Iron Bridge

North Star Bushfire Management Plan

Health and Safety

31/10/2015
NS-0000-PL-SA-0005

	North Star Bushfire Management Plan		NS-0000-PL-SA-0005
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1. PURPOSE

This North Star Bushfire Management Plan ('Plan') is to be used in conjunction with the *Fortescue Emergency Management Sub-Plan: Bushfire Management (100-PL-EM-0009)* as a guide in determining, and recording, the bushfire risk treatments that will be applied to the North Star Mine Site ('North Star') or areas of operations over the coming year.

Assessment of bushfire risk is carried out through a combination of quarterly internal and an annual third party audit. The audit findings shall be incorporated into the annual review of this Plan in June and prior to commencement of the high risk period to ensure audit recommendations are implemented.

The aim of this plan is to –

- Assist the Senior Site Official, Registered Manager, General Manager and the Management team at North Star to conduct strategic fire planning which encompasses asset protection and natural fire line management;
- Ensure the safety of personnel during and after bushfire activities
- Minimise the impact on environment, property, essential services and areas of cultural significance
- Ensure fire prone vegetation within North Star is managed in accordance with government legislation, traditional and current land management practices in an environmentally sustainable manner
- Communicate effectively with local government departments and stakeholders about Fortescues land management practices and ensure they are informed of any hazard reduction burning activities.

Refer to Appendix 1 – Annual Bushfire Planning Flowchart

Refer to Appendix 2 - Annual Bushfire Risk Review @ 9/05/2015

2. SCOPE

This procedure applies to all Employees, Contracting Partners, Sub-contractors and Visitors at North Star.

3. ACCOUNTABILITIES AND RESPONSIBILITIES

Table 1: Accountabilities and Responsibilities

Role/Department	Primary Function
Senior Site Official	• Ultimately responsible for the development and successful implementation of this Plan. This function may be delegated to the HSEST Superintendent. • Ensure adequate resources are available to support the Plan.
HSEST Superintendent	• Assist the site Registered Mine Manager/Operations Manager in the implementation of this Plan. • Development and implementation of this Plan. • Ensure quarterly audits are carried out to an acceptable standard and that actions are completed in a timely manner. • Conduct a review of this Plan on a yearly basis in June prior to commencement of the High Risk period. • Ensure that all Emergency Response personnel are trained in the Bushfire Management Plan.
HSE Advisors	• Administration, maintenance and assistance in the implementation of this Plan. • Coordinate the required training for bushfire management
North Star Emergency Services Officers	• Assist the IMT Incident Controller or On Scene Commander. • Assist the HSEST Superintendent in the review of this Bushfire Management Plan. • Assist in the completion and action closure of quarterly and yearly audits • Conduct routine monitoring of the site for bush fires and potential bush fire locations • Implement rehabilitation and restoration works post bushfire incidents • Conduct routine maintenance and operational checks of fire-fighting equipment and emergency equipment
Emergency Response Team	• Provide support to Emergency Service Officers in Bushfire management as required.
Area Managers, Superintendents and Supervisors	• Ensure employees in their control are trained and able to response to and communicate an emergency event.

4. DEFINITIONS

Table 2: Definition of Terms/Acronyms

Word/Term	Definition
AIIMS	Australian Inter-Service Incident Management Systems
Asset Protection Zone	The immediate area between buildings and other assets from bushland vegetation.
Burn Prescription	A written statement defining objectives to be attained during hazard reduction burning.

Clearing	Clearing means: a) The killing or destruction of; or b) The severing of trunks or stems of; or c) Any other substantial damage to, some or all of the native vegetation in an area
DFES	Department of Fire and Emergency Services
Firebreak	Strip of land where vegetation has been removed to stop the spread of fire.
Fire Control Lines	A natural or constructed barrier, or treated fire edge, used in fire suppression and hazard reduction burning to limit the spread of fire.
Fire Hazard Reduction Burning	The deliberate and controlled burning of vegetation growing close to, or on the ground to minimise the fuel supply for future bush fires.
Fortescue	Fortescue Metals Group Limited all subsidiaries and employees.

5. LEGISLATIVE CONTEXT

Table 3: Legislation

Act/Regulation/Standards
Bush Fire Act 1953 (WA)
Energy Operators (Powers) Act 1979 (WA)
Environmental Management Act 1986 (WA)
Environmental Management (Clearing of Native Vegetation) Regulations 2004 (WA)

6. COMPLIANCE STANDARDS

The Shire of East Pilbara will issue a Firebreak Notice each year. The first step in compiling the annual site Bushfire Management Plan is to check if the requirements of the Firebreak Notice have changed since the previous year.

The Shire Firebreak Notice sets out the minimum legal requirements whereas the *Fortescue Emergency Management Sub-Plan: Bushfire Management (100-PL-EM-0009*) contains Fortescue's minimum standards which may exceed the local Shire requirements. In this case, the higher standards are to be targeted in the annual Bushfire Management Plan.

All assets at North Star shall be protected as per the requirements of the Shire of East Pilbara Fire Break Notice - Shire of East Pilbara - Firebreak Notice

Note: The Shire of East Pilbara may update the Firebreak Notice during the period of this Plan.

6.1 Total Fire Bans

A yearly Total Fire Ban exemption is current as at 25/06/2015 under Section 22C of the Bush Fires Act 1954. Where an exemption for a Total Fire Ban has been issued by DFES, all conditions as detailed within the exemption shall be implemented by North Star personnel, including Contracting Partners, prior to commencement of any activities that have the potential to breach the conditions of the total fire ban installed for the Shire of East Pilbara.

Refer to Appendix 3 – Notice of Exemption @ 25/06/15 - DFES

7. BUSHFIRE PREVENTION

7.1 Firebreaks and Asset Protection Zones

An asset Protection Zone is a gap created between the immediate area surrounding an asset and the vegetation. The Protection Zone is to ensure no direct flame contact is sustained by the asset.
Remote assets, critical pipelines and power lines shall be inspected on a quarterly basis, to ensure there is suitable clearance of vegetation to provide protection during a bushfire.

Construction of firebreaks shall be in accordance with Section 6.2 Construction of Firebreaks of the *Fortescue Emergency Management Sub-Plan: Bushfire Management (100-PL-EM-0009).*

The following site specific clearance distances shall be installed and maintained on North Star -

- Surface power lines (maximum growth of 1 Metre)
- Satellite Assets (Fire Break – 5 Metres)
    - CHF Feed Line,
    - CHF Return Water pipeline,
    - Production Bore pipeline
    - Potable Water pipeline
    - Tailings Pipeline
    - Bores and associated Gen-Sets
    - Survey fixed base stations
    - Tailings return water pipeline
    - Tailings return water pump
    - Turkeys Nest and associated infrastructure
    - Satellite diesel tanks for gen-sets on Bores.
    - Laydown yards
    - Water tanks
- High Risk Areas (Fire Break - 10 Metres)
    - Explosives Magazine
    - SRS Facility
    - Permanent structure including offices, crib rooms, workshops and Go-Lines
    - Communications Tower and associated infrastructure

  - Bulk Diesel tanks
  - OPF/CHF and associated Infrastructure
  - Japal Camp Sewage discharge area
- High Risk Areas – Japal Camp
  - Two firebreaks surrounding all buildings –
    - Not less than three metres wide and cleared of all flammable material.
    - The inner firebreak is to be not more than twenty (20) metres from the perimeter of the building or group of buildings;
    - The outer firebreak not less than twenty (20) metres; *and*
    - Not more than one hundred (100) metres from the inner firebreak.
  - The fuel load must be reduced from the whole of the land between the firebreaks as required above.
  - Completed as per the Shire of east Pilbara Fire Break Notice – 2014/2015

Refer to Appendix 4 for the GPS Locations of critical North Star Assets

7.2 Fuel Loading and Hazard Reduction

Bushfire risk on North Star will be reduced by the management of Fuel Loading by incorporating the installation/clearing of firebreaks, chemical treatment including use of herbicides and Hazard Reduction burns.

7.2.1 Fuel Loading

On an annual basis the site shall conduct an assessment for fuel loading around infrastructure located on site.

A Fuel Loading Map of North Star shall be maintained to identify areas of high risk and significance to ensure that fuel loading controls are implemented on a scheduled rotational basis, and may include –

- Significant heritage, cultural or environmental value
- Accommodation Buildings
- Satellite Assets
- Fixed plant and buildings

The fuel loading map should clearly show the areas where hazard reduction burning is proposed. A simple legend is to be used as follows:

- Low Fuel Zones (Vegetation burnt within 3 years) – **GREEN**

- Medium Fuel Zones(Vegetation burnt between 4 – 7 years) – **ORANGE**
- Heavy Fuel Zones (Vegetation burnt beyond 7 years) – **RED**

Appendix 5: Fuel Loading Maps

7.2.2 Hazard Reduction Burning

Hazard reduction burns will be utilized to install a vegetation clear zone between or in parallel with firebreaks and will be undertaken by competently trained personnel and in conjunction with the Shire of East Pilbara Ranger and/or a third party contractor.

Hazard reduction burning must be pre-planned and be conducted in accordance with the Permit to Burn issued by the local Bushfire Control Officer and the Burn Prescription that is developed.

The person undertaking and developing the prescribed burn plan shall address the following criteria -

- Gain approval by the North Star Registered Manager or delegate;
- All external (e.g. Local Shire) and internal permits and approvals shall be obtained;
- Environment and Heritage specialists shall be consulted to ensure that burning is not being conducted in areas of significance;
- An approved Ground Disturbance Permit (GDP)acquired where required;
- Notification to and consultation as required with traditional owners, local pastoral lease holders and adjacent stakeholders;
- Risk assessment completed to ensure the appropriate personnel, equipment and contingency measures are in place prior to burning commencing;
- Identify the number of personnel required to undertake the task safely;
- Provide a communication plan for communicating to stakeholders when hazard reduction burning will be taking place;
- Resource list; *and*
- Contingency response planning.

Refer to Shire of East Pilbara - Fire Permit Requirements for information on the conditions of a Fire Permit.

8. BUSH FIRES

North Star has employed both a defensive or offensive strategies to defend infrastructure from bush fires with earth moving equipment, water carts, a 4WD fire fighting vehicle and equipment available to be deployed as required.

North Star and Contracting Partners shall make all work areas free from combustible materials, ensure that hot works are managed in a manner that meets the obligations as per the Total Fire Ban Exemption and implement designated smoking areas with butt disposal bins provided and maintained.

8.1 Bushfire Preparedness

Bushfire preparedness measures include:

- Maintenance of water supplies (including sprinkler systems where installed)
- Maintenance of firefighting equipment
- Maintenance of access tracks and gates
- Maintenance of signage e.g. location of firefighting water supplies and directional signage to camps
- Housekeeping around infrastructure to remove packaging and flammable items
- Identifying pipeline locations and purpose so that sewerage water, non-potable and potable water can be readily identified during bushfire management operations.

The quarterly bushfire risk audit conducted by North Star Emergency Services personnel includes checking the present status of bushfire preparedness measures.

A list of site assets and areas requiring bushfire management maintenance or tidying-up should be incorporated into the annual Bushfire Management Plan.

8.2 Bushfire Monitoring

Routine monitoring of bushfire occurrence shall be conducted by the site Emergency Services team or appointed person/group.

For bushfires occurring outside of a 20km radius from site, electronic monitoring shall be conducted using the Sentinel system or Fortescue Earth (which has Sentinel built in). For bushfires within 20km of a site, direct observation may be required.

8.3 Bushfire Response

AIIMS shall be used for the management of all bushfire emergency incidents.

Where an evacuation from operational areas is required, the Japal Village should be regarded as the safe place of refuge, and should be the primary focus of infrastructure defence.

8.3.1 Bushfire Response – Activation Triggers

Table 4: Bushfire Response Triggers

Alert/Level	Trigger	Actions
FIRE WATCH	A bushfire has been located within a 20km radius of the site	• Emergency Services or appointed person/group to commence bushfire monitoring. • Notify Senior Site Official/Registered Manager and local Shire Ranger/Bushfire Control Officer of bushfire. • Notify local Department of Parks and Wildlife (DPaW) office if fire is located on DPaW managed land. • Evaluation to be undertaken to determine risk to people and assets and if Fire Standby is required.
FIRE STANDBY	A bushfire is between 10 and 20km from site and weather conditions and fire movement indicate the bushfire could affect Fortescue people and assets.	• Activate site Incident Management Team (IMT). • Initiate new event in ERIMS. • Incident Controller to determine response strategies and form combat strategies for defensive and/or offensive options for fire control. • Seek advice as required from the Shire Ranger/ Bushfire Control Officer • Determine the need for assistance through mutual aid agreements and neighbouring sites. • Incident Management Team (IMT) and Emergency Response Team members must remain contactable.
FIRE RESPONSE	When the fire is within 10km or four hours from Fortescue people and assets whichever is less	• Incident Management Team (IMT) to make decision on the need to stay and defend or evacuate to a safe refuge as identified in the site specific Bushfire Protection Plan. (Attachment 1: Village Evacuation Checklist). • If accessibility for response is limited, a more defensive approach should be taken. • Incident Management Team (IMT) to refer to the response strategies identified for each asset in the site Bushfire Protection Plan.
SAFETY ASSESSMENT	When the fire is within 10km or four hours from Fortescue people and assets whichever is less	• Incident Management Team (IMT) to make decision on the need to stay and defend or evacuate to a safe refuge as identified in the site specific Bushfire Protection Plan. • If accessibility for response is limited, a more defensive approach should be taken. • Incident Management Team (IMT) to refer to the response strategies identified for each asset in the site Bushfire Protection Plan.
ALL CLEAR	Accommodation Centres and work centres are safe to return to operations.	• Prior to return to work, personnel should be brought together and an update on the situation provided. • Return to work.

8.3.2 Bushfire Response - Firebreaks and Fire Control Lines

The Incident Controller shall liaise with the Emergency Services personnel and through utilisation of the site maps maintained by the Emergency Services, those within Section 7.2.1 of this Plan and in Fortescue Earth will assess the probable impact on areas of significant heritage, cultural or environmental value. If any uncertainty exists, all reasonable effort shall be made to engage a Heritage/Environment representative to assist in identifying areas that should be avoided.

If a direction is issued by a Bushfire Control Officer or Bushfire Brigade Officer, a record of what was issued along with the name and position of that person shall be noted, and records kept.

8.3.3 Bushfire Response - Evacuation of Work Area

When considering evacuation the following options shall be evaluated –

- The safest muster location is within the dry mess of the Japal Camp. This eliminates any associated risks of smoke inhalation or lightning strikes;
- The destination must be safer than the origin;
- The IMT shall -
    - Obtain a manning schedule for North Star;
    - Undertake a roll call to ensure all personnel are encountered for prior to evacuating site;
    - Undertake an inspection of the site to ensure site is secure;
    - Determine and communicate the primary muster location and next muster time at Japal Camp;
    - Obtain current and forecast weather conditions from the Bureau of Meteorology;
    - Inspection undertaken by a delegate of the IMT to ensure a safe path of travel from the work area to Japal Camp;
    - The required type and availability of transport.

Refer to Appendix 6 – Bushfire Event Management Flowchart

8.3.4 Bushfire Response - Evacuation of North Star Mine Site

Where an evacuation from operational areas is required, Japal village should be regarded as the safe place of refuge, and should be the primary focus of infrastructure defence. The annual bushfire audit should focus on ensuring that the village is a safe place of refuge.

Any decision to evacuate camps must be authorised through the Operations Director or the Chief Executive Officer. The below Village evacuation Checklist shall be filled out prior to any evacuation decision is made.

Refer to Appendix 7 – Village Evacuation Checklist

8.4 Bushfire Recovery

The following shall be implemented post a bushfire event on North Star-

- Access to bushfire affected areas adjacent to Japal Camp or work areas shall be barricaded using bunting or danger tape until deemed safe by the Incident Controller;
- Aerial inspections utilising helicopters should be considered to detect unburnt pockets, smouldering vegetation and likely sources of re-ignition;
- Any person not directly involved with the incident that requires access to burnt areas during or post incident shall gain permission from the Incident controller prior to entry;
- In accordance with the *Fortescue Incident Event Management Procedure (100-PR-SA-0011),* where the bush fire has initiated from North Star site activities, details of the event must be entered into BMS within 24 hours of the incident occurring;
- An investigation shall be conducted on all deliberately lit fires that do not have the approval of the Senior Site Official and reported to the relevant Governmental Department;
- Once a fire has been brought under control the site needs to be rendered and deemed safe by the Incident Controller. This may include track reinstatement, rehabilitation of work areas disturbed during bush firefighting activities.
- Rehabilitation and restoration works are to be implemented by the Emergency Services personnel as part of the works programme and budget process.

8.5 Bushfire Control Officers

When a bushfire appears beyond the capacity of Fortescue personnel to manage and control a request should be made to the local Bushfire Control Officer to take control as per the State Emergency Management Plan for Fire (Westplan-Fire).

9. TRAINING REQUIREMENTS

North Star shall provide awareness of and training in this Plan and the *FORTESCUE Emergency Management Sub Plan: Bushfire Management (100-PL-SA-0009)* to all Emergency Service Officers and Emergency Response Volunteers.

Training and development will also be facilitated for Emergency Service Officers and selected Emergency Response Team Leaders in the following disciplines;

- Develop Prescribed Burn Plans (PUAFIR406B)
- Conduct Prescribed Burn Plans (PUAFIRE407B)
- Respond to Wildfire (PUAFIR204B)
- Supress Wildfire (PUAFIR303B)
- Supervise machinery use in wildfire operations (PUAFIR415)

Only trained and competent personnel shall carry out roles within the Incident Management Team (IMT) at bushfire events.

10. MONITORING AND REVIEW

A monitoring (audit) and review program should be undertaken as follows -

The responsibility for monitoring this Bushfire Management Plan is the Northstar HSES Superintendent. All required changes to this document are to be communicated to Northstar Emergency Services where the changes or edits to the document information will then be communicated.

Table 5: Programmes and Schedules

Monitor (Audit) and Review	Frequency	Responsibility
North Star Bushfire Management Plan	Annually (or as and when required)	HSEST Superintendent
Fire Break Audits	Quarterly (or as and when required)	Emergency Service Officers and Mining Superintendent
Fire Management Equipment inspections	Monthly	Emergency Service Officers
Bushfire Monitoring Systems	On-going	Emergency Service Officers

11. DOCUMENTATION AND RECORDS MANAGEMENT

This document and all supporting documents will be maintained as controlled documents in Fortescue's Document Management System and in accordance with the Fortescue Document Control Procedure.

The HSES Superintendent is responsible for all records as described above are forwarded to Fortescue's Information Management Department for retention in accordance with the Fortescue Records Retention Manual.

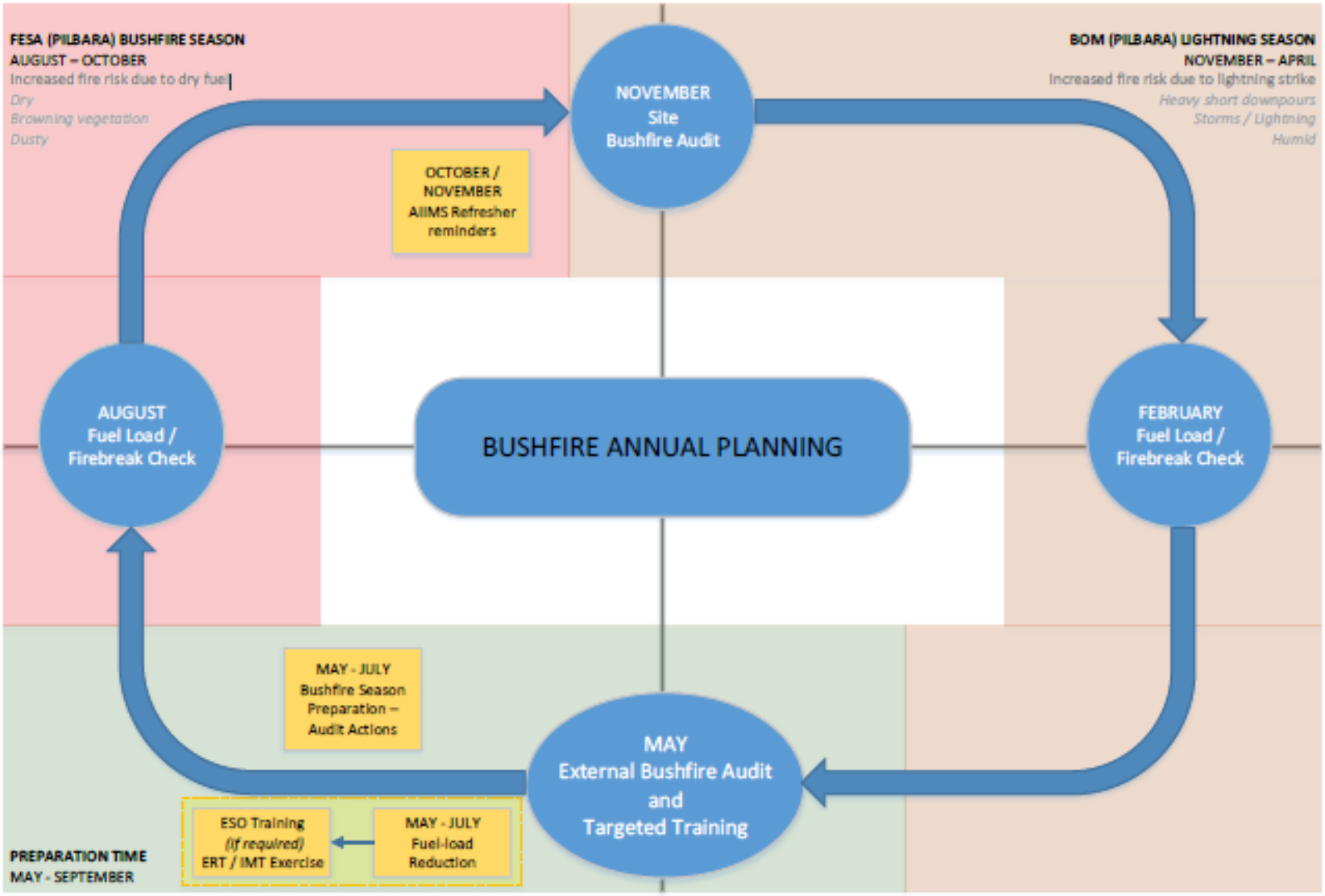
12. RELATED PUBLICATIONS

The following document should be read in conjunction with this Plan:

Table 6: Related Publications

Document Number	Title of Document
NS-0000-PL-SA-0004	North Star Emergency Response Plan
100-PL-EM-0009	Emergency Management Sub-Plan: Bushfire Management
100-ST-SA-0079	HSES Management Standards
100-PL-EM-0005.001	Emergency Management Template Part 1 of 4
100-LC-EM-0001	Notice of Exemption Total Fire Ban Section 22C - Mines
100-PR-SA-0011	Incident Management Procedure
100-PR-SA-1040	Hot Work Procedure
100-PR-EM-0007	Fire Management and Prevention
100-PR-EN-0004	Ground Disturbance Permits
100-LE-0040	Internal Memo – Fire Break Construction and Hazard Reduction Burning Advice

Appendix 1: Annual Bushfire Planning Flowchart


FESA (PILBARA) BUSHFIRE SEASON
AUGUST – OCTOBER
Increased fire risk due to dry fuel
Dry
Browning vegetation
Dusty
NOVEMBER
Site
Bushfire Audit
BOM (PILBARA) LIGHTNING SEASON
NOVEMBER – APRIL
Increased fire risk due to lightning strike
Heavy short downpours
Storms / Lightning
Humid
OCTOBER / NOVEMBER
AIIMS Refresher reminders
AUGUST
Fuel Load / Firebreak Check
BUSHFIRE ANNUAL PLANNING
FEBRUARY
Fuel Load / Firebreak Check
MAY - JULY
Bushfire Season Preparation – Audit Actions
MAY
External Bushfire Audit and Targeted Training
ESO Training
(if required)
ERT / IMT Exercise
MAY - JULY
Fuel-load Reduction
PREPARATION TIME
MAY - SEPTEMBER

Appendix 2: Annual Bushfire Risk Review

sandalwest
forest management

Annual Bushfire Risk Review – Fortescue Metals Group Limited

Site Audited	**Northstar Mine Site**
Audit Company	**Sandalwest**
Auditor	**Kevin Haylock**
Audit Dates	**8 – 9 May 2015**
Audit Report Recipient	**Tony Cocking**

This annual audit of bushfire risk at Fortescue Metals Group Limited's Northstar Mine was conducted by Sandalwest at the request of Mr Tony Cocking, Emergency Services Supervisor.

The audit included a review of documents and a site visit across the Northstar Mine and associated assets including the slurry pipe from the mine to the Concentrate Handling Facility.

Conclusions

The level of bushfire risk at the Northstar Site has decreased since the previous audit in 2014 largely due to reduced exploration activity and considerable areas being burnt by bushfires during the 2014/15 fire season.

The overall risk however remains unacceptably high when the likelihood and consequence of fire occurring in the mine site is considered. The bushfire risk related to human safety is potentially very high when considering the adequacy of Japal Camp as a safe refuge. The risk of damage to critical infrastructure and the likely interruption to ore processing is high.

The statement regarding high risk is currently more applicable to human behaviour than risk of fire igniting within the building zone however this will change over time as vegetation growth increases.

Improvements are required in the following areas:

- Making Japal Camp a safe refuge area during bushfires
- Protecting critical pipe lines by clearing along the pipe length or burying
- Training of Fortescue employees in planning and conducting hazard reduction burns
- Reducing fuel loads around the communications tower
- Incorporating bushfire protection as an integral part of planning the location of buildings and assets, and
- Removing physical impediments that will restrict access by fire vehicles.

Additional gains in bushfire risk treatment can be achieved through improved information at a more strategic level to enable decisions on resourcing and actions during bushfire.

Further details of areas checked and issues reviewed are contained on the following pages.

Firebreaks

The Shire of East Pilbara, where the Northstar mine is located, publishes an annual Firebreak Notice that details the requirements for firebreak installation and maintenance.

The Firebreak Notice requires that:
Two firebreaks should surround all buildings on land that is outside town sites, not less than three metres wide and cleared of all flammable material. The inner firebreak is to be not more than 20 metres from the perimeter of the buildings and the outer firebreak not less than 100 metres from the inner firebreak. The fuel load must be reduced from the whole of the land between the Firebreaks

The Shire of East Pilbara Firebreak Notice has not been complied with at the Northstar mine. At Japal Camp, an inner firebreak surrounds all buildings, power generation and water treatment facilities. The clearing between buildings and the nearest flammable vegetation is to a very high standard and contributes appropriately to making the camp a safe refuge during bushfires. An outer firebreak does not comply with the distance requirement from the inner firebreak which reduces the effectiveness of the overall firebreak system as a bushfire risk treatment. The location of the outer firebreak has little value in terms of creating and maintaining a safe refuge area.

The two firebreaks that are required by Local Government are intended to be separated by sufficient distance to provide, in conjunction with fuel reduction, a combined low fuel zone to protect buildings and occupants from bushfire.

Fuel reduction between the perimeter breaks, as required by the Firebreak Notice, has not yet been carried out which, combined with the sub-optimal firebreak locations, increases bushfire risk. The level of risk is unacceptably high if the camp is intended to serve as a safe refuge during bushfire.

The width between firebreaks surrounding the Japal Camp does not meet Local Government requirements and is too narrow to effectively reduce bushfire risk.

Constructing an outer perimeter firebreak, *not less than 100 metres from the inner firebreak,* surrounding Japal Camp is an important measure in reducing bushfire risk to the camp. This is not only a legal requirement, unless an exemption has been granted by the Local Government, it is a critically important measure to ensure that occupants can remain in the camp, possibly for a couple of days, until the bushfire risk has passed.

Firebreaks will not stop fires however they are an important part of a fire suppression strategy. To ensure firebreaks are effective they must be constructed and maintained prior to, not during, bushfire events. At the time of this audit the firebreak south of Japal Camp was separated from the access road by a mound and an above ground potable water supply pipeline. Access to firebreaks by firefighting vehicles must be maintained to avoid unnecessarily tying up resources during bushfire suppression.

Fuel reduction, to achieve a mosaic of fuel ages no greater than four years between the firebreaks, is also an essential element of making Japal Camp a safe refuge during bushfires.

Issue/Area	Compliance Status	Action Recommended
Firebreaks	Non-conformance	1. Relocate the Japal Camp outer perimeter firebreak at least 100 metres from the inner firebreak 2. Carry out hazard reduction burning around Japal Camp prior to 2015 bushfire season

Pipe lines

A number of pipe lines within the mine and along the production process are vulnerable to damage during bushfires.

Slurry pipelines

The most important of these appears to be the steel pipe that carries slurry from the mine to the concentrate handling facility. This steel pipe is not exposed to bushfire risk however the return water pipe is at risk of damage due to its location. Where the return water pipe is above ground and immediately surrounded by flammable vegetation it is quite probable that the pipe will be damaged during a bushfire.

The plastic slurry return water pipe is located alongside a steel slurry pipe from the mine to the concentrate handling facility. Unfortunately, from a bushfire risk perspective, the plastic pipe is located adjacent to spinifex and other flammable vegetation along its length from the mine to the concentrate handling facility with the non-flammable steel pipe situated on the access road side. The vegetation alongside the plastic slurry return pipe will regrow quickly requiring regular maintenance to protect the pipe from damage by bushfire.

The return water pump located near Japal Camp is located on the edge of the cleared area that once housed the Fly Camp. This pump facility is exposed to higher bushfire risk as the adjacent vegetation is highly flammable and there is insufficient separation between flammable vegetation and the pumping equipment.

The return water pump facility is located close to flammable vegetation.

The pipeline that supplies water to the concentrate handling facility is connected to a bore approximately two kms to the east. This pipeline is above ground and for much of its length is located amongst highly flammable vegetation. In discussion with Fortescue personnel responsible for the slurry operation it is considered likely that any interruption caused by bushfire could be repaired within a day.

Clearing along, or burying, this pipelines will reduce, or remove, the risk of interruption to concentrate processing.

Plastic pipes leading to the concentrate handling facility are exposed to damage from vegetation that will burn intensely during bushfire.

Raw water and potable water

Within the Northstar mine, the raw water supply pipe leading to the ore processing facility is partially located amongst flammable vegetation. The potable water supply pipe leading to Japal Camp is also located amongst flammable vegetation for much of its length.

Potable water (left) and critical raw water pipes (right) are exposed to damage from vegetation that will burn intensely during bushfire.

Both the raw water supply and potable water supply pipes are at risk of damage during bushfire due to their location amongst flammable vegetation.

Maintaining potable water supply to Japal Camp is a critical component of maintaining the camp as a safe refuge.

Waste water pipelines

The pipeline from the Japal Camp waste water treatment facility to the irrigation area is located above ground and is therefore likely to be damaged either by fire or machinery during a bushfire.

The interruption to camp operation from damaged pipes may render the camp unserviceable as a safe refuge during bushfires.

It is recommended that critically important pipe lines be programmed for protection work to be carried out prior to the high fire danger period. If the pipes are not to be buried, developing and maintaining a standard for separation between pipe lines and vegetation is recommended.

Sufficient width for a suitable sized loader or grader to pass may be a reasonable standard that is workable and easily understood.

Issue/Area	Compliance Status	Action Recommended
Pipe lines	Non-conformance	3. Complete programme of pipe line protection by end June 2015 4. Develop a standard for separation width between pipe lines and flammable vegetation for pipes that are left above ground

Communications Infrastructure

Access to the Nate Hill communications tower has been significantly improved since 2014 with the addition of a new access road that reduces travel time from the Emergency Services area where fire vehicles are normally parked.

The communications tower is located off centre in the cleared area such that solar panels are located close enough to flammable vegetation to require cooling with water during the passage of a bushfire. This procedure would require a fire unit to remain at the communication tower until the threat of damage to communication equipment was over. This would mean the fire unit was unavailable for despatch to other fire needs for a period of time. There is also a risk that the fire crew may not be able to descend from the hill if fire below posed the threat of entrapment during descent.

Communications equipment on Nate Hill may require particular attention during bushfire to prevent damage to solar panels.

Establishing a wider mineral earth break (e.g. 10 metres) around communications equipment would reduce the risk of damage from bushfire. A programme of weed spraying should be established to maintain the site in a weed free condition. Checking could be incorporated into the quarterly internal audit programme.

Issue/Area	Compliance Status	Action Recommended
Communications infrastructure	Non-conformance	5. Develop a programme to maintain the communications site in a weed free, low bushfire risk condition

Equipment storage

Equipment storage in laydown areas could be improved from a firefighter perspective. Although loss of equipment is unlikely, there are a number of examples where fire may damage plastic storage containers and rubber conveyor belting that can then cause remediation problems for fire personnel.

At the NRW laydown area, plastic intermediate bulk containers holding up to 1,000 litres of gear oil were stored within a few metres of spinifex. These storage containers could easily melt allowing the stored hydrocarbons to leak onto the ground.

At the OPF laydown area, conveyor belting is stored adjacent to the perimeter bund within a few metres of flammable vegetation. There is no access for fire vehicles between the vegetation and the flammable equipment.

Hydrocarbons stored in plastic containers present a risk to firefighters when located adjacent to highly flammable spinifex.

Issue/Area	Compliance Status	Action Recommended
Equipment storage	Minor Non-conformance	6. Shift equipment or clear vegetation to achieve five metre break between flammable equipment and flammable vegetation

Power generation, fuel storage and mining infrastructure

Power generation, fuel storage facilities and mining infrastructure (crusher, ore processing and slurry facilities) are all located on cleared ground with good separation from nearby flammable vegetation. All of the facilities inspected meet, or exceed, the requirement for ten metres separation from flammable material as prescribed in the Local Government Firebreak Order.

Issue/Area	Compliance Status	Action Recommended
Power generation, fuel storage and mining infrastructure	Conformance	No action required

Bushfire detection, monitoring and response

A bushfire near Northstar mine last summer provided emergency services personnel with a good deal of experience in detecting, monitoring and responding to bushfires.

It appears that significant time can be spent monitoring low risk bushfires (in addition to higher risk bushfires) however only checking and assessing fires in the field will provide enough information for an informed decision to be made in regard to the required action.

A system of fuel mapping, infrastructure location and asset susceptibility to fire damage would be useful to assist decision making in the early stages of fire detection and monitoring. The system being developed at Rail Operations would be well suited to the needs of personnel at Northstar Mine.

Issue/Area	Compliance Status	Action Recommended
Bushfire Monitoring	Continual Improvement	7. Develop fuel mapping and asset condition recording system

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13 May 2015

Appendix 3: Fire Ban Exemption Notice - DFES

Government of Western Australia
Department of Fire & Emergency Services

DFES
Department of Fire & Emergency Services

BUSH FIRES ACT 1954
NOTICE OF EXEMPTION
TOTAL FIRE BAN
Section 22C

Lighting or use of fire, or carrying out activity in the open air that causes or is likely to cause fire, during a total fire ban.

Correspondence No. 12424 — Department of Fire and Emergency Services

Pursuant to the powers delegated and sub delegated to the DFES Deputy Commissioner, I hereby exempt **Fortescue Metals Group Limited (FMG)**, under section 22C of the *Bush Fires Act 1954*, from the operation of the provisions of sections 22B and 46 of that Act, subject to compliance with the conditions specified hereunder.

This exemption applies;

- to FMG employees and contractors,
- for the construction, maintenance and repair of plant, machinery and equipment,
- for the purpose of hot works (welding, cutting, grinding and heating) and electrical switching,
- to enable access to infrastructure that is "off road",
- at their **Cloudbreak minesite, Christmas Creek minesite, Solomon Hub operations**, and **North Star mining and processing operations**,
- during a total fire ban for the Shire of Ashburton, the Shire of East Pilbara or the Town of Port Hedland.

SPECIFIED CONDITIONS

1. **Fire Prevention**
   1.1. This exemption only applies for work which cannot reasonably be postponed to a time with safer weather conditions.
   1.2. FMG management is to assess weather conditions and heed warnings, limiting all activities to that which can be undertaken safely.
   1.3. The company's sites are to be maintained in accordance with the local government fire break notice.

2. **Notification**
   2.1. The Department of Fire and Emergency Services (DFES) Pilbara Regional Office, Karratha is to be notified on the day, prior to these activities occurring during a total fire ban.
   2.2. The relevant local government or their authorised representative (e.g. Chief Fire Control Officer) is to be notified on the day, prior to these activities occurring during a total fire ban.

3. **Site Requirements**

3.1. Where such works are to be conducted more than 30 metres from any bush or grassland.

3.1.1. An area of 5 metres radius free from flammable materials immediately around the work site will be established and maintained around all hot work areas.

3.1.2. Welding screens and the wetting down of surrounding area is required to reduce possible spark ignition around the immediate work site.

3.1.3. The provision of two (2) operational 9 litre stored water fire extinguishers at the site of any hot works.

3.1.4. At least one (1) able-bodied person (trained in extinguisher operation), other than the training presenter, and wearing the appropriate "Personal Protective Clothing (PPC)" is to be in attendance and dedicated solely to the detection and suppression of any fire.

3.1.5. At least 2 able bodied people are to remain at the work site for at least 30 minutes after the works have been completed to ensure the site remains safe and the site is to be fully inspected for any potential fire activity prior to their departure.

3.2. Where such works are to be conducted within 30 metres of any bush or grassland.

3.2.1. An area of 5 metres radius free from flammable materials immediately around the work site will be established and maintained around all hot work areas.

3.2.2. Welding screens and wetting down of surrounding area is required to reduce possible spark ignition around the immediate work site.

3.2.3. A fire suppression unit is to be on site, comprising a minimum of 400 litres of water, with an operational pump and 20 metres of 19 mm diameter hose (minimum), capable of delivering water through an adjustable nozzle to be located in close proximity to the site of any work.

3.2.4. At least one able bodied person (trained in the unit operation) and wearing the appropriate 'Personal Protective Clothing (PPC)' is to be in attendance and dedicated solely to the detection and suppression of any fire.

3.2.5. A bulk water supply tanker (min 5000 litres) is present when hot work is conducted where no reticulated water supply is available within 1 km of the work site.

3.2.6. At least 2 able bodied people are to remain at the work site for at least 30 minutes after the works have been completed to ensure the site remains safe and the site is to be fully inspected for any potential fire activity prior to their departure.

4. **To enable "off road" vehicle operations.**

4.1. All vehicles and stationary motors are to be inspected prior to leaving any formed road to ensure that the exhaust systems are in a sound condition and fitted with a spark arrestor of suitable design.

4.2. The access to the worksite is to be checked to ensure that no vegetation can come into contact with catalytic converters fitted to any vehicle.

4.3. The vehicles and plant are to be sited/parked in an area free from flammable material.

Period of Exemption.

This exemption is **valid from the date of signature through until 30th June 2018 inclusive.**

GRAHAM SWIFT
Assistant Commissioner, Country Operations of the Department of Fire and Emergency Services, as sub-delegate of the Minister under sections 15 and 16 of the *Fire and Emergency Services Act 1998.*

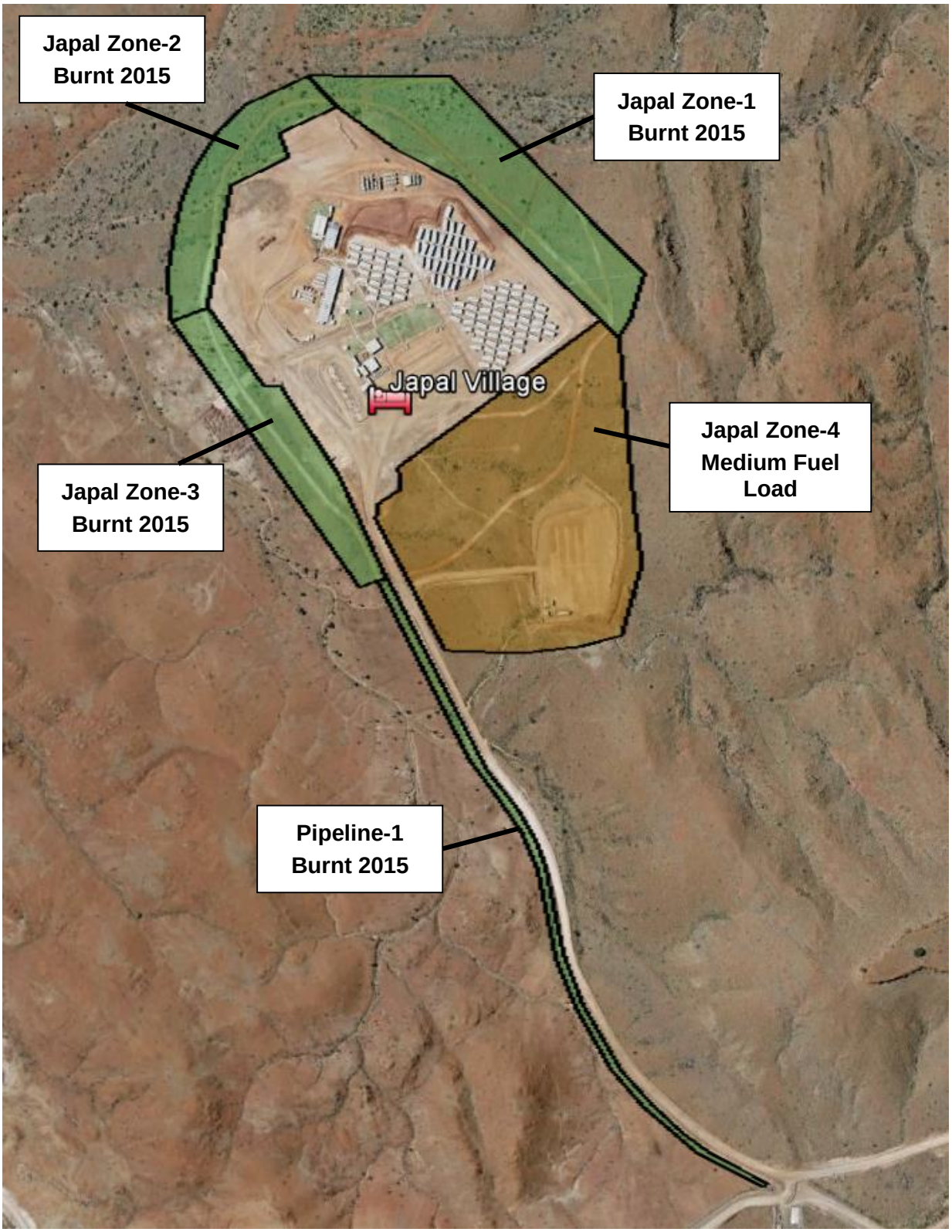
25th June 2015

Appendix 4: North Star Asset GPS Locations

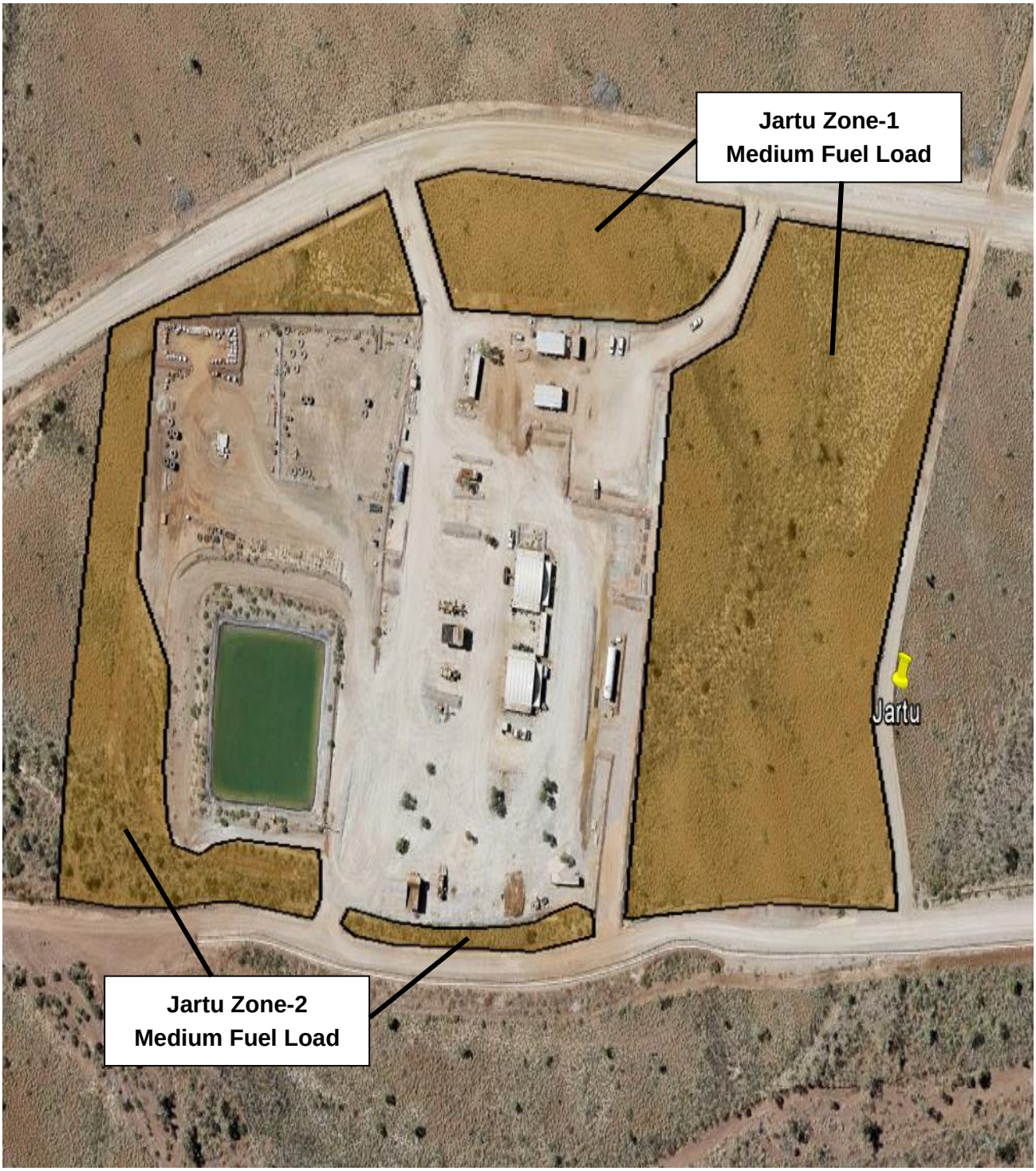
Asset	Location	GPS COORDIANTES	
Japal Camp	Accommodation Area		
Jartu Laydown	Mining Contractor Compound		
OPF	Ore Processing Facility		
CHF	Concentrate Handling Facility		
SRS Magazine Facility	North Star		
COMMUNICATIONS	NATES COMMUNICATION TOWER	711055mE	7647958mN
Water Management	NRW TURKEYS NEST	710130mE	7647383mN
Darby Turkeys Nest	Darby Ramp	0709414E	765543 N
Jimmy's Gap Turkeys Nest	Jimmy's Gap	0712575E	7648518N
NRW Laydown Turkeys Nest	NRW Laydown Turkeys Nest	0710159E	7647358N
Access Road Turkeys Nest	Access Road Turkeys Nest	0699963E	7648526N
Bore Pumps (with Gensets)	Golder (NS-PB02)	710143mE	7654606mN
	NS-EXS03	710676.81E	7644834.78N
	NS-PB 15	709402mE	7647283mN
	NS-PB 17	709794mE	7647256mN
	NS-PB 19	709162mE	764713mN
	NS-PB 31	709500.97E	76447557.92N
	NS-PB 32	709611mE	7647017mN
	NS-PB 33	710795mE	7647248mN
	NS-OBS 14	712615mE	7649148mN
	NS-OBS 18	710075mE	7647308mN
	NS-OBS 2	712810mE	7648564mN

Appendix 5: Fuel Loading Maps - 2016

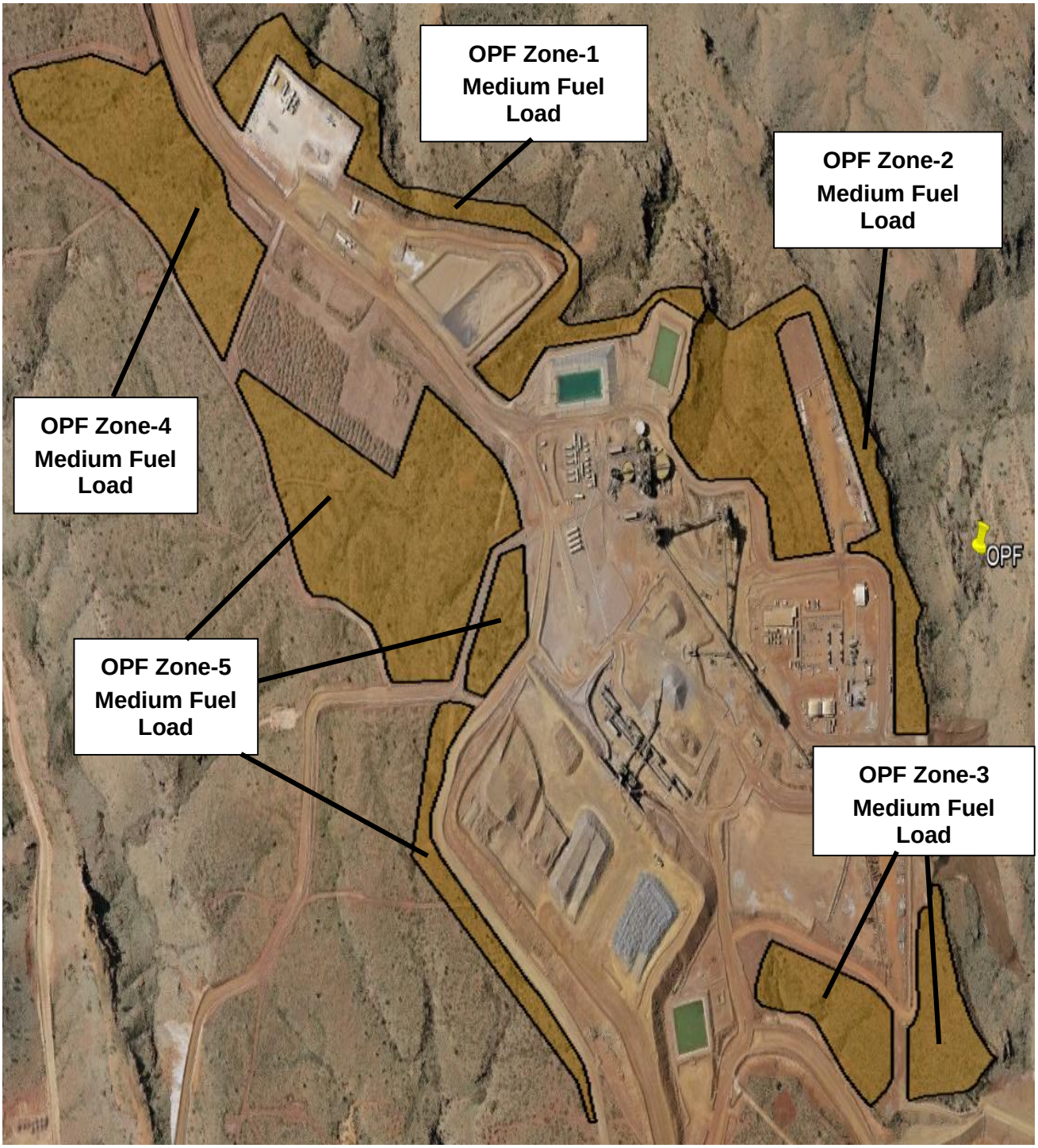
JAPAL CAMP/RETURN WATER FACILITY FUEL LOADING - 2016



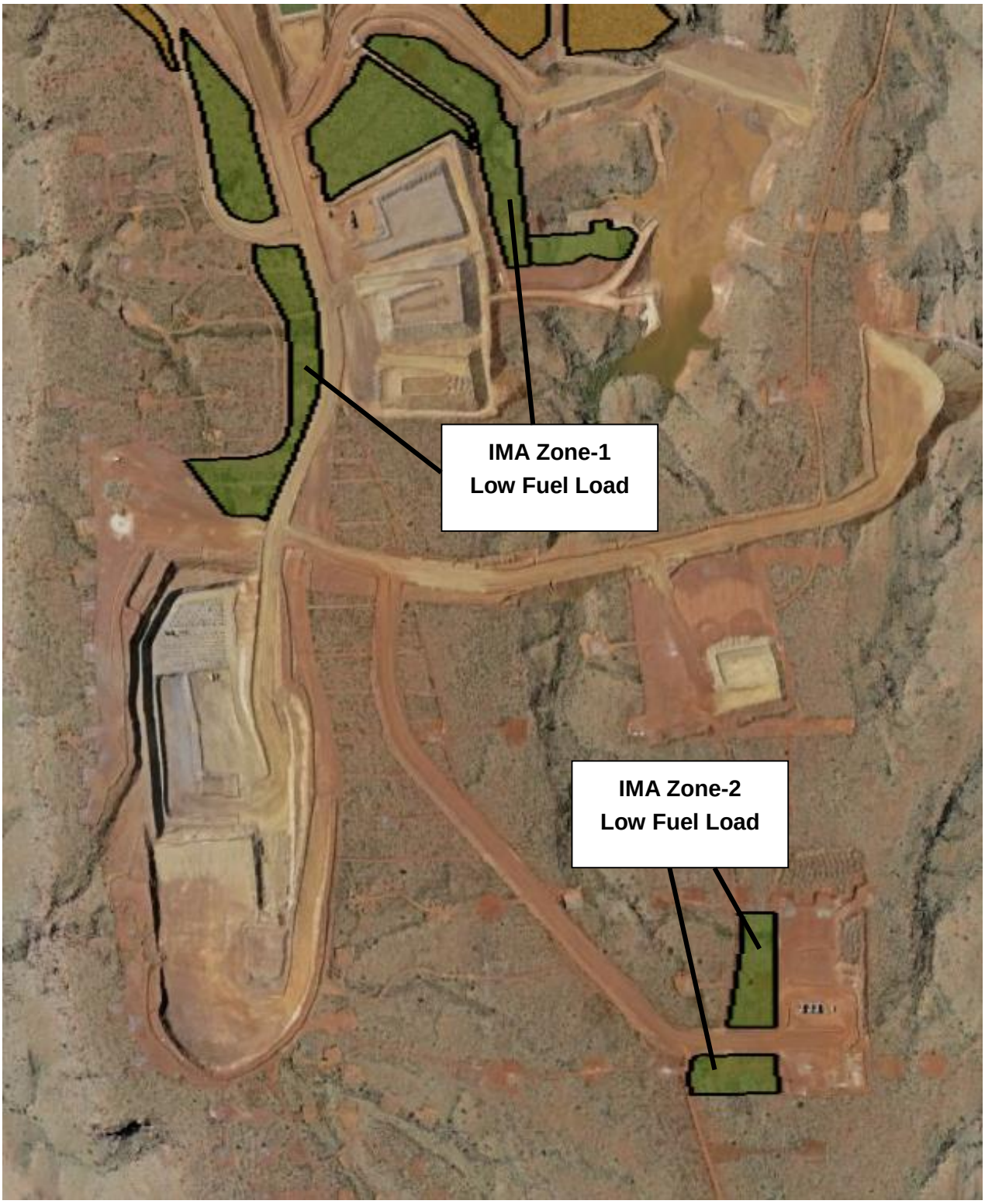
JARTU LAYDOWN FUEL LOADING – 2016



OPF FUEL LOADING - 2016

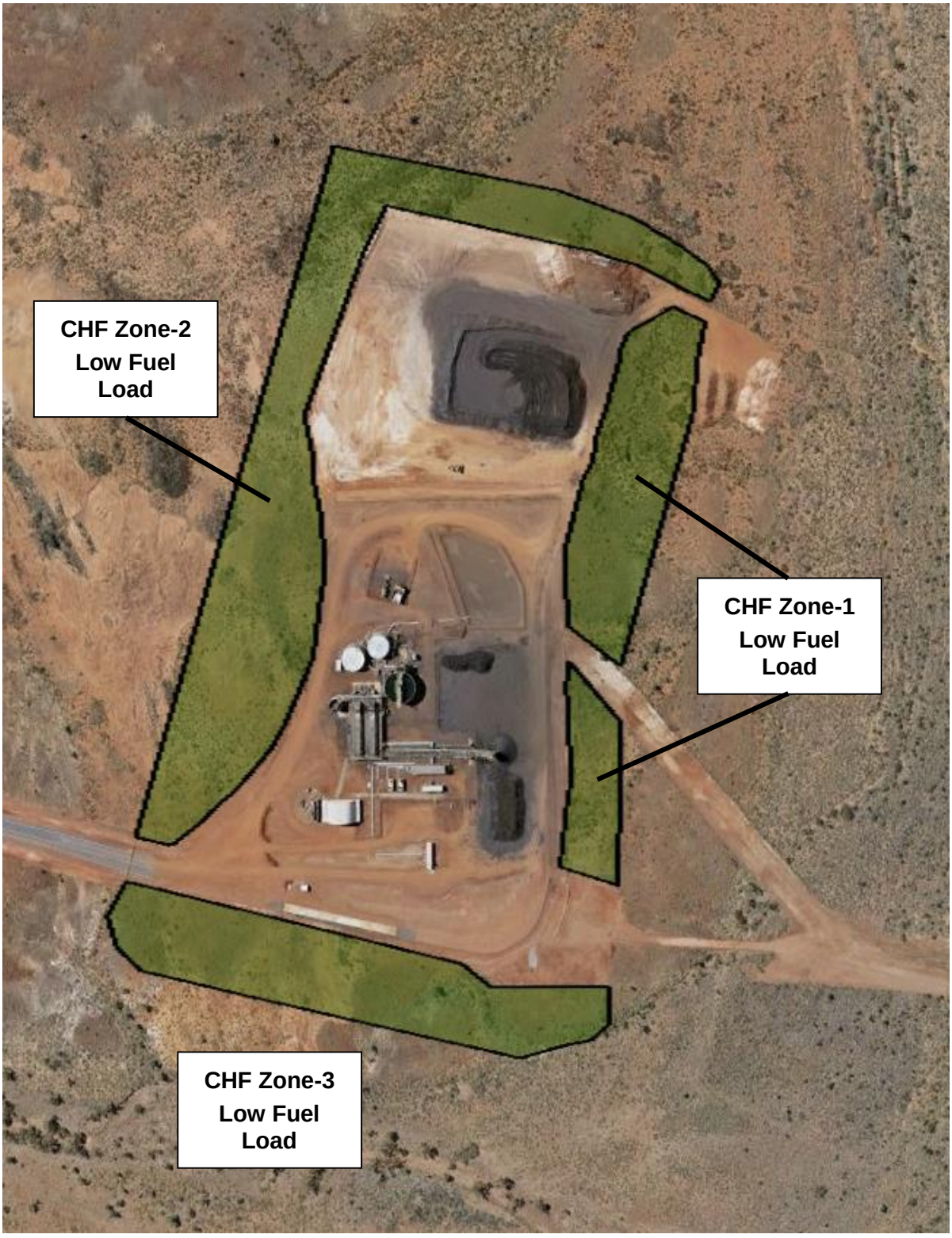


IMA FUEL LOADING – 2016



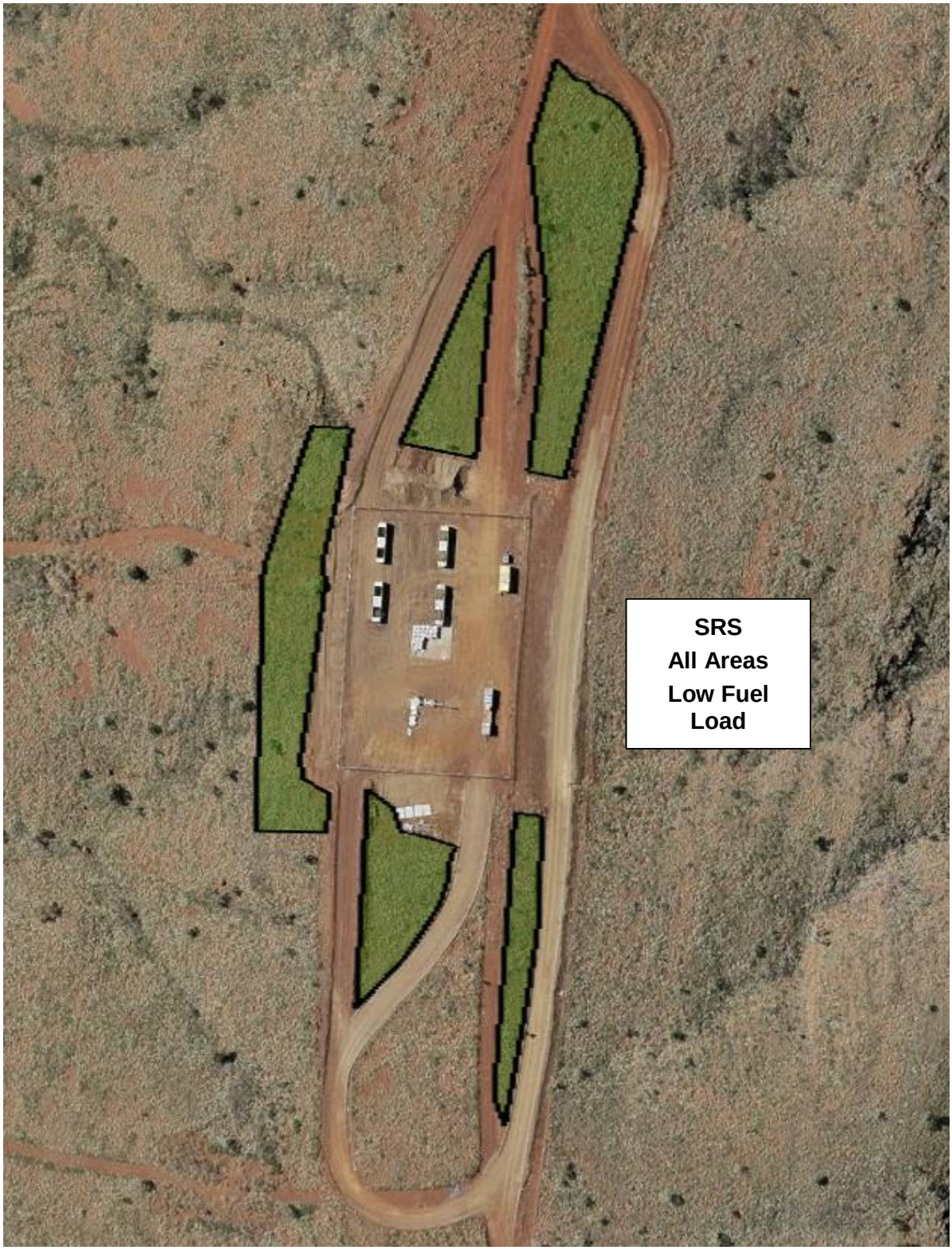
OPF EMERGENCY ACCESS FUEL LOADING - 2016

CHF FUEL LOADING – 2016

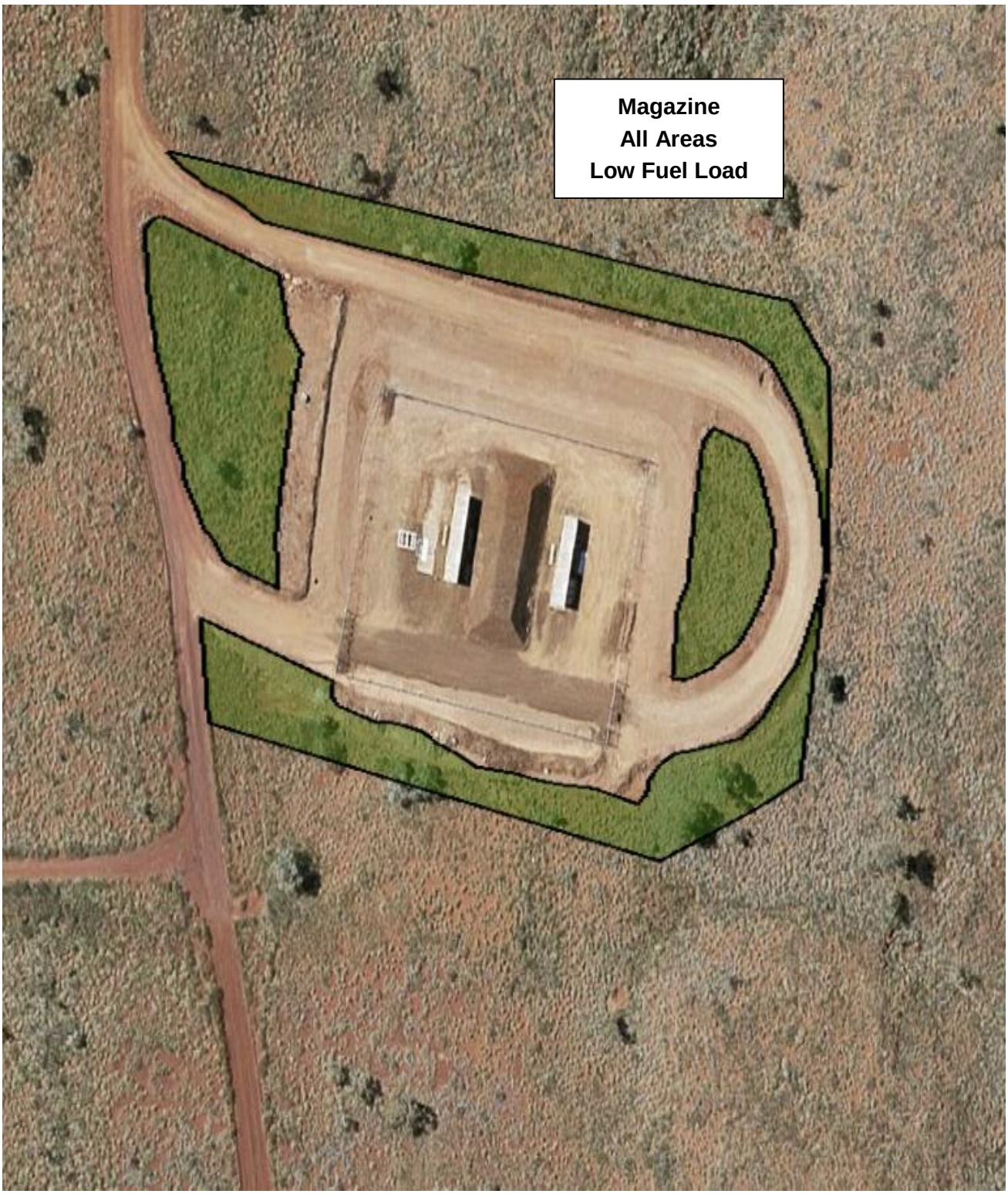


TATE COMM TOWER FUEL LOADING - 2016

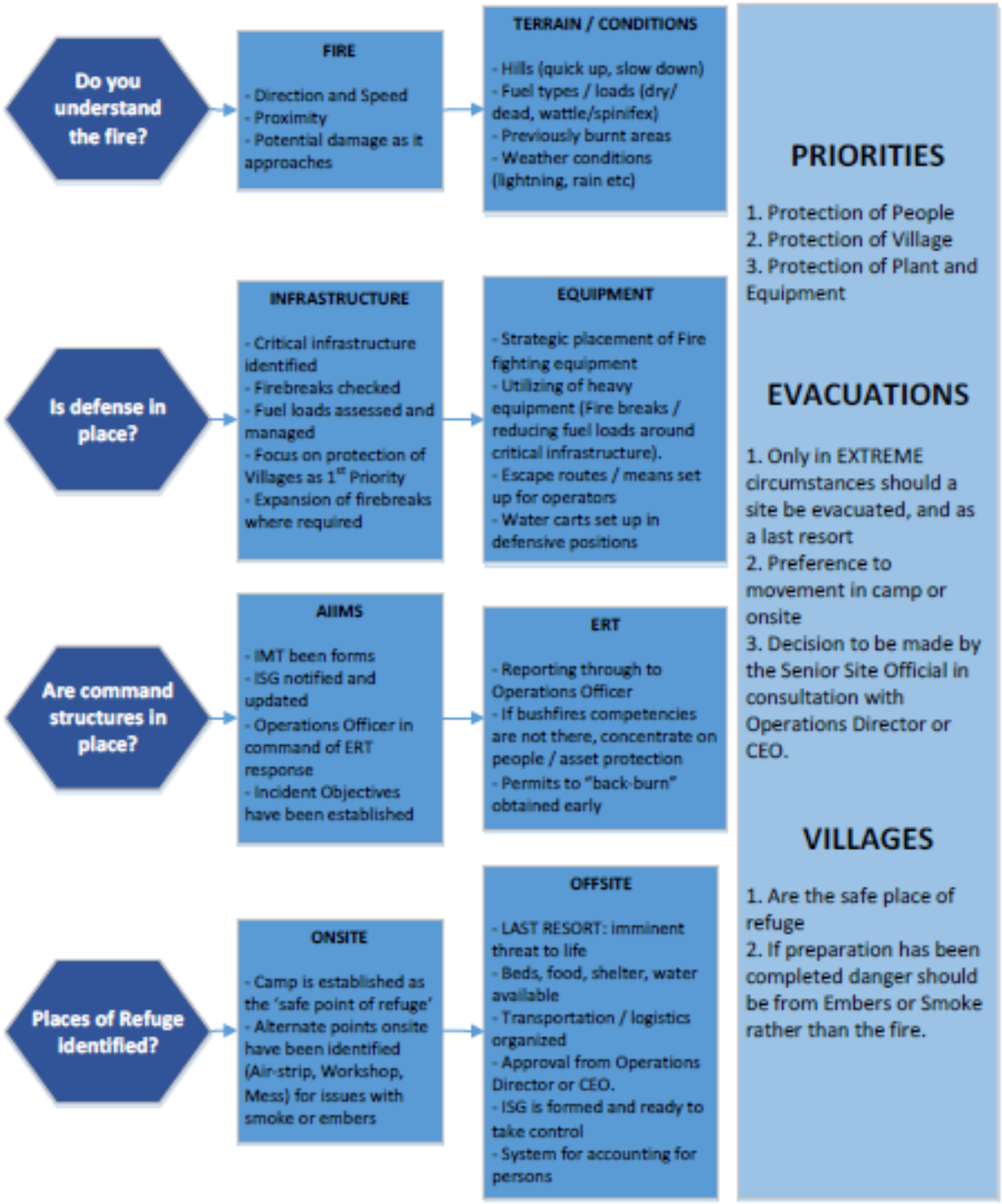
SRS FUEL LOADING - 2016



EXPLOSIVES MAGAZINE FUEL LOADING - 2016



Appendix 6: Bushfire Event Management Flowchart


Do you understand the fire?
FIRE
- Direction and Speed
- Proximity
- Potential damage as it approaches
TERRAIN / CONDITIONS
- Hills (quick up, slow down)
- Fuel types / loads (dry/ dead, wattle/spinifex)
- Previously burnt areas
- Weather conditions (lightning, rain etc)
Is defense in place?
INFRASTRUCTURE
- Critical infrastructure identified
- Firebreaks checked
- Fuel loads assessed and managed
- Focus on protection of Villages as 1st Priority
- Expansion of firebreaks where required
EQUIPMENT
- Strategic placement of Fire fighting equipment
- Utilizing of heavy equipment (Fire breaks / reducing fuel loads around critical infrastructure).
- Escape routes / means set up for operators
- Water carts set up in defensive positions
Are command structures in place?
AIIMS
- IMT been forms
- ISG notified and updated
- Operations Officer in command of ERT response
- Incident Objectives have been established
ERT
- Reporting through to Operations Officer
- If bushfires competencies are not there, concentrate on people / asset protection
- Permits to "back-burn" obtained early
Places of Refuge identified?
ONSITE
- Camp is established as the 'safe point of refuge'
- Alternate points onsite have been identified (Air-strip, Workshop, Mess) for issues with smoke or embers
OFFSITE
- LAST RESORT: imminent threat to life
- Beds, food, shelter, water available
- Transportation / logistics organized
- Approval from Operations Director or CEO.
- ISG is formed and ready to take control
- System for accounting for persons
PRIORITIES
1. Protection of People
2. Protection of Village
3. Protection of Plant and Equipment
EVACUATIONS
1. Only in EXTREME circumstances should a site be evacuated, and as a last resort
2. Preference to movement in camp or onsite
3. Decision to be made by the Senior Site Official in consultation with Operations Director or CEO.
VILLAGES
1. Are the safe place of refuge
2. If preparation has been completed danger should be from Embers or Smoke rather than the fire.

Appendix 7: Village Evacuation Checklist

This checklist is to be completed prior to an evacuation from village facility in the event of an emergency.

	QUESTION	YES	NO	COMMENT
1	Is the event sufficiently close to warrant consideration of an evacuation?	☐	☐	
2	Is the event sufficiently severe to warrant consideration of an evacuation?	☐	☐	
3	Has something occurred that compromises the villages' status as safe refuge?	☐	☐	
4	Is there sufficient fire equipment to provide defence of the village?	☐	☐	
5	Do we have the transportation capacity to move all persons?	☐	☐	
6	Is the path of evacuation safe?	☐	☐	
7	Is the place of evacuation safe?	☐	☐	
8	Does the alternate arrangement have sufficient Beds?	☐	☐	
9	Does the alternate arrangement have sufficient Supplies?	☐	☐	
10	Is there a process for accounting for all people being transported?	☐	☐	
11	Is there a process for monitoring those that stay behind?	☐	☐	

Person Authorising Evacuation: Contact Number:

Person Coordinating Evacuation: Contact Number:

	Action	Responsible Person	Contact Number	Due	Complete
1					☐
2					☐
3					☐
4					☐

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