

Appendix G – Fire Management Plan



Arafura Resources Limited
Nolans Project
Fire Management Plan

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Table of contents

1.	Introduction	1
1.1	Purpose	1
1.2	Objectives	1
1.3	Legislation and Guidelines.....	1
2.	Fire Environment and Protocols.....	2
2.1	Fire Triangle.....	2
2.2	Fire Danger Ratings	2
2.3	Fire Tracking	3
2.4	Climate Conditions	4
2.5	Bushfire Management	7
2.6	Fire Equipment.....	8
3.	Fire Management	9
3.1	Associated Management Plans.....	9
3.2	Fire Management Plan	9
3.3	Key Activities, Risks and Impacts	9
3.1	Objective.....	10
3.2	Mitigation Measures	10
3.3	Trigger, Action and Response Plan.....	12
4.	Performance Review.....	14

Table index

Table 2-1	Fire Danger Ratings	2
Table 2-2	Fire Tracking and Alert Systems.....	3
Table 2-3	Summary of Climate Statistics and Fire Risk (BoM 2015; Territory Grape Farm NT 1987-2014)	5
Table 2-4	Bushfire Attack Methodologies (Source: ACT Fire & Rescue, 2011).....	7
Table 2-5	Summary of Firefighting Equipment.....	8
Table 3-1	Key Activities, Risks and Impacts	9
Table 3-2	Fire Management Objectives.....	10
Table 3-3	Mitigation Measures	10
Table 3-4	Trigger, Action and Response Plan.....	12

Figure index

Figure 2-1 Annual and Seasonal Wind Roses (Source: BOM, Territory Grape Farm Station
No. 015643)6

Appendices

Appendix A – Risk Matrix

1. Introduction

1.1 Purpose

The Nolans Project is situated at a location where bushfires have occurred historically and onsite processes and activities have the potential to increase fire frequency. The threat of a fire can be categorised into three types including bushfires that will impact primarily on the environment, and, building fires and machinery / plant fire that will impact primarily on project assets.

The Fire Management Plan (FMP) has been developed to provide a framework for the management of fires across and adjacent to the Project site. It is a living document that will be reviewed and updated in consultation with pastoralists, traditional owners and their representative organisations including the Central Land Council (CLC).

1.2 Objectives

The FMP has been created to minimise potential impact in relation to fires. The main objects are to:

- Protect cultural heritage sites, assets, biodiversity and people from controlled and uncontrolled fires;
- Detail procedures to be implemented to reduce potential for fires;
- Establish consultation procedures for controlled burns; and
- Provide bushfire control procedures and responses.

1.3 Legislation and Guidelines

The Bushfires Act establishes the legal framework and responsibilities for bushfire management in the Northern Territory. The fundamental principle established by the Act is that the responsibility for bushfire management rests with the landholder. A key consideration when clearing native vegetation is that there are minimum standards for firebreaks along boundary and internal fence lines.

The key Northern Territory legislation applicable to fire management at the Project includes:

- *Bushfire Act 2009*;
- *Bushfire Regulation 2005*;
- *Fire and Emergency Act 1996*; and
- *Fire and Emergency Regulations 2011*.

2. Fire Environment and Protocols

2.1 Fire Triangle

Fire and explosions can result in human and environmental impacts. Fires require three elements (the fire triangle) in order to occur:

- **Fuel:** A source of fuel to burn (combustible, flammable or electrical). These can typically include vegetation, structures, equipment and hazardous substances.
- **Oxygen:** A source of oxygen (usually in the air). Oxygen is required to burn the fuel causing a chemical reaction to occur which produces increased heat, gasses and turns spent fuel into ash.
- **Heat:** A source of energy sufficient to ignite the fuel. Initially, heat energy is used to evaporate moisture content and other volatile liquids. If the heat source continues following the drying out of the fuel it will reach its ignition temperature. Heat can be transferred to adjacent fuels by:
 - Radiation: heat energy travelling in all directions away from the fire.
 - Convection: heated air displaces sideways (by wind) and upwards carrying embers away from the fire and potential to cause 'spot fire' away from the main fire. Oxygen will be drawn in at the base of the fire to replace the displaced air.
 - Conduction: transfer of heat through objects from an area of high temperature to an area of lower temperature.

2.2 Fire Danger Ratings

Fire danger ratings are a standardised scale used by the Bureau of Meteorology (BOM) to indicate the danger of a fire should it occur or the difficulty in putting out any fires. The level is based on wind, temperature, humidity and rainfall. A summary of the fire danger ratings are provided Table 2-1.

Table 2-1 Fire Danger Ratings

Key	Fire Rating	Fire Behaviour and Risks	BOM Recommendations
	Catastrophic	<ul style="list-style-type: none"> • Fire will threaten without warning. It will be very hard to see, hear and breathe. • Fire may be uncontrollable and fast moving. Embers will start spot fires, often kilometres ahead of the main fire. • Highly likely that unprepared people will suffer serious or life-threatening injury. • Property in the fire's path is likely to be destroyed (even well-prepared homes). • Wide-scale power, telephone and water supply failure likely. • Do not expect a fire truck or firefighters to attend. 	<ul style="list-style-type: none"> • Leave your property early in the day. It is not safe to stay and defend even with the best-prepared property in catastrophic conditions. • Listen to a battery-powered radio tuned to ABC local radio to keep updated with the situation throughout the day.
	Extreme	<ul style="list-style-type: none"> • Fire will threaten suddenly and it will be hot, windy and difficult to see, hear and breathe. • Fires will be fast moving and very difficult to control. Burning embers will start spot fires. • There is potential for property in the fire's path or homes under ember attack to be lost. • People may suffer serious or life-threatening injury. • Only very well-prepared homes that are solidly constructed will be likely to offer any safety. • Expect power, telephone and water supply failure. • Do not expect a fire truck or firefighters to attend. 	<ul style="list-style-type: none"> • If you are leaving your property, do so early in the day. • If your bushfire survival plan permits the decision to stay and defend your home, only do so if it is prepared to the highest level and constructed to withstand bushfire, and you are physically able to do so. • Listen to a battery-powered radio tuned to ABC local radio to keep updated with the situation throughout the day.

Key	Fire Rating	Fire Behaviour and Risks	BOM Recommendations
	Severe	<ul style="list-style-type: none"> Fires will burn unpredictably and may be difficult to control. Embers will be blown around. It will be dangerous and uncomfortable to be outside. There is potential for property in the fire's path or homes under ember attack to be lost. People may suffer serious or life-threatening injury. Only very well-prepared homes that are solidly constructed will be likely to offer any safety. Expect localised power, telephone and water supply failure. Do not expect a fire truck or firefighters to attend. 	<ul style="list-style-type: none"> If you are leaving your property, do so early in the day. If your bushfire survival plan permits the decision to stay and defend your home, only do so if it is prepared to the highest level and constructed to withstand bushfire, and you are physically able to do so. Listen to a battery-powered radio tuned to ABC local radio to keep updated with the situation throughout the day.
	Very High	<ul style="list-style-type: none"> Fires can be difficult to control. Embers may be blown around. Loss of property and injury is less likely, but significant damage could occur. Well-prepared homes and substantial buildings can offer safe shelter. Some local infrastructure may be temporarily unavailable. 	<ul style="list-style-type: none"> If you are leaving your property, do so early in the day. If your bushfire survival plan permits the decision to stay and defend your home, only do so if it is prepared to the highest level and constructed to withstand bushfire, and you are physically able to do so. Listen to ABC local radio to keep updated throughout the day.
	High	<ul style="list-style-type: none"> Fire can be controlled. Loss of property is unlikely but damage may occur. Well-prepared homes and substantial buildings can offer safe shelter. 	<ul style="list-style-type: none"> Listen to ABC local radio to keep updated throughout the day. Know how and where to get further information if required.
	Very High	<ul style="list-style-type: none"> Fire can be easily controlled. Little risk to life and property. 	<ul style="list-style-type: none"> Listen to ABC local radio to keep updated throughout the day. Know how and where to get further information if required.

2.3 Fire Tracking

Fire tracking is an important tool in determining seasonal fire threat at the project site. Several internet based systems provide details on the fire forecast, watch and act notices, official emergencies and tracking maps. The websites will be reviewed and information assessed to determine threat to site personnel. A summary of the fire tracking details are provided in Table 2-2.

Table 2-2 Fire Tracking and Alert Systems

System	Website	Information	Monitoring Frequency
Bureau of Meteorology – Fire Forecast Simpson West	http://www.bom.gov.au/nt/forecasts/fire-forecast-summary.shtml	Fire forecast for the region on a daily basis.	As required
Bushfires NT – Watch and Act Central Australia	http://www.lrm.nt.gov.au/bushfires/media	Department of Land Resource Management summary of fire locations and issues 'Watch and Act' procedures.	
ABC Website – Summary of Alerts and Warnings	http://www.abc.net.au/news/emergency/state/nt/	Official warnings will be issued through the ABC as and when released.	
North Australia Fire Information – Bushfire Map	http://www.firenorth.org.au/nafi3/	Mapping of hotspots and fire scars in the area.	
Secure NT – Bushfire Map:	http://www.securent.nt.gov.au/	Bushfire tracking map.	

2.4 Climate Conditions

Climatic conditions have a significant effect on the ability of bushfires to spread. The Bureau of Meteorology Territory Grape Farm Station (BOM Site No. 015643) has been used to summarise the climatic characteristics for the Project area. The data provides indication of high bushfire risk months.

2.4.1 Rainfall and Evaporation

The mean annual rainfall is approximately 316.7 mm, with a seasonal pattern of more summer rainfall than winter rainfall. Average monthly rainfall totals range from 4.7 mm in August to 65.8 mm in February. Average three-monthly rainfall totals range from 18.3 mm in June/July/August to 178.7 mm in December/January/February. However, any month can receive relatively large rainfall totals, or little or no rain at all.

Evaporation is greatest during months of higher mean rainfall with the high average evaporation occurring in December and January at 375 mm. Rates of evaporation are significantly lower from May to August coinciding with lower mean rainfall and temperatures. The annual average evaporation is 3,000 mm, approximately 847% greater than the annual average rainfall of 316.7 mm.

The rainfall and evaporation rates are provided in Table 2-3.

2.4.2 Temperature and Humidity

The Project site experiences hot and arid conditions. The hottest months are November to March, with monthly mean daily maximum temperatures above 35 °C, and monthly mean daily minimum temperatures not dropping below 18 °C. The coolest months are May to August, with monthly mean daily maximum temperatures remaining at or below 25.5 °C, and monthly mean daily minimum temperatures not rising above 9.5 °C.

The average humidity at the Project is 40% at 09:00 and 25% at 15:00, this is consistent across the year with monthly afternoon humidity readings being approximately 15% lower than the morning. The highest levels of humidity are experienced in June at 53 %. This coincides with lower temperatures occurring.

The temperature and humidity rates are provided in Table 2-3.

Significance

There are limited periods at the Project site when vegetation is likely to have sufficient moisture to reduce the potential for bushfire.

The highest likelihood for bushfires is when high temperature coincides with low humidity increasing the ease of ignition. High temperatures and low humidity generally occur from November to March and are considered high risk bushfire months.

2.4.3 Wind

The winds at the Project are predominant south easterly wind direction throughout the year. The average wind speeds range from 2.50 to 3.17 m/s (9.0 to 11.4 km/h) with an annual average of 2.86 m/s (10.3 km/h). Wind speed and gusts are generally higher from October to April with higher speeds at 9 am.

Therefore, the threat to the Project area will be predominately from the southeast with the prevailing wind.

The wind roses are provided in Figure 2-1 and wind speeds are summarised in Table 2-3.

Significance

Bushfire direction is dependent upon wind direction which is predominantly from the southeast at the Project. The wind speed influences the bushfire advancement. The months of highest wind speeds and gusts are generally October to April and are considered high risk bushfire months.

Table 2-3 Summary of Climate Statistics and Fire Risk (BoM 2015; Territory Grape Farm NT 1987-2014)

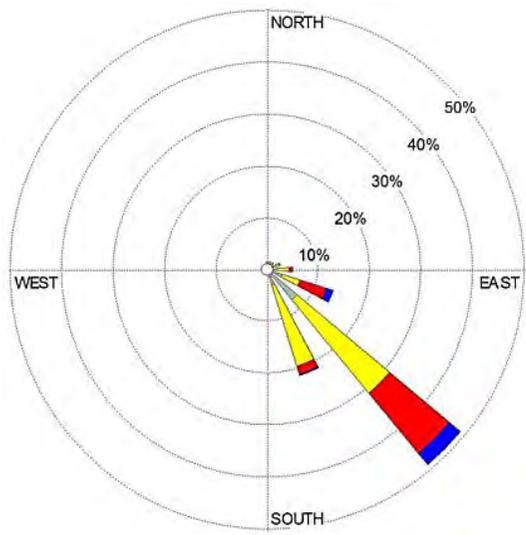
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)												
Highest	280.4	342.2	109.2	151.7	136.3	53.8	34.2	39.4	96.6	56.8	119.2	119.2
95 th percentile	159.0	244.2	96.9	89.9	100.1	48.7	21.3	26.9	41.7	51.3	81.4	109.9
Mean	62.4	65.8	21.9	18.0	23.3	8.7	4.9	4.7	10.3	15.3	30.9	50.5
5 th percentile	3.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	8.9
Lowest	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Evaporation (mm)												
Total	375	300	290	210	150	125	145	180	200	300	350	375
Temperature (°C)												
Maximum ¹	37.3	36.2	34.3	30.5	25.5	22.2	22.5	25.3	30.5	33.3	35.6	36.3
Minimum ²	21.9	21.6	19.5	14.6	9.5	6.2	5.2	7.1	12.1	15.6	18.8	21.1
Humidity (%)												
Mean 9 am	38	40	37	37	47	53	51	38	32	32	34	37
Mean 3 pm	24	28	27	25	27	28	28	22	21	21	22	26
Wind (km/h)												
Mean 9 am	17.0	18.1	19.7	18.9	15.2	12.8	14.3	17.3	18.2	19.6	18.2	18.0
Mean 3 pm	15.8	16.7	16.6	14.9	14.2	13.5	14.0	16.0	15.5	14.8	14.1	14.5
Gusts	85	89	93	78	57	55	85	76	72	85	84	91
Bushfire Risk³												
-	High	High	High	High	Low	Low	Low	Low	Med	High	High	High

Notes: ¹ Monthly mean maximum temperature is the average of the available daily maxima for that month.

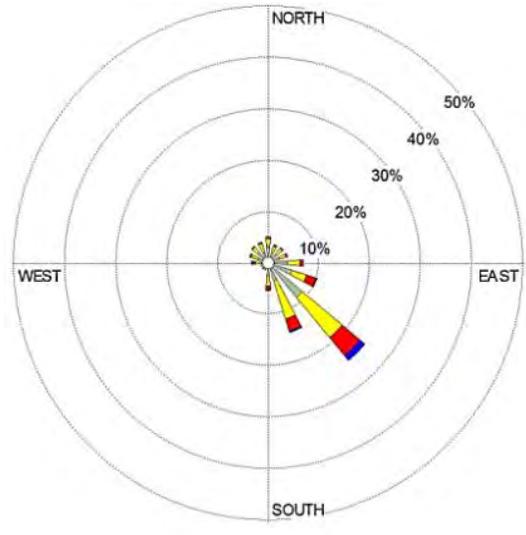
² Monthly mean minimum temperature is the average of the available daily minima for that month.

³ Bushfire risk is based on elevated temperature, low humidity and elevated wind speeds.

Highest values/risks are indicated in bold.

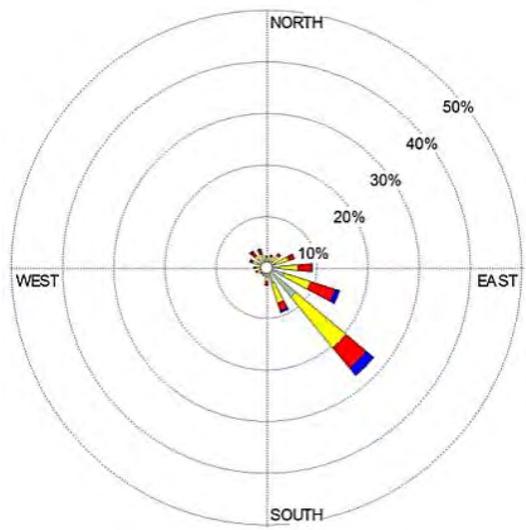


Spring (September – November)

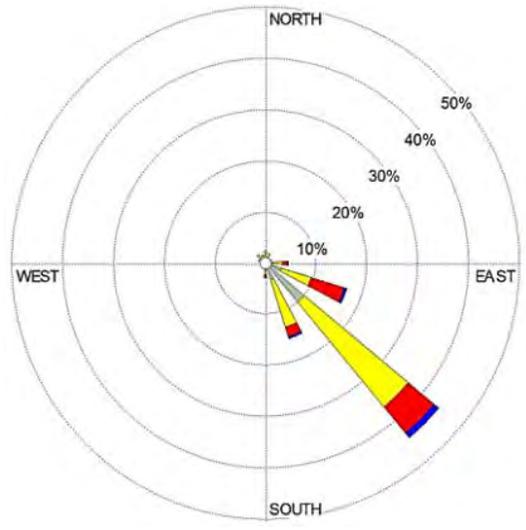


Summer (December – February)

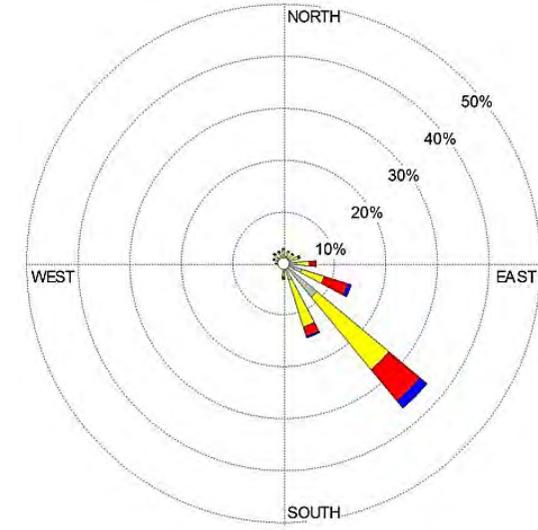
Wind Speed (m/s)	Average wind speed (m/s)
>= 10.0	Annual: 2.86
8.0 - 10.0	Spring: 3.17
6.0 - 8.0	Summer: 2.50
4.0 - 6.0	Autumn: 2.92
2.0 - 4.0	Winter: 2.84
0.0 - 2.0	



Autumn (March – May)



Winter (June – August)



Annual

Figure 2-1 Annual and Seasonal Wind Roses (Source: BOM, Territory Grape Farm Station No. 015643)

2.5 Bushfire Management

Bushfire management will be undertaken in accordance with the Basic Wildfire Awareness Guidance, ACT Fire and Rescue Community Fire Units Learners Guide (2011). The management of fires at the Project site will be managed by the Emergency Response Coordinator in accordance with the Emergency Response Plan (ERP).

A summary of bushfire management is provided below.

2.5.1 Bushfire Influences

Bushfires are significantly influenced by climate conditions as detailed in Section 2.4. In addition to these influences which generally dictate ease of ignition the following can impact on fire spread:

- Wind: increased wind speeds are experienced around ridge lines/slopes with the downwind slopes experiencing lower wind speeds.
- Aspect: Northern and western facing slope will burn quicker due to the slopes generally being drier from increased solar radiation.
- Slope: every 10° increase in angle doubles the rate of spread due to the fire travelling a shorter distance to reach unburnt fuel.

2.5.2 Bushfire Management Methodologies

If bushfires are deemed likely to impact on the construction or operation of the Project, bushfire management methods will be implemented. Personnel will be sufficiently trained to manage bushfire management methods prior to implementing.

Bushfire management methods include direct or indirect attacks as detailed in Table 2-4.

Table 2-4 Bushfire Attack Methodologies (Source: ACT Fire & Rescue, 2011)

Attack Method	Details	
Direct Attack		
Head Attack	Attacking the bushfire from the head of the fire (front and progressing direction). Only recommended for low intensity fires.	
Flank Attack	Attack the fire from its side flanks and attempt to extinguish and progress to the head of the fire.	
Parallel Attack	Establishing a control line in front of the fire using tools to reduce potential fuel load. The line is to restrict advancement of the fire across the control line.	
Equipment	Advantages	Disadvantages
<ul style="list-style-type: none"> • Water contained in knapsacks or tankers, or in hoses from a static water source. • Bull dozers and other earth moving equipment. • Handtools such as axes, rakehoes and chainsaws. 	<ul style="list-style-type: none"> • Less area is burnt • Fuel is removed from the immediate path of the fire, allowing the earliest possible control • Parts of the fire edge that may have gone out may be quickly incorporated into the fire line. 	<ul style="list-style-type: none"> • Firefighters working at the fire's edge can be exposed to heat and smoke • An irregular control line has to be constructed in a short time (if the fire's perimeter is irregular) • Fences and natural barriers may present obstacles • Patrol of the constructed control line can be difficult

Attack Method	Details	
Indirect Attack		
Indirect Attack	Back burning from a safe distance to the bushfire to eliminate fuel sources. This method is recommended for high intensity fires.	
Equipment	Advantages	Disadvantages
<ul style="list-style-type: none"> Water contained in knapsacks or tankers, or in hose lines from a static water source. Source of fire. 	<ul style="list-style-type: none"> Ability to control intense bushfire Reduces exposure of firefighters to the effects of bushfire Allows choice of better locations for control lines. Allows more time for control line construction. 	<ul style="list-style-type: none"> Size of the fire is increased Increased size gives a greater area to be controlled and patrolled leading to a greater chance of the fire breaking through the control lines. Fuel between the fire and the control line may have to be backburned. The two fires joining may result in intense fire activity at the junction zone (where the fires meet). Increased chance of spotting.

2.6 Fire Equipment

A summary of firefighting equipment at the Project is provided in Table 2-5.

Table 2-5 Summary of Firefighting Equipment

Item	Location	Capacity
<i>Equipment to be detailed and updated prior to the commencement of construction activities.</i>		

3. Fire Management

3.1 Associated Management Plans

Fire management refers to bushfires, building fires and machinery / plant fire at the Project. These events have potential to impact site personnel, adjacent land users and biodiversity. Management of fire at the Project relates to several sub-management plans including the Biodiversity Management Plan, Non-mineralised Waste Management Plan and Emergency Response Plan.

3.2 Fire Management Plan

Management of fire is structured below as follows:

- **Key Activities, Risks and Impacts:** A summary of the key activities being undertaken during the management period. The potential environmental impacts and residual risk levels are identified for each environmental aspect.
- **Objective:** The guiding environmental management objective(s) and activities that apply to the element.
- **Mitigation Measures:** The procedures to be employed to ensure that the relevant objectives are met.
- **Responsibility:** Nominates the responsible position for implementing actions and monitoring.
- **Trigger, Action, Response Plan (TARP):** The actions to be implemented in the case of non-compliance. This includes strategies of remediation and the person(s) responsible for the actions.

3.3 Key Activities, Risks and Impacts

The key activities and potential environmental impact have been identified for fire and are listed in Table 3-1. The risk matrix is provided in Appendix B.

Table 3-1 Key Activities, Risks and Impacts

Activity	Potential Environmental Impact	Residual Risk Level		
		Consequence	Likelihood	Risk
External bushfire, resulting in structural failures and release of process consumables, products or ignition of gas inventory.	Fragmentation or loss of habitat or food resources over a wide area, rendering habitats for listed threatened species unsuitable for periods of time. Potential for direct mortality and increase in predation for listed threatened species such as the mulgaras due to reduction in ground-layer vegetation cover.	Major	Rare	Medium
	Disturbance or loss of vegetation with potential for change in vegetation composition, including simplification in structure and diversity.	Moderate	Rare	Low
	Personnel fatality or injury.	Catastrophic	Rare	Medium

Activity	Potential Environmental Impact	Residual Risk Level		
Personnel impacted by fire or explosion. This includes equipment and substance fire and explosions. This may occur during construction or operations. Mining operations fires would typically involve mobile equipment fires. Processing plant fires would typically involve fixed plant fires. This also includes the gas fired power generation plant and Amadeus Basin to Darwin high pressure gas pipeline.	Personnel fatality or injury.	Catastrophic	Rare	Medium

3.1 Objective

The fire management objectives have been established and are detailed in Table 3-2.

Table 3-2 Fire Management Objectives

Objective	Target	Indicator
Reduction of bushfire risk prior to bushfire season.	Maintain clear, continuous firebreaks around infrastructure prior to the commencement of the Dry Season. Undertake controlled burns when required. Ensure compliance with NT Bushfires permitting requirements and appropriate notification and liaison with relevant parties, including local pastoralists.	Number of fire related incidents reported.

3.2 Mitigation Measures

Mitigation measures have been developed to minimise potential impacts associated to fire management. The mitigation measures, timing and responsibilities are provided in Table 3-3.

Table 3-3 Mitigation Measures

ID	Mitigation Measure	Timing	Responsibility
Site Induction			
F1	Site induction includes the following components for fire management: <ul style="list-style-type: none"> Awareness of potential bushfire risks across the Project; Requirements for reporting bushfires or incidental fires in close proximity to the Mine Site; Hot works permitting system; Management procedures/stop work requirements; and Location of permitted smoking areas. 	Site Induction	All personnel
General Management			
F2	Permanent site personnel to undertake fire control training, including the correct use of extinguishers.	At all times	All personnel
F3	All vehicles to carry fire extinguishers and UHF radios.	At all times	All personnel
F4	Installation of signage to demark fire hazards and permitted smoking areas.	At all times	Area Managers
F5	Annually collaborate controlled burns activities with stakeholders including: <ul style="list-style-type: none"> Central Land Council (Traditional Owners); Local Pastoralists; and Northern Territory Emergency Service – Ti Tree Volunteer Unit. 	Prior to April	HSEC Manager

ID	Mitigation Measure	Timing	Responsibility
F6	Storage of flammable and combustible materials will be in accordance with the Hazardous Substances Management Plan. Open flame or other ignition sources are prohibited within 20 m of bulk flammable storage areas, fuel dispensing vehicles or refuelling operations and activities in hazardous atmospheres.	At all times	Area Managers
F7	If "hot work" is to be undertaken in any area where a potential fire hazard exists or in areas designated as a potential fire risk by Contractor in the risk assessment, a 'Hot Works' permit is required. In addition, a fire watcher or fire warden shall remain on watch for a minimum of 30 minutes after completion of the hot works. The "hot work" risk assessment will use Australian Standard AS 1674.1 Safety in welding and allied processes – Fire precautions to determine the required controls to be implemented.	At all times	Area Managers
F8	Firefighting equipment will be inspected, maintained and tested routinely.	As required	Emergency Response Coordinator
F9	Inspections of landfill and waste management practices to identify potential accumulation of combustible materials and associated risks prior to April.	Prior to April	Emergency Response Coordinator
F10	Fire detection and suppression systems, fire extinguishers and firefighting training.	At all times	Area Managers
F11	Dedicated firefighting equipment and trained personnel for fire management.	At all times	Emergency Response Coordinator
Bushfire			
F12	Monitor the fire Danger Rating for Simpson West (http://www.bom.gov.au/nt/forecasts/fire.shtml).	At all times	Emergency Response Coordinator
F13	Bushfires will be managed in accordance with the Emergency Response Plan and the Fire Management Plan.	At all times	All personnel
Building Structure Fire			
F14	Building structure fires will be managed in accordance with the Emergency Response Plan and the Fire Management Plan..	At all times	All personnel
Machinery / Plant Fire			
F15	Machinery or Plant Fire will be managed in accordance with the Emergency Response Plan and the Fire Management Plan.	At all times	All personnel
F16	Vehicles maintained and serviced at regular intervals to reduce potential of fire related to engines or exhausts.	At all times	Area Managers
F17	No machinery left running unattended.	At all times.	All personnel
Firebreaks			

ID	Mitigation Measure	Timing	Responsibility
F18	Maintain a clear and continuous firebreak of 10m minimum around infrastructure including: <ul style="list-style-type: none"> • Processing Plant; • Gatehouse; • Explosives Magazine; • Mine Camp; and • Adnera Loadout Facility. 	Prior to April	HSEC Manager
Landfill Burning			
F19	Controlled burns are held at the landfill site as necessary to control amount of putrescible and windblown waste. The burn will be undertaken in accordance with the Waste Management Plan.	At all times	HSEC Manager
Controlled Burns			
F20	Identify areas with high fuel loads requiring controlled burns. Liaise with Traditional Owners, local Pastoralists and Bushfires NT prior to burning.	Prior to May	Emergency Response Team HSEC Manager
F21	Implement patchy burns of low scorch height wherever practicable.	At all times	Emergency Response Coordinator
F22	No fire to be lit during designated fire bans. Fire ban status can be checked at: http://www.bom.gov.au/nt/warnings/index.shtml .	At all times	All personnel
Monitoring and Inspections			
F23	Incident report to be completed following any fire related incident.	At all times	All personnel
F24	Firefighting equipment will be maintained, inspected and tested.	Monthly	Emergency Response Coordinator Safety Officer
F25	Firebreaks, active working areas and fuel storage locations will be regularly inspected to determine if they are increasing fire risk.	As required	Emergency Response Coordinator
F26	Annual Fire Management Plan performance review.	Annual	HSEC Manager

3.3 Trigger, Action and Response Plan

The Trigger, Action and Response Plan (TARP) outlines remedial actions and responses to the situation. The levels of incidents are outlined in Table 3-4.

Table 3-4 Trigger, Action and Response Plan

Responsibility	Situation			
	Standard	Level 1	Level 2	Level 3
	Firebreaks maintained. Equipment sufficiently maintained. No bushfires or planned fires within the vicinity of the Project.	Trigger: Inspection identifies elevated risk due to activities or firebreaks not maintained.	Trigger: Bushfire within the vicinity of the Project.	Trigger: Unplanned fire at the Project.
Site Personnel	<ul style="list-style-type: none"> • Maintain awareness of potential bushfire risks across the Project. • Maintain vigilance against potential outbreaks of fire in work areas. 	Onsite personnel should: <ul style="list-style-type: none"> • If a work specific risk, personnel should mitigate the situation to reduce/eliminate the risk. • Notify the respective Supervisor and/or Area Manager of the elevated fire 	Onsite personnel should: <ul style="list-style-type: none"> • Maintain safe distance from bushfire. • Report bushfire to Emergency Response Coordinator. 	Contact the Site Emergency Response Coordinator and attempt to extinguish the fire if safe to do so.

Area Managers	<ul style="list-style-type: none"> • Maintain a clear and continuous firebreak of 10 m minimum around infrastructure. • Vehicles maintained and serviced at regular intervals. • Continue controlled burns of landfill. • Firefighting equipment will be inspected, maintained and tested frequently. • Inspections of landfill and waste management practices to identify potential accumulation of combustible materials. • Active working areas and fuel storage locations regularly inspected to determine if they are increasing fire risk. 	<p>risk.</p> <ul style="list-style-type: none"> • Maintain a clear and continuous firebreak of 10 m minimum around infrastructure. • Firefighting equipment will be inspected, maintained and tested. • Log incident. 	<ul style="list-style-type: none"> • Monitor bushfires through Table 2-2 and on ground inspection to determine risk to site personnel. • Provide updates to personnel within vicinity of the bushfire and inform of requirements (i.e. stop work). • Log incident. 	<ul style="list-style-type: none"> • Utilise firefighting equipment at incident. • Undertake incident investigation and support the implementation of corrective and preventative actions.
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4. Performance Review

No previous period data is available for review.

Appendices

Appendix A – Risk Matrix

An environmental risk assessment was undertaken for the Nolans Project and associated construction, operation and closure. The risk assessment identified the risk source (hazard and event), receptors and potential impact. The consequence and likelihood were determined using the descriptions identified in Table A1 and Table A2 respectively. The risk matrix is provided in Table A3.

Table A1 Consequence Description

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Air	Air quality	No measurable air quality impacts or exceedance of air quality standards.	Local short term and approaching exceedance of air quality standards.	Local minor long term, or widespread minor short term or exceedance of air quality standards.	Widespread (regional) major short term exceedance of air quality standards.	Regional long term change in air quality or exceedance of air quality standards.
Air	Noise	Applicable standards / guidelines met at all sensitive receptors at all times.	Isolated and temporary increase in noise levels exceeding relevant noise standards / guidelines at a sensitive receptor.	Short term, local increase in noise levels exceeding relevant noise standards / guidelines at a sensitive receptor.	Long term, local increase in noise levels exceeding relevant noise standards / guidelines at a sensitive receptor.	Long term, regional increase in noise levels exceeding relevant noise standards / guidelines at a sensitive receptor.
Biodiversity	Listed Flora Species	Minor local habitat modification and/or lifecycle disruption for a listed species.	Moderate local habitat modification and/or lifecycle disruption for a listed species.	Substantial local habitat modification and/or lifecycle disruption for a listed species.	Moderate regional habitat modification and/or lifecycle disruption for a listed species.	Substantial regional habitat modification and/or lifecycle disruption for a listed species.
Biodiversity	Listed Threatened Fauna Species	No loss of individuals of listed fauna species.	Minor local decrease in size of population(s) of listed fauna species.	Moderate local decrease in size of population(s) of listed fauna species.	Substantial local decrease in size of population(s) of listed fauna species.	Moderate or substantial regional decrease in size of population(s) of listed fauna species.
Biodiversity	General flora and fauna	Insignificant or imperceptible effects.	Local short term decrease in abundance of some species with no lasting effects on local population.	Local long term decrease in abundance of some species resulting in some change to community structure.	Regional decrease in abundance of some species resulting in some changes to community structure.	Regional loss of numerous species resulting in the dominance of only a few species.
Historic and cultural heritage	Aboriginal and cultural heritage	Minor repairable damage to more common structures or sites. No disturbance of historic and / or cultural heritage sites.	Moderate or repairable damage or infringement to sensitive structures or sites of cultural significance or sacred value.	Considerable damage or infringement to sensitive structures or sites of cultural significance or sacred value.	Major damage or infringement to sensitive structures or sites of cultural significance or sacred value.	Irreparable and permanent damage to sensitive structures or sites of cultural significance or sacred value.

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Human health and safety	Safety	Low level short term subjective inconvenience or symptoms. Typically a first aid and no medical treatment.	Reversible / minor injuries requiring medical treatment, but does not lead to restricted duties. Typically a medical treatment.	Reversible injury or moderate irreversible damage or impairment to one or more persons. Typically a lost time injury.	Single fatality and/or severe irreversible damage or severe impairment to one or more persons.	Multiple fatalities or permanent damage to multiple people.
Human health and safety	Health	Reversible health effects of little concern, requiring first aid treatment at most.	Reversible health effects of concern that would typically result in medical treatment.	Severe, reversible health effects of concern that would typically result in a lost time illness.	Single fatality or irreversible health effects or disabling illness.	Multiple fatalities or serious disabling illness to multiple people.
Radiation	Occupational exposure	<1 mSv/y Measurable increase in radiation dose with outcomes below public dose limit.	<5 mSv/y Measurable increase in radiation dose with outcomes remaining below dose constraints.	>5 mSv/y and <20 mSv/y Measurable increase in radiation dose with outcomes between dose constraint and dose limit (averaged over five years).	>20 mSv/y and <50 mSv/y Measurable increase in radiation dose with outcomes between dose limit (averaged over five years) and maximum annual dose.	>50 mSv/y Measurable increase in radiation dose with outcomes greater than the maximum annual dose.
Radiation	Public exposure	No change from background Dose not discernible above natural background.	<0.3 mSv/y Measurable increase in radiation dose with outcomes below public dose constraint.	>0.3 mSv/y and <1 mSv/y Measurable increase in radiation dose with outcomes between dose constraint and dose limit (averaged over five years) for public.	>1 mSv/y and <5 mSv/y Measurable increase in radiation dose with outcomes between dose limit (averaged over five years) and maximum annual dose for public.	>5 mSv/y Measurable increase in radiation dose with outcomes greater than the maximum annual dose for public.
Radiation	Environmental impact	ERICA RQ < 0.1	ERICA RQ >0.1 and <1.0	ERICA RQ >1.0 plus justification	ERICA RQ >1.0 and no justification	ERICA RQ > 10.0

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Socio-economic	Community	Local, small-scale, easily reversible change on social characteristics or values of the communities of interest or communities can easily adapt or cope with change.	Short-term recoverable changes to social characteristics and values of the communities of interest or community has substantial capacity to adapt and cope with change.	Medium-term recoverable changes to social characteristics and values of the communities of interest or community has some capacity to adapt and cope with change.	Long-term recoverable changes to social characteristics and values of the communities of interest or community has limited capacity to adapt and cope with change.	Irreversible changes to social characteristics and values of the communities of interest or community has no capacity to adapt and cope with change.
Socio-economic	Visual and landscape	Almost imperceptible or no visual change from sensitive receptors or places of cultural and natural value. No loss of / or change to features or characteristics of the landscape.	Minor visual change from sensitive receptors or places of cultural and natural value. Minor loss or alteration to key landscape characteristics, or introduction of elements that may be visible but not uncharacteristic.	Moderate visual change from sensitive receptors and places of cultural and natural value. Discernible changes in the landscape due to partial loss or change to characteristics of the landscape.	Significant visual change from sensitive receptors and places of cultural and natural value. Discernible change which is out of scale with the landscape, at odds with landform and will leave an adverse impact.	Catastrophic visual change from sensitive receptors and places of cultural and natural value. A substantial change to the landscape due to total loss of elements or characteristics, causing the landscape to be permanently changed and its quality diminished.
Transport	Traffic and transport operations and conditions	Negligible adverse impact on traffic and transport conditions. No perceptible deterioration of road integrity.	Detectable adverse changes in traffic and transport condition (decrease in Level of Service) at one or two locations at any one point in time during the construction period or at a single location during operations. Seasonal, local deterioration of road integrity.	Detectable adverse change in traffic and transport conditions (decrease in Level of Service) at multiple locations. Short term, local deterioration of road integrity.	Traffic and transport congestion and delays exceed acceptable levels at multiple locations. Short term, regional deterioration of road integrity.	Traffic and transport congestion and delays severely restrict the safe operation and efficiency of the transport network. Long term, regional deterioration of road integrity.

Category of Impact	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Transport	Road safety	No increase in vehicle incidents along relevant haulage routes above historical baseline trend.	An increase in vehicle incidents along relevant haulage routes of five per cent above historical baseline trend.	An increase in vehicle incidents along relevant haulage routes of ten per cent above historical baseline trend.	An increase in vehicle incidents along relevant haulage routes of twenty per cent above historical baseline trend.	An increase in vehicle incidents along relevant haulage routes of greater than twenty per cent above historical baseline trend.
Water	Surface water	Minimal contamination or change with no significant loss of quality.	Local minor short term reduction or change in water quality. Local contamination or change that can be immediately remediated.	Local minor long term or widespread minor short term or local major short term reduction or change in water quality. Local contamination or change that can be remediated in long term.	Widespread (regional) major short term reduction or change in water quality. Local contamination or change that cannot be remediated in long term. Widespread contamination or change that can be remediated.	Regional long term reduction or change in water quality. Widespread contamination or change that cannot be immediately remediated.
Water	Groundwater	Negligible change to groundwater regime, quality and availability.	Changes to groundwater regime, quality and availability but no significant implications.	Changes to groundwater regime, quality and availability with minor groundwater implications for a localised area.	Groundwater regime, quality or availability significantly compromised.	Widespread groundwater resource depletion, contamination or subsidence.

Table A2 Likelihood Description

Likelihood	Rare	Unlikely	Moderate	Likely	Almost Certain
Description	The event may occur only in exceptional circumstances. This event is not expected to occur except under exceptional circumstances (up to once every 100 projects of this nature).	The event could occur but is improbable. This event could occur up to once every 10-100 projects of this nature.	The event could occur but not expected. This event could occur up to once every 10 projects of this nature.	The event will probably occur in most circumstances. This event could occur up to once during a project of this nature.	The event is expected to occur in most circumstances. This event could occur at least once during a project of this nature.
Chance of Occurring (%)	0 - 1%	2 - 10%	11 - 50%	51 - 90%	> 91%

Table A3 Risk Matrix

		Consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	High	Extreme
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Medium	Medium

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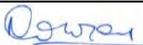
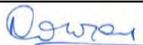
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