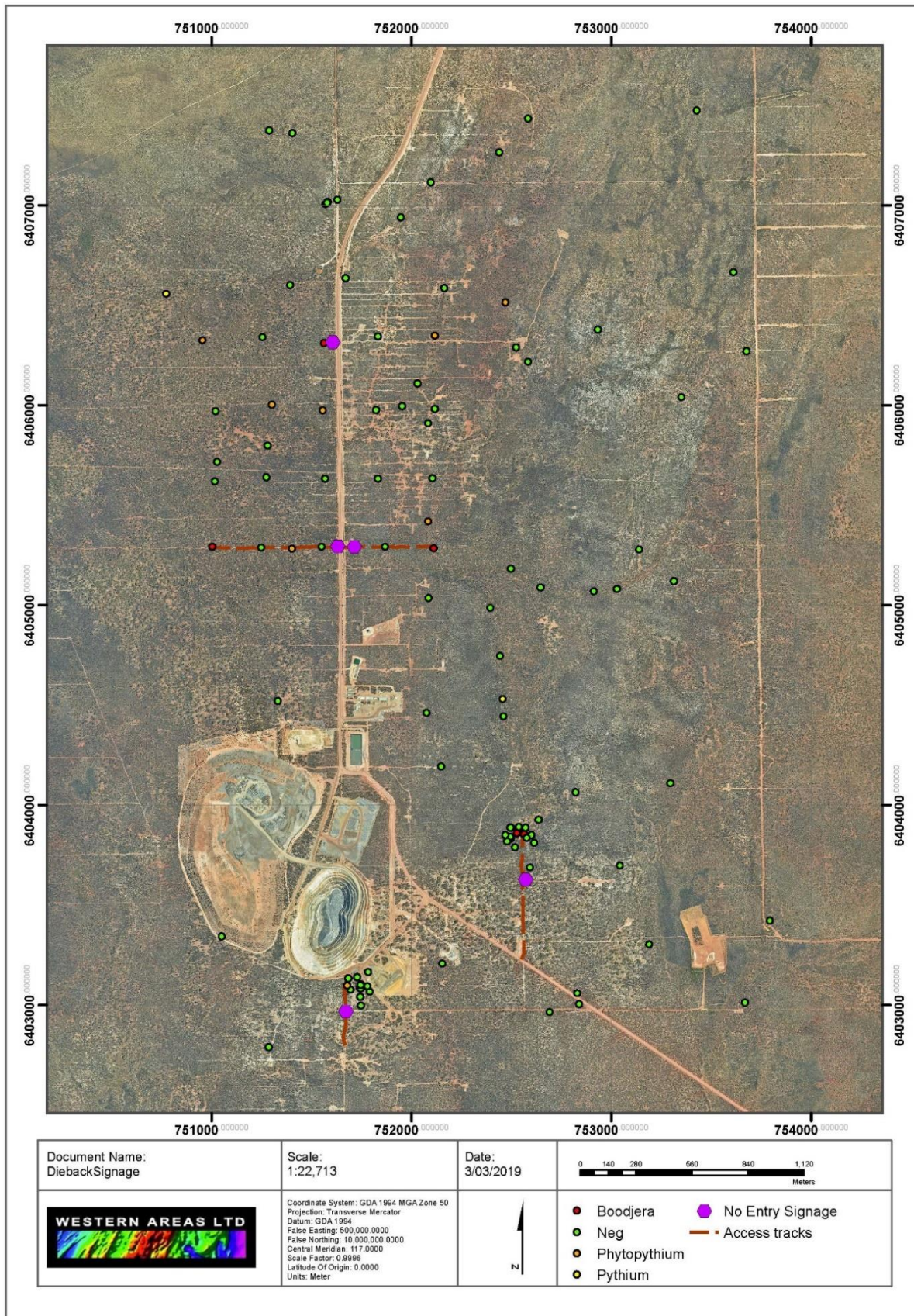


Figure 3: Dieback signage locations



APPENDIX 2: RISK ASSESSMENT

Table 4: Risk Assessment for mining activities with potential to introduce or spread *P. boodjera* and other potential *Phytophthora* species at the FNO

Activity	ASPECT	ENVIRONMENTAL IMPACT (no control)	LIKELIHOOD	CONSEQUENCE	PRIORITY	RISK	CONTROL (Future/needed?)	RESIDUAL RISK			
								LIKELIHOOD	CONSEQUENCE	PRIORITY	RISK
• Exploration • Mining	Land clearing	Spread of disease into uninfested areas	B	2	17	E	Occurrence mapping, exclusion zones, vehicle washdown, clean on entry/exit station, clearing in dry weather	D	3	19	M
	Environmental monitoring/surveys	Transport of potentially infested materials from walking between infested zones to uninfested zones	C	2	17	E	Occurrence mapping, exclusion zones, vehicle washdown, clean on entry/exit station, dry weather access, footwear and tool cleaning between sites	E	3	19	M
	Vehicle access	Dirtying vehicle with soil from driving through infected zones into uninfested zones through routine activities i.e. Drilling, exploration, surveys, monitoring, inspections.	B	2	17	E	Occurrence mapping, exclusion zones, vehicle washdown, dry weather access and clean on entry/exit station	E	3	19	M
	Topsoil recovery	Stockpiling topsoil collected during land clearing activities	B	2	17	E	Occurrence mapping, designated dieback infested stockpile locations, clear signage of topsoil stockpiles and dry weather operation where required	E	3	19	M
	Transport of construction material	Movement of material for construction e.g., sand, gravel for road building.	A	2	20	E	Occurrence mapping, designated locations for dieback free materials, clear signage of material stockpiles and dry weather operation where required	D	3	23	M


Table 5: Qualitative Measures of Likelihood

LEVEL	DESCRIPTOR	DESCRIPTION
A	Almost Certain	Environmental issue that is expected to occur in most circumstances.
B	Likely	Environmental issue that has been a common problem in the past and will probably occur in most circumstances.
C	Possible	Environmental issue may have arisen in the past and could occur.
D	Unlikely	Environmental issue may have occurred in the past and it could occur but not expected.
E	Rare	Environmental issue that would occur only in exceptional circumstances.

Table 6: Qualitative measures of Consequence

LEVEL	DESCRIPTOR	DESCRIPTION Example
1	Catastrophic	Death, toxic release off-site with detrimental effect, huge financial loss. <i>Major hydrocarbon spill to a land are with extensive surface and water pollution.</i>
2	Major	Extensive injuries, loss of production capability, off-site release contained with outside assistance and little detrimental impact, major financial loss <i>Removal of Declared Rare Flora (DRF) without permission.</i>
3	Moderate	Medical treatment required, onsite release contained with outside assistance, high financial loss. <i>Groundwater pollution with limited biological damage and no contamination of a potentially usable groundwater resource.</i>
4	Minor	First aid treatment, on-site release immediately contained medium financial loss. <i>Minor hydrocarbon spills from vehicles and equipment.</i>
5	Insignificant	No injuries, low financial loss, negligible environmental impact. <i>Erosion control structures not constructed along access areas.</i>

Table 7: Qualitative Risk Analysis Matrix

LIKELIHOOD	CONSEQUENCE				
	1	2	3	4	5
A	E	E	E	H	H
B	E	E	H	H	M
C	E	E	H	M	L
D	E	H	M	L	L
E	H	H	M	L	L

E = Extreme Risk, H = High Risk, M = Moderate Risk, L = Low Risk


Table 8: Prioritisation of Risks

LIKELIHOOD	CONSEQUENCE				
	1	2	3	4	5
A	1	3	8	11	16
B	2	5	10	15	21
C	4	9	13	18	22
D	6	12	17	20	24
E	7	14	19	23	25

Table 9: Risk Definitions (AS/NZ HB 203:2006)

Extreme	Immediate action required
High	Senior management attention required
Moderate	Management responsibility must be specified
Low	Manage by routine procedures