



Report

Bushfire Management Plan (Renewables)

LOCATION: TRONOX (CHANDALA) BESS FACILITY

ADDRESS: 722 (LOT M1261) OLD GINGIN ROAD, MUCHEA WA



DOCUMENT ISSUE APPROVAL

Project Title:	Bushfire Management Plan (Renewables)
Project Location:	Tronox (Chandala) BESS Facility
Project Address:	722 (Lot M1261) Old Gingin Road, Muchea WA
Project No:	264527
Report No:	N26-0211
Issue:	C
Date:	3 August 2026
Distribution:	Client
	Covey Associates

© Copyright **Covey Associates Pty Ltd** (2026).

This document is the property of **Covey Associates Pty Ltd**. This document and the information contained in it are solely for the use of the authorised recipient and this document may not be used, copies of reproduced in whole or part for any purpose other than that for which it was supplied by Covey Associates Pty Ltd. **Covey Associates Pty Ltd** makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document, or the information contained in it.

COPYRIGHT NOTICE: Parts of this document contain material originally prepared by:



Author:

Linden Wears

Senior Bushfire Engineer



BSc, GradDip (Fire Safety Eng.), GradDip
(Bushfire Protection)

BPAD Level 3 Accredited Bushfire
Practitioner

Contents

1	Introduction	1
1.1	Proposed Development.....	1
1.2	Site description	1
1.3	Purpose.....	3
1.3.1	Current Bushfire Regulatory Requirements.....	3
1.3.2	Project Bushfire Compliance and Reporting Approach	4
1.4	Other plans/reports.....	4
2	Environmental Considerations.....	8
2.1	Native vegetation - modification and clearing	8
2.2	Revegetation / Landscape Plans.....	8
3	Bushfire assessment	9
3.1	Assessment inputs	9
3.1.1	Vegetation classification	9
3.1.2	Effective Slope.....	9
3.1.3	Summary of Inputs.....	9
3.2	Assessment outputs	10
3.2.1	Bushfire Attack Level (BAL) contour assessment.....	10
3.3	Likelihood of Bushfire Impact.....	14
3.4	Bushfire Hazard Summary	16
4	Renewable Energy Infrastructure Hazard and Risk Analysis.....	17
4.1	Battery Energy Storage System (BESS) hazard review	17
4.1.1	Thermal runaway in Li-ion batteries	17
4.1.2	Historical failure events (Li-ion battery and BESS).....	18
4.1.3	BESS Standards.....	18
4.1.4	Likelihood of BESS Facility Fire	19
4.1.5	BESS hazard summary for bushfire	19
4.2	Transformer Hazard.....	19
4.3	Derived Bushfire Risk Management Principles.....	20
5	Bushfire Safety Strategy and Management Measures	23
5.1	Bushfire Risk Strategy	23
5.2	Vegetation Management and Separation	24
5.2.1	Vegetation Management and Separation - BESS.....	24

5.2.2	Vegetation Management and Separation - Transformers	25
5.3	Vehicular Access	25
5.3.1	Vehicular access – BESS	25
5.3.2	Vehicular access – Transformers	26
5.4	Firewater Supply	26
5.4.1	Firewater - BESS	26
5.4.2	Firewater – Transformers	27
5.5	Renewable Energy Infrastructure Design	28
5.5.1	BESS System	28
5.5.2	Transformers	29
5.6	Bushfire resilient construction	29
5.7	Construction and Commissioning	29
5.8	Operation, Maintenance and Housekeeping	30
5.9	Emergency Information Book and Signage	30
5.10	Emergency Services Familiarisation	31
5.11	Emergency Management Plan	32
5.12	Dangerous Goods	33
5.13	Compliance with annual firebreak notices	33
6	CFA Renewable Guidelines Compliance Assessment	36
7	Responsibilities for implementation and management of the bushfire measures	46
8	References	48
	Appendix A Vegetation plot photos and description	49
	Appendix B APZ Standards from WA PBG	68
	Appendix C AS 3959 Clause 2.2.3.2 (e) and (f) – Low threat Vegetation and Non-Vegetated Areas ...	74
	Appendix D Method 2 Calculation – Plot 1	76
	Appendix E Vehicular Access Technical Standards of the WA PBG	78
	Appendix F Water Technical Standards of the WA PBG	82
	Appendix G Shire of Chittering Firebreak Notice	86
	Appendix H Bushfire Emergency Management Plan Requirements	87

Figures

Figure 1-1. Development Layout	5
Figure 1-2. Site Overview	6

Figure 1-3. Designated Bushfire Prone Areas	7
Figure 3-1. Post-Development Vegetation and Effective Slope.....	12
Figure 3-2. BAL Contour Plan	13
Figure 3-3. Bushfire History (Firewatch 2026)	15
Figure 3-4. Bushfire History (DBCA 2026)	15
Figure 5-1. Bushfire Management Measures	35

Tables

Table 1: Post-development vegetation classifications/exclusions and effective slope (within 150 m of BESS compound & Transformers)	9
Table 2: BAL contour assessment results (to proposed BESS compound & Transformers)	11
Table 3: BAL applicable to proposed infrastructure	11
Table 4: Summary of Renewable Energy Facility requirements relating to bushfire and the development response (CFA, 2025).....	37
Table 5: Responsibilities for implementation and management of the bushfire measures	46

1 Introduction

1.1 Proposed Development

A Battery Energy Storage System (BESS) facility and associated infrastructure at Lot 1261 (No.722) Old Gingin Road, Muchea is lodging a development application (DA) for development within the existing Tronox Chandala Processing Plant (the subject site).

This project constitutes part of the Tronox Decarbonisation Project, which seeks to develop an environmentally friendly and cost-effective power system for the synthetic rutile process.

The proposed BESS development is expected to include the following infrastructure (see Figure 1-1):

- **Battery Energy Storage System (BESS)**
 - 4 BESS modules expected to store up to 38 MW/322MWh each
 - Each BESS module contains 8 DC containers and 1 AC skid
 - The BESS modules will be a centralised BESS arrangement occupying approximately 15 m x 105 m area within the nominated BESS compound (29.5 m x 225 m) is located on the southern side of the existing Chandala facility.
- **Transformers**
 - Addition of up to two transformers as follows:
 - A new transformer co-located with the proposed BESS (Transformer 2)
 - A new transformer (Transformer 1) located next to the existing switchyard, located 180 m east of the BESS compound.
 - Both transformers are expected to be designed and constructed in accordance with relevant Australian Standards.
- **Internal roads**
- **Fencing**
- **Firewater infrastructure**
 - Likely to be extended to BESS compound from existing onsite hydrant system

There are no buildings proposed as part of the proposed BESS development, and there will be no staff required for the operation BESS. Any attendance to the BESS is to be for routine maintenance and any troubleshooting or repairs, and would be conducted by specialist contractors or existing Tronox staff.

The existing facility is manned 24 hours a day, 7 days a week, and there is expected to be Tronox staff at the plant at all times.

1.2 Site description

The proposed BESS is to be sited in the southern portion of existing Chandala facility, which forms a part of the processing sequence that Tronox implements to turn raw mineral sands into finish products (zircon, rutile, leucoxene and activated carbon). The Chandala facility includes three major plants: a dry mill, which separates the minerals; a synthetic rutile plant, which upgrades ilmenite into high-quality synthetic rutile; and a residue management plant. Additionally, there is also a number of administration, maintenance and support buildings and areas that form the existing facility.

The existing facility predominantly occupies the north-eastern portion of Lot M1261, with the following infrastructure also noted onsite:

- Existing switchyard along the southern part of the existing facility
- Existing Western Power owned transmission lines extend from the switchyard, to the north-east and south-west within a 20-25 m easement
- Existing railway extending from silos on the southern part of the existing facility, west and then south-west to the existing railway running parallel with the Brand Highway (but doesn't appear to connect to this railway line)
 - This onsite railway has not been used for over 20 years and has been disconnected from the main railway in excess of 10 years
 - The onsite railway is associated with an existing easement, however is not fully sited within the easement, especially at the subject site.

The proposed BESS compound and Transformer 2 is located immediately south of the existing maintenance buildings, partially over the existing railway line, in an area that isn't cleared of vegetation other than the old railway line. Most land within the subject site, and surrounding it to the south-west, south and east, is forest or scrub vegetation. Land to the north is primarily existing non-vegetated buildings, infrastructure and roads, or managed landscaping.

Transformer 1 is proposed within the existing switchyard, and this site is currently cleared of vegetation, and surrounded by grassland, scrub and forest vegetation.

Slopes across the site appear to be shallow (less than 5 degrees) and descending from the slightly higher existing facility, to lower lying areas to the south and west.

Public road access to the existing site is largely via the main entrance to the facility from Brand Highway to the west. This entrance road provides access to the main administration area, but also extends into the existing facility through security-controlled entrances.

Additionally, there is an alternative vehicular access from Old Gingin Road to the east, however this is connected to the existing facility by narrower unsealed track, and is generally rarely used (see Figure 1-2).

Internal vehicular access within the Chandala facility is currently via existing sealed and unsealed roads, which are used by a variety of light and heavy vehicles.

There is no known reticulated town main water supply currently provided to the existing site, nor is there any existing street hydrants. The site has an existing fire hydrant system that serves the majority of the plant and administration areas, that includes:

- 1 combined process/firewater tank
 - Overall capacity of up to 1735 kL, but currently kept to 60% of this (approximately 1041 kL)
 - 415 kL of overall capacity is kept as firewater reserve at the bottom of tank
- 2 fire pumpsets to two fire hydrant ring mains as follows:
 - Mineral Separation Plant (MRP) ring main
 - Synthetic Rutile Plant (SRP) ring main
- Fire hydrants and fire hose reels off each ring main, providing coverage of the existing facility

In addition to the fixed firewater systems, the existing facility has the following onsite fire appliances:

- 1 Fire Truck with 3000 L tank, rear mount pump, fire branches and hoses, and various firefighting and communication equipment.

- 1 Light Fire Tanker (4WD) with 800 L tank, small pump, hose reel, extinguishers, and various firefighting and communication equipment.
- 1 Mobile Fire Trailer, with 500 L tank and small pump and hose reel; and
- 1 Emergency Response Vehicle with fire branches and hoses, and various firefighting and communication equipment.

1.3 Purpose

1.3.1 Current Bushfire Regulatory Requirements

The entire subject site is currently designated as bushfire prone (Area 2) as per the *Map of Bush Fire Prone Areas* (DFES 2026; see Figure 1-3), however as no habitable buildings are proposed as part of this DA, there is no trigger to assess the proposal against 'State Planning Policy 3.7: Bushfire' (SPP 3.7; Western Australian Planning Commission (WAPC) 2024) and the WA 'Planning for Bushfire Guidelines For the implementation of State Planning Policy 3.7 Bushfire' (the WA PBG; WAPC 2024).

Application of SPP3.7 and the WA PBG is only required for "habitable buildings" as defined in WA Planning Regulations, in addition to hazardous, flammable and/or combustible materials associated with the development, however the proposed renewable energy infrastructure (e.g. BESS and transformers) is not considered "habitable building", therefore assessment is not triggered.

The following is also noted for renewable energy facilities:

- As compliance with SPP 3.7 and the WA PBG isn't triggered for proposed renewable energy infrastructure, there is no statutory requirement for this infrastructure to comply with any specific requirements.
- The Department of Planning, Lands and Heritage (DPLH) are currently in the process of drafting a WA Renewable Code and Guidelines, which is expected to address wind, solar, BESS and transmission infrastructure, however at this time, they have only produced a draft of these documents for wind farms which is not applicable to this project. The timing of the preparation and release of these documents is currently unconfirmed.
- The Western Australian Planning Commission (WAPC) have previously released a Position Statement on Renewable Energy Facilities (principally for wind turbine and solar array systems), and while not specifically applicable to this project, it does provide the following high-level guidance:
 - The objectives of the position statement include facilitate appropriate development of renewable energy facilities while minimising any potential impact upon the environment, natural landscape, and urban areas
 - Wind turbines and solar arrays in bushfire prone areas should be designed and maintained so they are not a bushfire risk to surrounding bushland, and where possible should not be in bushfire prone areas with an 'extreme' bushfire hazard level or bushfire attack level (BAL) - 40 or BAL- Flame Zone.
 - A minimum 10 metres clearance to combustible vegetation in the form of an Asset Protection Zone (APZ) is recommended, which should be managed in a low threat state, in accordance with the WA PBG.
- Current referral advice typically provided by DFES is that strict compliance is unlikely to be required or achieved with SPP 3.7 and the WA PBG, however application of the Country Fire Authority (CFA) *Design Guidelines for Renewable Energy Facilities v4.4* (the CFA Renewable Guidelines; CFA 2025) from Victorian fire brigade, currently provides the best design guidance for renewable energy facilities at this stage.

- It is noted that the CFA Renewable Guidelines currently has no formal status in WA through SPP 3.7 and the WA PBG.
- The Shire of Chittering (the Shire) currently doesn't have any Local Planning Policies applicable to BESS development.

1.3.2 [Project Bushfire Compliance and Reporting Approach](#)

Based on the regulatory requirements detailed in Section 1.3.1, the following bushfire assessment and reporting approach is proposed:

- As there are no buildings proposed as part of the DA, nor are Covey aware of any Local Planning Policies or other planning instruments that trigger assessment of bushfire risk to the proposed BESS development, there is no requirement to produce bushfire reporting to accompany the DA.
- Voluntary assessment and mitigation of the bushfire risk to the development given the importance of bushfire risk in the proposed location;
- To address the above, Covey proposes voluntary adoption of the CFA Design Guidelines, documented in this Bushfire Management Plan, to:
 - Guide the development of the proposed bushfire risk management strategy and mitigation measures for the renewable energy infrastructure, and
 - Provide a technical benchmark with which to establish that bushfire risk has been managed to appropriate level for renewable energy infrastructure, noting the following:
 - The CFA Design Guidelines are a Victorian publication, and where relevant, Western Australian standards and specifications will be adopted
 - Aspects of the CFA Design Guidelines are aimed at both onsite infrastructure fires and bushfire risk management, and while Covey is primarily addressing the bushfire-relevant requirements of the CFA Design Guidelines, managing the potential for onsite renewable energy infrastructure fire to limit the opportunity for bushfire ignition and escape is also considered important part of bushfire risk management.

The focus of this BMP is to apply and demonstrate voluntary compliance of the proposed renewable energy infrastructure with the Model Requirements of the CFA Renewable Guidelines.

- *Covey notes that this BMP doesn't seek to achieve strict compliance with the Model Requirements of CFA Design Guidelines, but in lieu of any other detailed design guidance, use of it to provide a framework for bushfire assessment with some technical benchmarks to inform the bushfire risk management strategy for renewable energy infrastructure. Notwithstanding, where deviations have been made from the concepts of the CFA Design Guidelines, this has been justified in this BMP.*

1.4 Other plans/reports

There are no known bushfire reports or assessments that have been prepared previously for the subject site.

Covey note that the following reports accompany this DA submission:

- Environmental assessment reports
- Noise assessment reports

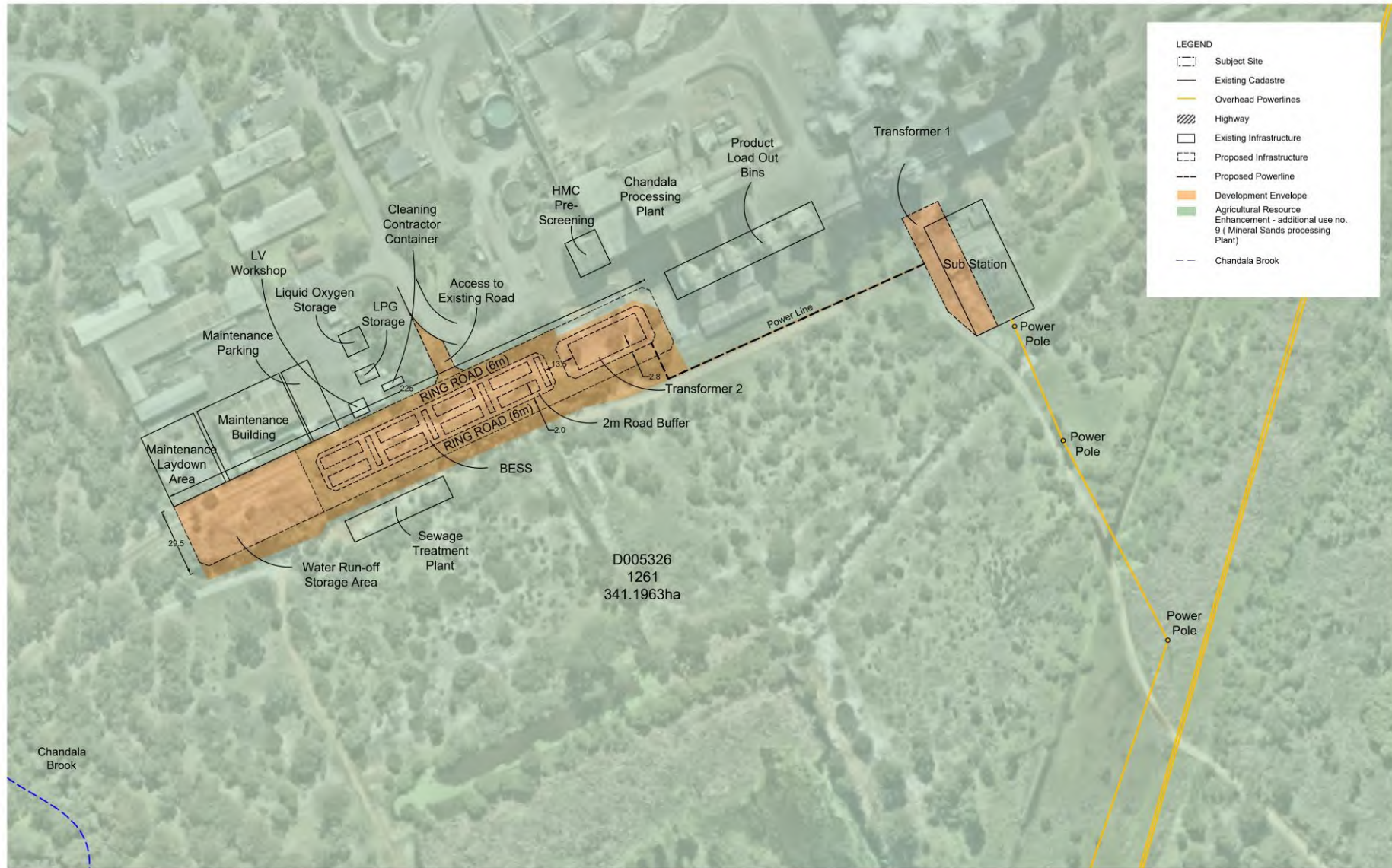
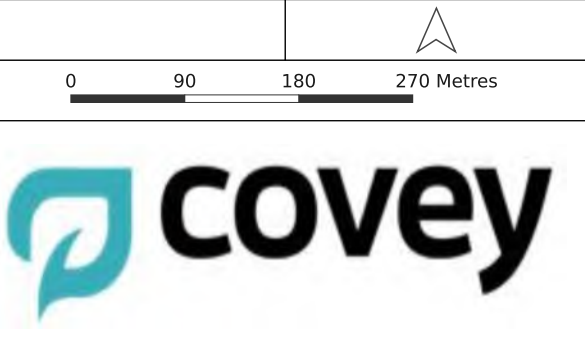


Figure 1-1. Development Layout



Legend

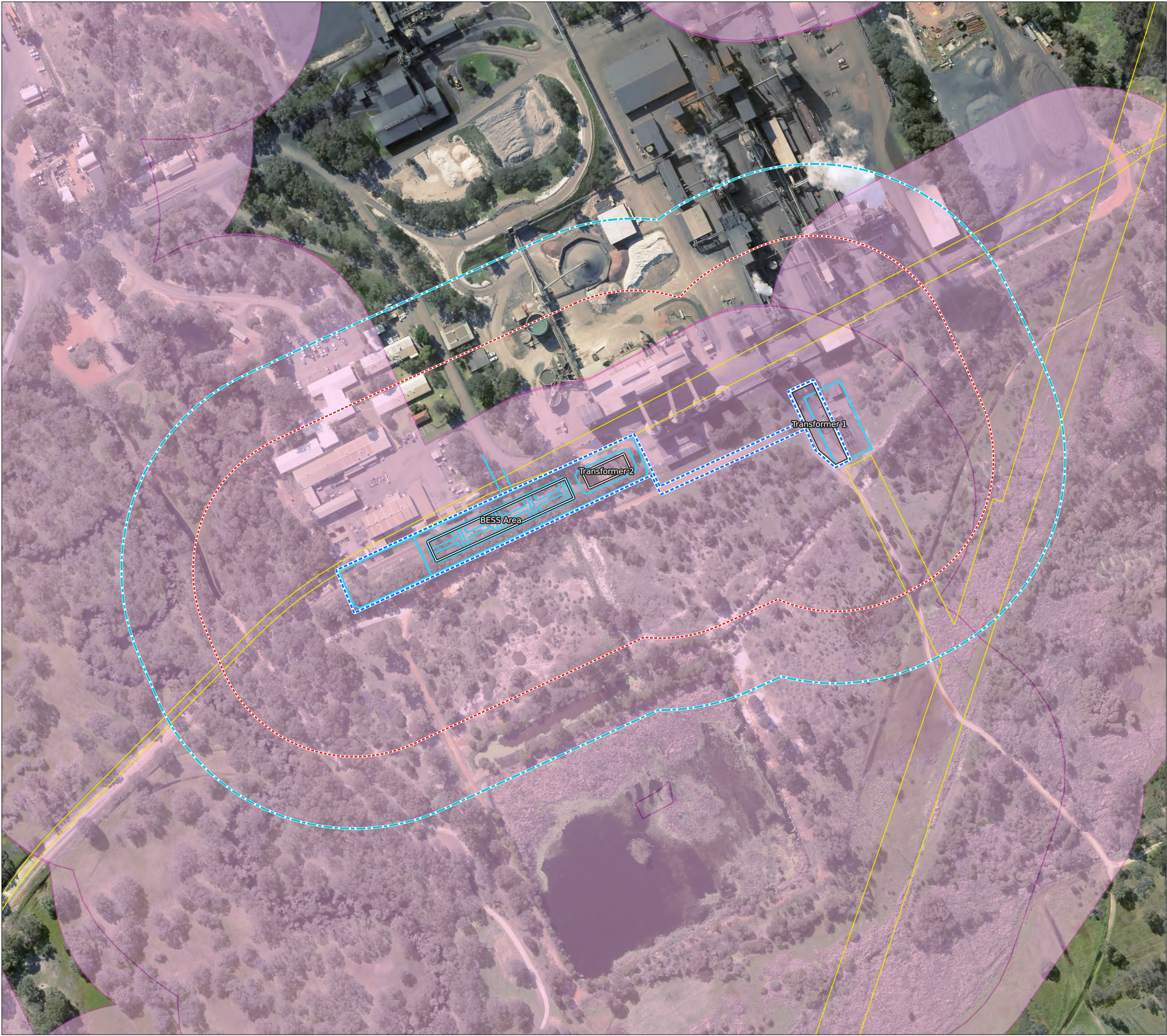
- Mitigation Measures
- Existing Fire Hydrant System Infrastructure
- Proposed Development
- Internal Road
- Internal Road
- Infrastructure Outline
- Subject Land
 - Assessment Area (100m)
 - Assessment Buffer (150m)
 - Cadastre



Tronox (Chandala) - BESS Facility

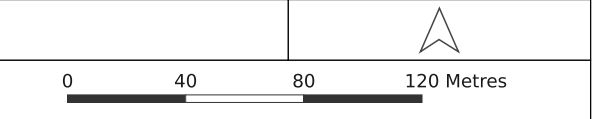
Site Overview

© 2026. GIS Pro makes no claims, no representations, and no warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the GIS data and GIS data products, including the implied validity of any uses of such data. Street Map Sources: Map data ©2021 Google. Hybrid Imagery: Images © Google Imagery, CNES, Airbus, Maxar Technologies. Date Printed: 03-08-2026



Legend

- Proposed Development
- Infrastructure Outline
- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastral
- Bushfire Prone Area 2



Tronox (Chandala) - BESS Facility

Designated Bushfire Prone Areas

© 2026. GIS Pro makes no claims, no representations, and no warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the GIS data and GIS data products, including the implied validity of any uses of such data. Street Map Sources: Map data ©2021 Google. Hybrid Imagery: Images © Google Imagery, CNES, Airbus, Maxar Technologies. Date Printed: 03-08-2026

2 Environmental Considerations

2.1 Native vegetation - modification and clearing

The proposed development is expected to require clearing of vegetation to enable construction of BESS infrastructure and implementation of the nominated Asset Protection Zones.

Covey understands that an Environmental Consultant to review the impacts of the proposal on environmental values and address under relevant legislation.

Notwithstanding, Covey assumes that all relevant environmental and heritage studies will be conducted, and that all required environmental and heritage approvals will be obtained prior to commencing any on-site vegetation modification or clearing required to construct the development or implement the onsite Asset Protection Zones.

2.2 Revegetation / Landscape Plans

No revegetation is proposed within the bushfire assessment areas, however some revegetation is proposed in the southern portion of the property as part of environmental obligations associated with the project.

All vegetation modification and management are to be conducted in accordance with the requirements detailed in Section 5.2 of this BMP, including compliance with the APZ standards from the WA PBG (see Appendix B) and requirements for low threat vegetation and managed landscaping in accordance with AS 3959 Clause 2.2.3.2 (f) (see Appendix C).

3 Bushfire assessment

Although no buildings are proposed as part of this DA, the suitability of the proposed renewable energy infrastructure siting from a bushfire risk perspective, is best assessed through use of a BAL assessment to achieve target BAL ratings (or target radiant heat flux).

On this basis, this section details the post-development vegetation and BAL contour mapping for the proposed renewable energy infrastructure.

3.1 Assessment inputs

3.1.1 [Vegetation classification](#)

Covey assessed classified vegetation and exclusions within 150 m of the subject site through on-ground verification, conducted on 17 June 2026 in accordance with *AS 3959—2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016).

Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Appendix A and Table 1 and depicted on Figure 3-1.

3.1.2 [Effective Slope](#)

Covey assessed effective slope under classified vegetation through on-ground verification on 17 June 2026 in accordance with AS 3959. Results were cross-referenced with 2 m contour data depicted on Figure 3-1, and are summarised in Table 1.

Site observations near the BESS and new transformer areas were that land is elevated to the north and north-west was relatively flat, and descends to the west, south and south-east, resulting in classified vegetation having an assessed effective slope of downslope 0° – 5°.

3.1.3 [Summary of Inputs](#)

Table 1 summarises the anticipated post-development vegetation classifications and exclusions within 150 m of the proposed BESS compound and transformers, following completion of development works and implementation of Asset Protection Zones. The post-development vegetation classifications/exclusions and effective slope are illustrated on Figure 3-1.

Table 1: Post-development vegetation classifications/exclusions and effective slope (within 150 m of BESS compound & Transformers)

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class A Forest	Downslope >0–5°	Trees greater than 6 m high at maturity (and often 10-30 m), dominated by Eucalypts, multi-tiered structure comprising tall canopy layer, shrubby middle layer and grass/herb/sedge understorey.
2	Class D Scrub	Downslope >0–5°	Scrub vegetation, generally between 2 m and <6m high, generally associated with banksia woodland south of the subject site.

Vegetation plot	Vegetation classification	Effective slope	Comments
3	Class C Shrubland	Downslope >0–5°	Shrubland vegetation <2 m high, typically associated with reeds in low-lying drainage areas south of the subject site.
4	Class G Grassland	Downslope >0–5°	Unmanaged grassland >100mm in height
5	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	Existing non-vegetated land, including buildings, infrastructure, roads and carparks.
6	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing managed low threat landscaping within the facility, and including non-vegetated elements such as paths.
7	Excluded – Low threat (Clause 2.2.3.2 [f])	N/A	Existing low threat landscaping that is located within the proposed APZ, and will be subject to some modification and management to comply with APZ standards for the operational life of the project.
8	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	Existing vegetation <u>within the BESS compound and the surrounding 10 m in addition to Transformer 2 pad and proposed new internal road</u> , that is to be established and maintained in a non-vegetated state for the operational life of the project.
9	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing vegetation within the BESS compound, Transformer 1 and 2 APZs, but further than 10 m the BESS compound and not within Transformer pads, to be modified to non-vegetated elements or low threat landscaping compliant with the APZ standards, for the operational life of the project.

3.2 Assessment outputs

3.2.1 Bushfire Attack Level (BAL) contour assessment

The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed future development and subsequently informs the standard of construction and/or setbacks required for the proposed development to potentially withstand such impacts.

Covey has undertaken a BAL contour assessment in accordance with Method 1 of AS 3959 for the BESS and transformer envelopes (see Figure 3-2).

The Method 1 procedure was conducted for all plots, with the methodology incorporating the following factors:

- state-adopted FDI 80 rating;
- vegetation classification;
- effective slope; and,
- distance maintained between proposed development areas and the classified vegetation.

The BAL contours are based on:

- the vegetation classifications and effective slope observed at the time of inspection; and,
- the anticipated post-development vegetation based on proposed on-site clearing extent, and resultant vegetation exclusions and separation distances, achieved to implement the proposed development and nominated Non-Vegetated Zones and Asset Protection Zones.

The results of the BAL contour assessment are detailed in Table 2 and illustrated in Figure 3-2.

Table 2: BAL contour assessment results (to proposed BESS compound & Transformers)

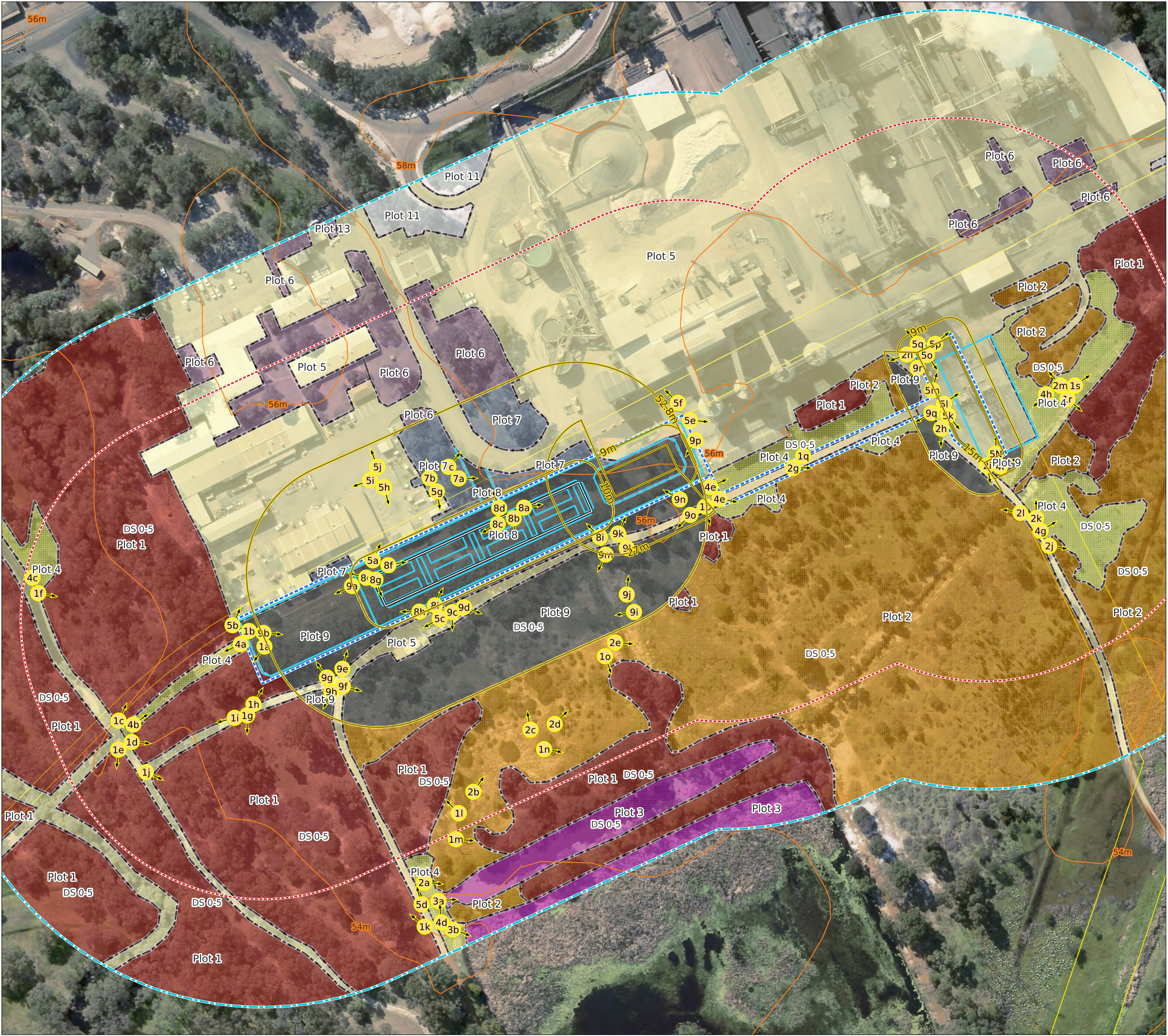
Plot	Vegetation classification	Effective slope	Calculation method	Separation (m)	BAL
1	Class A Forest	Downslope >0–5°	Method 1	33.5 m	BAL–29
2	Class D Scrub	Downslope >0–5°	Method 1	15 m	BAL–29
3	Class C Shrubland	Downslope >0–5°	Method 1	>100 m	BAL–Low
4	Class G Grassland	Downslope >0–5°	Method 1	15 m	BAL–19
5	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	N/A	N/A	N/A
6	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A	N/A
7	Excluded – Low threat (Clause 2.2.3.2 [f])	N/A	N/A	N/A	N/A
8	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	N/A	N/A	N/A
9	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A	N/A

Table 3 lists the BAL applicable to infrastructure within the proposed development.

Table 3: BAL applicable to proposed infrastructure

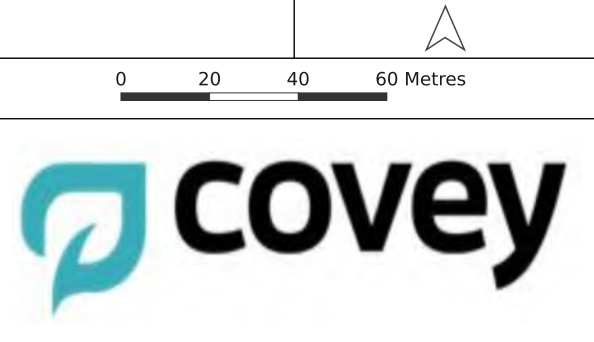
Infrastructure	Initial BAL	APZ	Revised BAL
BESS Compound	BAL–FZ	• 52.8 m wide NVZ/APZ extending from the external perimeter of the BESS Compound. • All land within the BESS Compound, and the 10 m surrounding the compound, is to be non-vegetated.	BAL–12.5 (10 kW/m ²)
Transformer 1	BAL–FZ	• 9 m to 15 m wide NVZ/APZ extending from the external perimeter of the Transformer 1. • All land within the Transformer 1 pad (and the existing switchyard) is to be non-vegetated land.	BAL–29
Transformer 2	BAL–FZ	• 9 m to 27 m wide NVZ/APZ extending from the external perimeter of the Transformer 2. • All land within the Transformer 2 pad is to be non-vegetated land.	BAL–29

Should there be any changes in development design or classified vegetation extent that results in a modified BAL outcome, then the BAL contours will need to be reassessed.



Legend

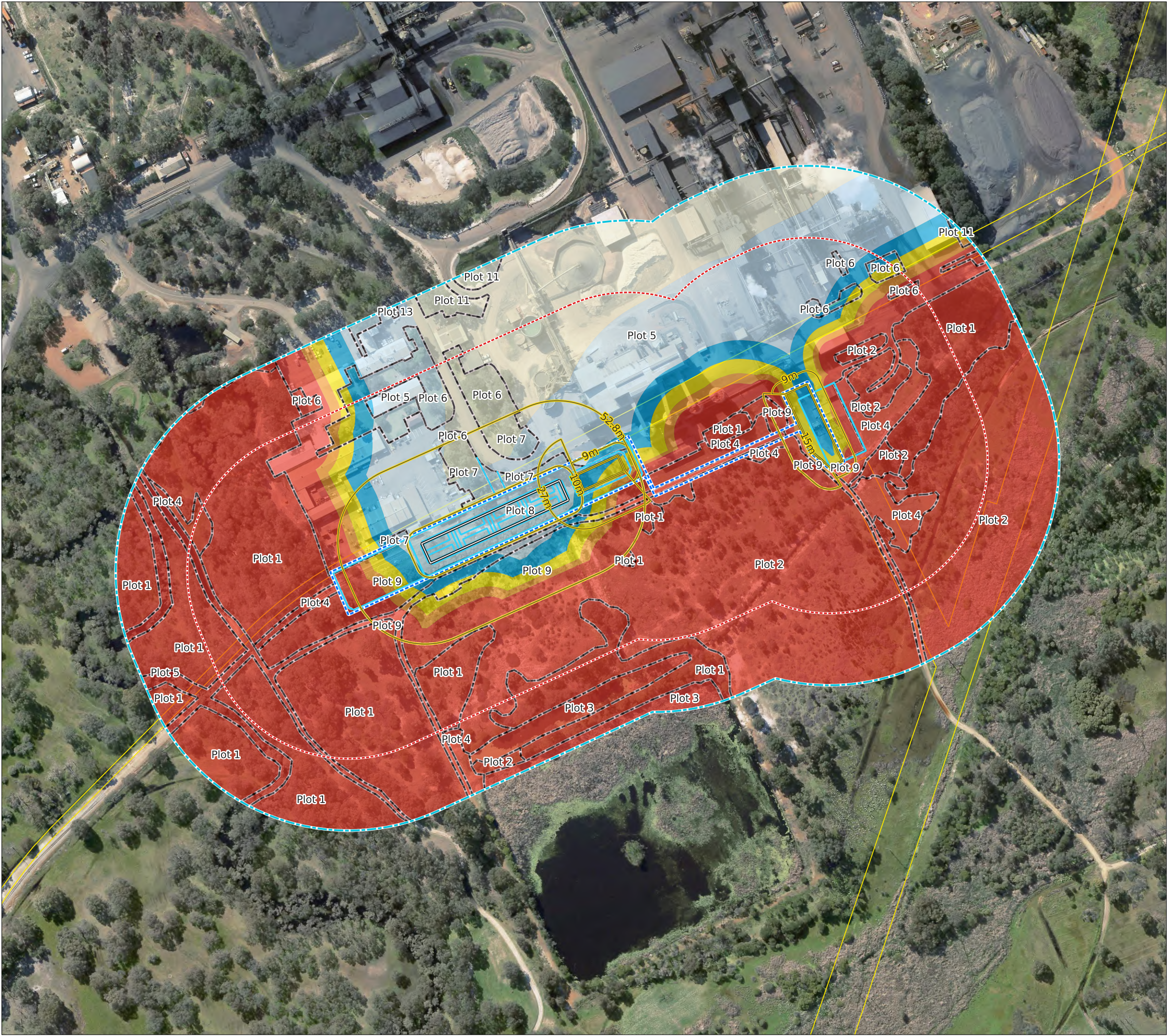
- Photo Location
- Proposed Development
- Contours
- Infrastructure Outline
- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastre
- Vegetation Plot
- Asset Protection Zone
- Classified Vegetation
 - A. Forest
 - C. Shrubland
 - D. Scrub
 - G. Grassland
 - Excluded Clause 2.2.3.2(a)
 - Excluded Clause 2.2.3.2(e)
 - Excluded Clause 2.2.3.2(f)
 - Excluded Clause 2.2.3.2(e&f)
 - Modified to non vegetated and low threat



Tronox (Chandala) - BESS Facility

Post-Development Vegetation and Effective Slope (zoomed)

© 2026. GIS Pro makes no claims, no representations, and no warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the GIS data and GIS data products, including the implied validity of any uses of such data. Street Map Sources: Map data ©2021 Google. Hybrid Imagery: Images © Google Imagery, CNES, Airbus, Maxar Technologies. Date Printed: 03-08-2026

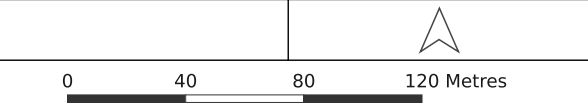


Legend

- Proposed Development
- Infrastructure Outline
- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastre
- Vegetation Plot
- Asset Protection Zone

BAL Contours

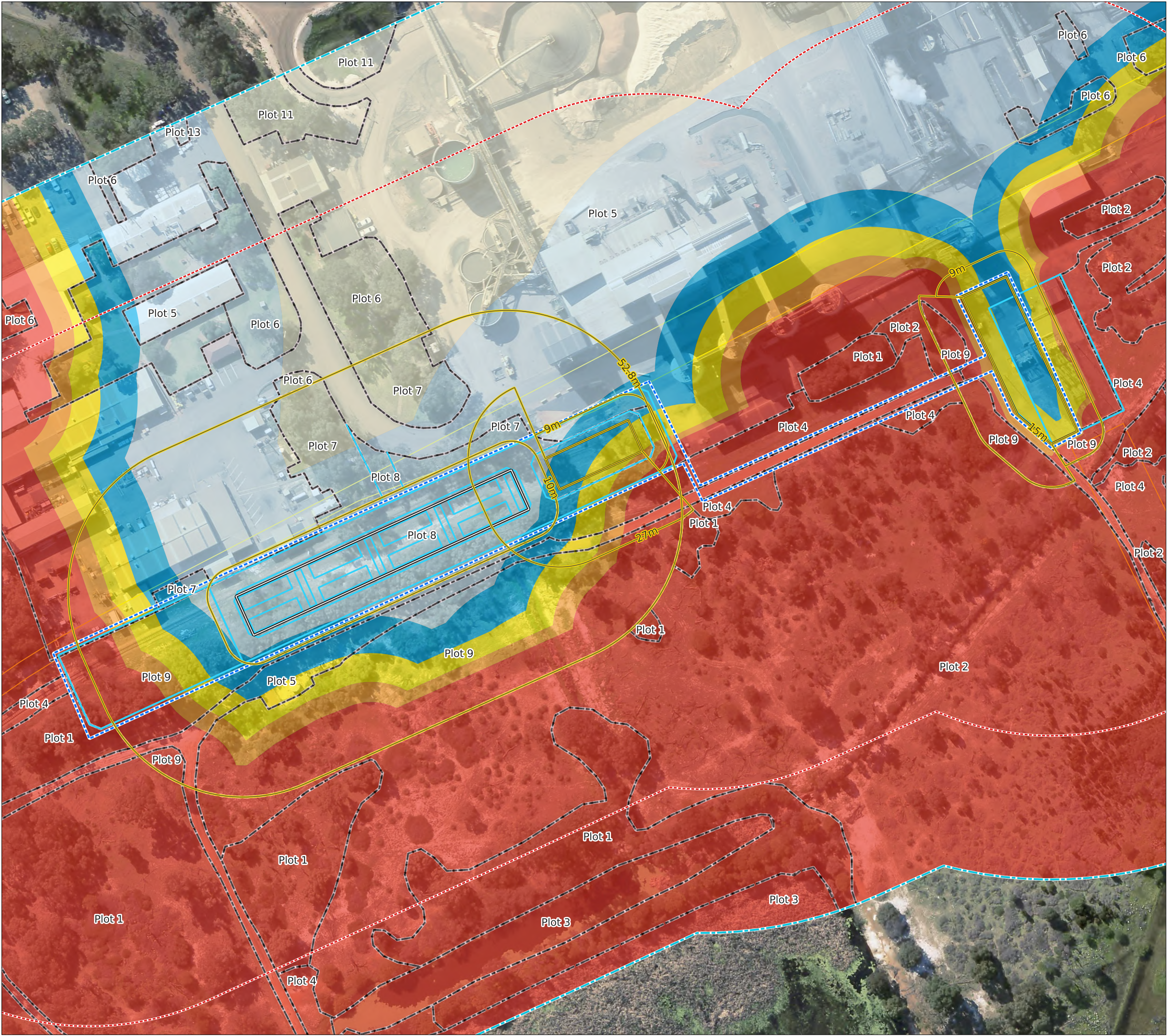
- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low



Tronox (Chandala) - BESS Facility

Post-Development BAL Contour Plan

© 2026. GIS Pro makes no claims, no representations, and no warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the GIS data and GIS data products, including the implied validity of any uses of such data. Street Map Sources: Map data ©2021 Google. Hybrid Imagery: Images © Google Imagery, CNES, Airbus, Maxar Technologies. Date Printed: 03-08-2026

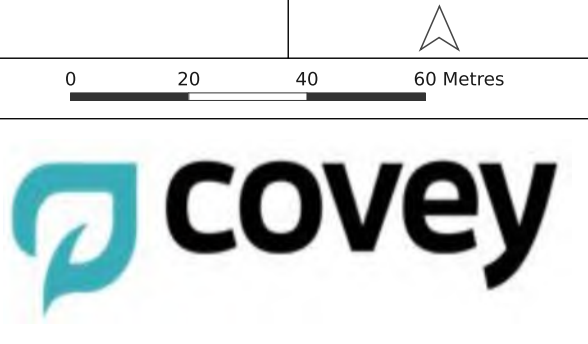


Legend

- Proposed Development
- Infrastructure Outline
- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastre
- Vegetation Plot
- Asset Protection Zone

BAL Contours

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low



Tronox (Chandala) - BESS Facility

Post-Development BAL Contour Plan (zoomed)

© 2026. GIS Pro makes no claims, no representations, and no warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the GIS data and GIS data products, including the implied validity of any uses of such data. Street Map Sources: Map data ©2021 Google. Hybrid Imagery: Images © Google Imagery, CNES, Airbus, Maxar Technologies. Date Printed: 03-08-2026

3.3 Likelihood of Bushfire Impact

The likelihood of bushfire impact on renewable energy facilities is tied to the potential for bushfires to impact the site. To provide some guidance on this, historical bushfires have been depicted on Plates 1 and 2, using the following publicly available datasets:

- Firewatch which is a Landgate service that uses satellite remote sensing imagery to detect fire hotspots and burnt areas, to track live bushfires but also to review the broad extent of past fire events from 1989 to present day.
 - There have been numerous large bushfires west of Brand Highway, within the continuous forest vegetation within Gnangara-Moore River State Forest and adjacent conservation reserves
 - Only one appears to have crossed Brand Highway approximately 5 km to the north
 - The closest these bushfires have come to the Chandala facility is about 2.5 km away.
 - There have been a number of larger fires to the east of Brand Highway, but these have been over 10 km from the site, typically east and north of Chittering, and south-east of Bullsbrook.
 - Two fires on the eastern side of Brand Highway have ignited closer than 10 km to the site, but both have been smaller fires that appear to have been contained:
 - In 2024 there was a 310 ha fire to the east of Muchea, about 3.5 km from Chandala facility
 - In 2023, there was a 385 ha fire near Lower Chittering, that was about 9 km from the facility.
- DBCA Fire History dataset which contains a collection of records of fire events (prescribed burns and bushfire) which were captured on departmental-managed land, and where available non-department managed land in Western Australia. The earliest records available are from 1937.
 - This dataset depicts a similar fire history of that from Firewatch, with numerous large bushfires west of Brand Highway, although the closest that they spread toward the Chandala is about 1.25 km.
 - Fires to the east of Brand Highway are also similar to Firewatch, with larger bushfires over 8 to 10 km from the site, other than the following:
 - In 2020 and 2021, two small ignitions occurred south of the facility along Brand Highway, approximately 900 m to 1.5 km from the site.
 - In 2019, a small fire occurred along Brand Highway, about 2 km to the north
 - In 2017 a 95 ha fire occurred near Chandala Nature Reserve, about 2.5 km to the north

In addition to the above, Tronox personnel have noted that a bushfire approached the facility directly from the west side of Brand Highway in 2025, which the onsite Emergency Response Team responded to.

The historical data depicts that while bushfires have regularly occurred in the local area, a significant number occur in the existing reserves containing remnant vegetation. Where the fire ignites in agricultural land, or spread from the reserves, these fires appear to generally be contained to relatively small-scale fires, likely due to lack of fuel (if harvesting has occurred) or due to being predominantly grassfires with reduced fire behaviour, that are more easily suppressed by local fire brigades and pastoralists, who are generally adept at managing these types of fires.

While there appear to be few historical bushfires within the site, the presence of such large bushfires to the west of Brand Highway, highlights that a combination of unfavourable conditions can support significant

destructive bushfire behaviour. Additionally, the potential for ignition events along Brand Highway, also presents another potential risk for smaller fires to ignite closer to the site.

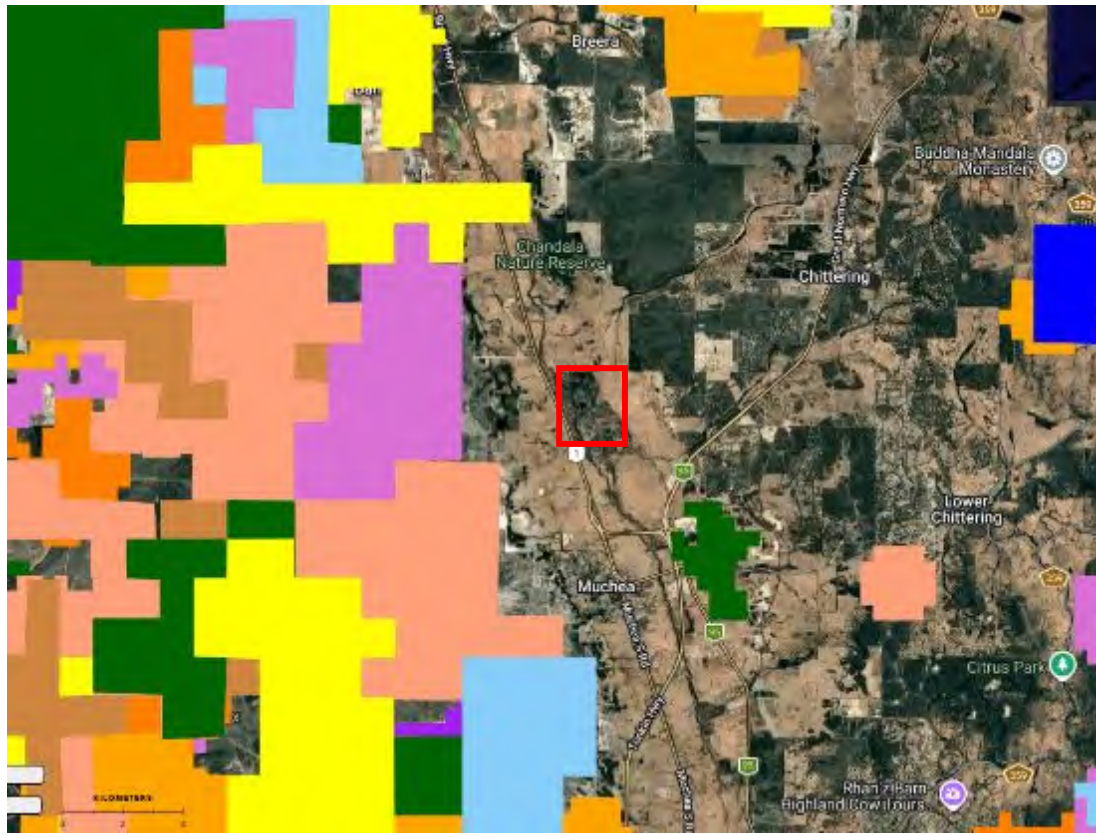


Figure 3-3. Bushfire History (Firewatch 2026)

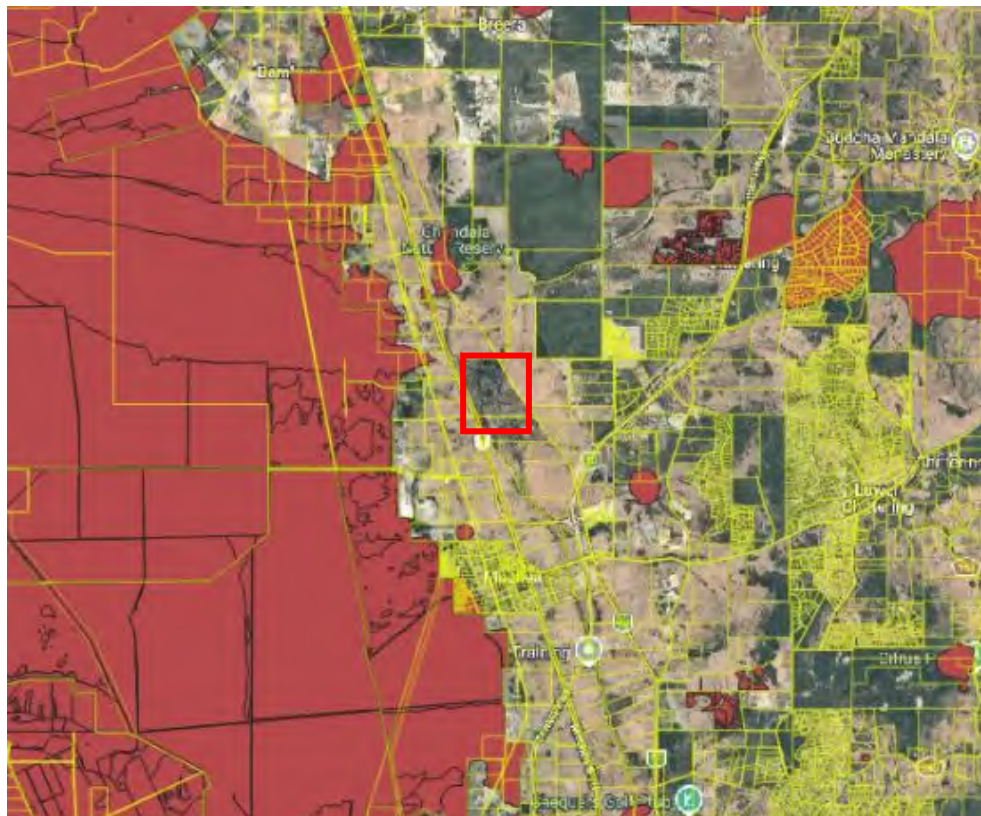


Figure 3-4. Bushfire History (DBCA 2026)

3.4 Bushfire Hazard Summary

The greatest bushfire threat to the proposed development is likely from bushfires spreading from the west and crossing Brand Highway to impact the site. While this hasn't historically occurred due to the agricultural land separating Chandala facility from the continuous forest vegetation to the west, fire spread across the grassland is possible at certain times of the summer.

Bushfires from the east could also occur within areas of continuous forest vegetation, and spread toward the site, and similar to the scenario above, the existing agricultural land has historically prevented spread toward the facility but could support steady-state grassfire during certain times during summer.

The other potential bushfire risk is from ignition events along Brand Highway and close to the facility, which could result in a fully-developed fire from a 500-800 m long fire run, primarily through the forest and scrub vegetation in the southern and western portions of the existing Chandala facility site.

Given the above, this BMP assumes that steady-state bushfire impact could occur in the future and addresses the risk accordingly.

4 Renewable Energy Infrastructure Hazard and Risk Analysis

The CFA Renewable Guidelines notes that fire hazards could be as follows for these renewable energy infrastructure types

- BESS facilities:
 - Electrical hazards, such as battery faults; overcharging; rapid discharge; loss of remote monitoring systems; internal short circuits; overheating; water ingress; lightning strike (leading to thermal events/runaway).
 - Chemical hazards, such as the inherent hazards of the stored dangerous goods; spills and leaks of transformer oil/diesel, refrigerant gas/coolant; chemical reactions.
 - Explosions, from ignition of venting gases. Potential fire spread due to proximity of batteries (and containers/enclosures) to each other, on-site infrastructure and vegetation (including screening vegetation).
 - Mechanical damage to battery containers/enclosures due to vehicular impact. Landscape hazards, such as bushfire/grassfire ignition from fire within the facility, or external ignition of site infrastructure from embers, radiant heat and flame contact.

From a bushfire risk assessment and management perspective, much of the above can be distilled into the potential impact of bushfire on the proposed renewable energy infrastructure (e.g. BESS containers), and the ability for significant fires from the renewable energy infrastructure to ignite a bushfire.

4.1 Battery Energy Storage System (BESS) hazard review

BESS units are typically comprised of Lithium-ion (Li-ion) battery cells that are wired together to form modules, which have a battery management system (BMS) that prevents electrical imbalances in the battery cells, including with voltage, current and temperature. The BMS' main function is to shut down operations of the module (or system) if any of the voltage, current, or temperature changes are out of limit.

4.1.1 Thermal runaway in Li-ion batteries

The significant hazard posed by BESS units is primarily associated with thermal runaway occurring in the Li-ion batteries, and the fire and explosion risk that can accompany the release of flammable gases. Thermal runaway describes a process that is accelerated by increasing internal temperature, in turn releasing more energy that further increases temperature.

In Li-ion batteries thermal runaway is a condition where voltage, current or temperature instability, causes the battery cell temperature to rise which in turn increases the current with a further rise in temperature. The battery can begin to emit gases due to thermal decomposition of the electrolyte solvents, which could potentially result in fire ignition or explosion (of the flammable gas release).

Battery cells can fail at different rates under different modes of off-gassing (flammable gas release), which can be with or without flaming. Because thermal runaway can occur without flame, gases may not be consumed by an ignition source immediately after they are emitted, this can create a scenario where high heat and combustible gases can coexist without igniting, and accumulation of these gases can result in an explosive event should an ignition source be subsequently introduced.

There are differences between thermal runaway and conventional fires that are important to understand. A conventional fire (e.g. campfire) is sustained by a combination of fuel, heat, and oxygen, where if any one of

them is removed, the fire may be extinguished (e.g. suffocating the fire to remove oxygen, applying water to cool it, or dispersing the wood to remove fuel).

Thermal runaway in a Li-ion battery differs from the conventional fire, as a Li-ion battery is consumed in thermal runaway is fuelled by an internal chemical reaction that releases heat and can continue without oxygen or a visible flame. As such, the management of thermal runaway differs from that of a conventional fire because starving a thermal runaway event of oxygen, may have little effect until the fuel is consumed. On this basis, stopping a thermal runaway event is more difficult and is generally addressed by either cooling to remove heat, or removing/dispersing the fuel.

While thermal runaway and fire are two different processes in a Li-ion battery failure, one can lead to the other including:

- An external fire can send a battery into thermal runaway, or
- Thermal runaway can create a secondary fire as it begins to burn plastic and remaining battery materials.

4.1.2 [Historical failure events \(Li-ion battery and BESS\)](#)

The hazard of Li-ion battery thermal runaway and off-gassing has been identified in research and public literature since the early 2000s, including extensive safety testing. Additionally, a number of failure events have created further awareness to the dangers of thermal runaway in Li-ion batteries, including the following in larger scale BESS systems (DNV-GL, 2020; ESV, 2021):

- **2017-2018** - BESS fires in a large facility in South Korea, however there is limited reporting and there appears to be some conflict regarding the causes of the failures.
- **2019** – McMicken BESS Failure Event, Arizona
 - This involved thermal runaway of a BESS container, that resulted in off-gassing and subsequent explosion of the BESS when the container door was opened by attending firefighters.
 - It is noted that the BESS technology and standards has progressed significantly since this event, which represents an example of BESS failure prior to many of the recent improvements in fire and explosion safety measures.
- **2021** – Victorian Big Battery fire
 - A Tesla Megapack at a facility in Geelong caught fire and spread to a neighbouring Megapack during the initial installation and commissioning, which didn't spread any further and burned out over the course of approximately six hours.
- **2023** – Bouldercombe Battery Project, Queensland
 - A Tesla Megapack ignited at a facility in Bouldercombe, and was allowed to burn out but attending firefighters, without firewater, as a low intensity fire. Firefighters monitored temperatures to ensure fire didn't spread to adjacent BESS units, and monitored gas levels and conducted air sampling to manage risk to nearby residents.

4.1.3 [BESS Standards](#)

The main standards for BESS testing, construction and installation, include:

- UL 9540 (2023): Energy Storage Systems (ESS) and Equipment
- UL 9540A (2019): Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems

- supplementary document to UL 9540 that defines test methods for thermal runaway.
- NFPA 855 (2023): Standard for the Installation of Stationary Energy Storage Systems
- International Fire Code (2021): Chapter 12 Energy Systems

4.1.4 [Likelihood of BESS Facility Fire](#)

As noted on Section 4.1.2, there appears to be a relatively low likelihood of BESS fires based on historical occurrences in Australia, however it is noted that these type of grid scale BESS facilities are relatively new with the opportunity for failure and fire also limited, and the statistics around fire losses are based on historical estimates and incomplete datasets. There is also varying levels of resultant damage associated with these fires, which can range from small ignition events that have minor damage, through to complete destruction of at least one BESS unit or potentially multiple units.

4.1.5 [BESS hazard summary for bushfire](#)

The overall hazard with the BESS units, is largely associated with the potential for thermal runaway in the Li-ion batteries to produce a fire or explosion failure event.

The rise of the BESS industry has been very quick, and it has resulted in rapid advances in the design, construction, commissioning, operation and maintenance of this technology. Notwithstanding, there hasn't seeming been a many reported historical BESS fires or explosions, and certainly not in Australia, however when they have occurred, it is clear that they result in significant firefighting challenges, primarily due to the inability to easily extinguish the fires and manage flammable gases.

The Arizona BESS failure in particular has highlighted historical issues with this for attending firefighters, as well as the potential for catastrophic failure to ignite vegetation some distance from the BESS (UL, 2020).

From a bushfire risk management perspective, the hazard related to the BESS units can be distilled to the following:

- Exacerbation of a bushfire from fire and/or explosion of the BESS's as follows:
 - A bushfire impressing significant radiant heat, or producing direct flame impingement, onto the BESS container, that could increase battery temperatures and send into thermal runaway. This could also include the damage or destruction of supporting systems (e.g. BMS, thermal management) which might affect the ability of the BESS to maintain temperatures at required levels.
 - Ember attack from a bushfire, igniting a fire within the BESS unit, that could send a battery into thermal runaway, or damage or destroy supporting systems.
 - Ember attack from a bushfire igniting flammable gases from BESS with thermal runaway condition, either within the BESS or flammable gases being ventilated.
- Ignition of a bushfire as a result of a fire or explosion within the BESS, likely to be associated with thermal runaway igniting an internal fire and/or emitting flammable gases, which could result in an explosion.

The bushfire risk management principles expected to address the hazards above are explored in further detail in Section 4.3.

4.2 [Transformer Hazard](#)

The causes of fire hazards relating to transformers are typically categorised as one of the following:

- Electrical equipment containing combustible insulating liquids may rupture due to internal failure, and there may be fire ignition or an explosion.
- Electrical equipment without combustible insulating liquids may rupture due to internal failure; there still be an explosion with a modest fire risk.
- Other plant and equipment such as cables, batteries, and drainage pipes may catch fire and spread the fire.

The risk associated with transformers, relates primarily to the oil used in transformers (where oil-filled) for insulation and cooling, which could potentially leak and be ignited. The ground mounted transformers are oil-filled and contains a hermetically sealed steel tank that contains the transformer core surrounded with windings and connecting leads which are separated, insulated and cooled by mineral oil (oil impregnated upgraded wood pulp insulation) or ester oils.

Potential failure of the transformer can occur if the ambient temperature is raised above the rating of the transformer (typically 105°C-140°C) for an extended time, with short-term heating able to be addressed through power supply reduction or shutdown. While overheating can result in degradation of the transformer, the main risk is the potential for cracking of the tank and resultant oil loss and potential pool fire of the flammable mineral or ester oil.

Previous correspondence from power supply providers has been there are historically very few transformer fires, with most associated with lightning strikes on pole-top transformers in non-built-up areas. They have assessed the likelihood of a transformer fire occurring as being approximately 0.1%, or with accumulated probability of 4% per transformer over its typical service life.

While there is not a high probability of transformer fires, it could result in transformer loss and/or damage to adjacent infrastructure or combustible items. As such, fire protection measures are considered a critical part of the design of transformers. which include the following recommendations:

- Transformers are designed in accordance with various standards, including AS 2067 (Substations and High Voltage Installations) to reduce risk of fire, with a variety of measures incorporated to minimise potential for fire ignition.
- Cable clamps and support to limit leaking bushings.
- Managing limits for transformers to prevent overloading.
- Providing sufficient clearances to transformers based on oil volume, incorporation of oil containment and/or flame trap, or consideration of a fire screening wall
 - The incorporation of an oil bund and/or flame trap enables a reduction in minimum separation distance as it contains the spread of any leaked oil and reduces the size of the oil pool exposed to oxygen, which is limits combustion.
 - A fire screen wall (2 hr FRL) also enables reduced minimum separation distances as it shields the transformer from adjacent buildings and combustible items and ignition risks.

4.3 Derived Bushfire Risk Management Principles

Based on the analysis of the bushfire hazards and risk associated with renewable energy infrastructure facilities, including review of historical fire events, the following are considered key bushfire risk management principles to be incorporated into the proposed development to manage bushfire risk, both to protect the renewable energy infrastructure from bushfire, and also to manage the risk of bushfire ignition from infrastructure fire.

-
- Considered siting of renewable energy infrastructure to minimise bushfire risk as much as practical, noting the siting of renewable energy infrastructure is based on a number of factors.
 - Ensure suitable separation from nearby unmanaged vegetation to ensure bushfire impact on the infrastructure is appropriately managed commensurate to anticipated bushfire behaviour, in addition to providing sufficient separation to limit fire escape from renewable energy infrastructure fires (or BESS explosion) to ignite a bushfire.
 - This also includes ensuring no trees are to be located close enough to renewable energy infrastructure such that any falling branches or trees could mechanically damage the infrastructure, or cause other ignition sources (e.g. thermal runaway in BESS).
 - Provision of appropriate vehicular access to the renewable energy infrastructure facility for attending firefighters, including permitting fire appliance turnaround where required.
 - Provision of secure firewater supply for attending firefighters, to enable a rapid suppression response without extended turnaround times for appliance refills.
 - It is noted that the preferred onsite response may include leaving a BESS unit to burn out rather than applying firefighting water, but this may depend on various factors.
 - Appropriate renewable energy infrastructure design and construction including (but not limited to):
 - For BESS facility
 - Limit potential for thermal runaway and associated off-gassing.
 - Incorporates a combined strategy of fire detection (and gas monitoring) and suppression followed by ventilation (and gas ventilation) and cooling, including all required infrastructure to achieve this.
 - Incorporate remote monitoring and communications, so the status of BESS BMS and fire/gas detection systems can be monitored and any information conveyed to relevant parties including fire brigade.
 - Ensure sufficient information regarding the facility, its hazards and emergency management procedures is available to assist any attending firefighters.
 - Engage with local fire brigade during project development and commissioning process, to ensure they understand the system and be aware of its specific hazards.
 - Develop an emergency management plan which comprehensively details:
 - The hazards associated with renewable energy infrastructure
 - Housekeeping and routine maintenance actions (including ongoing compliance with project obligations), including limiting any onsite ignition sources or fuel loads
 - Ensure communication protocols are established for contacting DFES, nearby landowners/neighbours (if applicable), and relevant agencies (e.g. Western Power, AEMO etc) to enable management of emergencies, access to land and management of facility.
 - Pre-emptive actions on days with forecast of elevated Fire Danger Rating or Total Fire Ban days
 - Response actions for in the event of bushfire in the local area
 - Evacuation of staff offsite
 - Ensuring all onsite access routes are unlocked and available for attending firefighters.
 - Response actions for onsite BESS fire including
 - Rapid notification of site personnel, DFES and nearby landowners/neighbours

- Shutdown and de-energisation of BESS
- If safe to do so, conduct suppression on spot fires until DFES arrival etc.
- Staff training and exercises of emergency management procedures
- Ongoing review of emergency management plans (and any information relied upon by emergency services) on regular basis, including following changes to the BESS or any fire events.

5 Bushfire Safety Strategy and Management Measures

5.1 Bushfire Risk Strategy

As detailed in Section 1.3, the CFA Renewable Guidelines are currently seen as the best guidance for renewable energy facilities available at this point in time. The CFA Renewable Guidelines provide a comprehensive suite of design, construction, operation and emergency planning measures recommended for renewable energy facilities, that address the risk of fire within the infrastructure, but also bushfire risk to the development.

The CFA Renewable Guidelines note that any planning applications for all renewable energy facilities proposed in bushfire prone areas, strengthened or additional risk mitigation measures will be required to address bushfire risk, and will also need to address the following:

- The impact of any ignition events arising from the renewable energy infrastructure on nearby communities, infrastructure and assets.
- The impact of bushfire on the renewable energy infrastructure (e.g. ember attack, radiant heat impact, flame contact).
- Assessment of whether the proposal will lead to an increase in risk to adjacent land and how the proposal will reduce risks at the site to an acceptable level.

A summary of the CFA Renewable Guidelines sections (relevant to this project) is provided in the voluntary compliance assessment on Table 4 in Section 6, and include the following:

- Siting and vegetation management requirements to ensure the renewable energy infrastructure fully involved in fire does not create the potential for ignition of vegetation.
- Vehicular access provisions for emergency services vehicles
- Firewater provisions for attending firefighters
- Design, construction and commissioning requirements for renewable energy infrastructure (especially BESS and transformers) and any Dangerous Goods
- Ongoing operation, maintenance and housekeeping requirements for renewable energy infrastructure (especially BESS)
- Familiarisation visits and emergency information for attending firefighters and emergency services personnel
- Development and preparation of comprehensive Emergency Management Plan for the facility, with relevant prevention, preparedness and response information for bushfires and onsite infrastructure fires.

Based on the guidance from the review of the bushfire risk and renewable energy infrastructure hazard in Sections 3 and 4, and informed by the relevant Model Requirements of the CFA Renewable Guidelines, the following bushfire safety strategy and associated risk management measures are to be incorporated into the proposed facility to manage bushfire risk to the renewable energy infrastructure, while also managing the escape of fire within the infrastructure to ignite a bushfire.

It is noted that while most management measures relate to management of bushfire impact on the proposed renewable energy infrastructure, some also relate to internal hazards which is also critical to avoid ignition of bushfires.

The subsections below detail the proposed bushfire risk management measures for the project, with an assessment in Section 6 demonstrating how these measures map to the principles from the CFA Renewable Guidelines.

Where possible, the bushfire management measures for both the buildings and renewable energy infrastructure have been depicted on Figure 5-1.

5.2 Vegetation Management and Separation

The following Non-Vegetated Zone (NVZ) and Asset Protection Zones (APZ) are to be established around proposed renewable energy infrastructure, to protect infrastructure from approaching bushfire impact, while also reducing the potential for onsite infrastructure fires to ignite a bushfire.

- NVZ/APZ around the perimeter of all renewable energy infrastructure including
 - BESS modules (BESS compound)
 - Transformers 1 and 2
- Non-vegetated land within perimeter NVZ/APZ of the following:
 - BESS compound
 - Transformers 1 and 2

Where stipulated, the NVZ/APZ must be non-vegetated, however outside this they can be either non-vegetated or managed low threat landscaping established in accordance with the APZ standards from the WA PBG and AS 3959 Clause 2.2.3.2 (e) and (f), however would preferably be non-vegetated where possible.

All onsite vegetation modification and management (including NVZ/APZ) is to be conducted and maintained for the operational life of the project.

5.2.1 Vegetation Management and Separation - BESS

Given the potential for BESS modules to react to elevated temperatures, NVZ/APZ to achieve a target radiant heat flux of no less than 10 kW/m^2 is considered appropriate. Additionally, given there has been historical BESS explosion igniting vegetation 23 m from the container, the NVZ/APZ for the BESS is to be no less than 25 m wide, to manage risk of bushfire ignition from an explosion. It is noted that this historical explosion was in a BESS that didn't have explosion management system nor many of the fire and safety features currently required, and as such, is not likely to be replicated, so the 25 m minimum NVZ/APZ is considered conservative.

Based on the above, the BESS system requires a 52.8 m wide perimeter NVZ/APZ consisting of the following:

- A 10 m wide NVZ adjacent to the BESS units (Plot 8), that is non-combustible (constructed of concrete, mineral earth or non-combustible mulch etc) and free of vegetation and obstructions at all times, with no plant or equipment unless totally non-combustible.
- Outside the 10 m NVZ, the remaining 42.8 m (Plot 9) can be non-vegetated or otherwise comply with the APZ standards from the WA PBG, with the following clarifications:
 - Have no trees located close enough to BESS's such that any falling branches or trees could mechanically damage the BESS
- The NVZ/APZ width is based on the following Method 2 calculation:
 - Separation from Plot 1 (Class A forest with effective slope of 2°) to achieve 10 kW/m^2 at the BESS compound boundary (i.e. at BESS modules)
 - All other inputs are default as per AS 3959 (i.e. fuel loads, flame width etc)
 - The Method 2 calculation is provided in Appendix D.

All land within the BESS perimeter NVZ/APZ (i.e. Plot 8 within BESS compound), are to be non-combustible (constructed of concrete, mineral earth or non-combustible mulch etc) and free of vegetation and obstructions at all times, with no plant or equipment unless totally non-combustible.

5.2.2 [Vegetation Management and Separation - Transformers](#)

In order to ensure sufficient separation is maintained between proposed transformers, and surrounding unmanaged vegetation, the following NVZ/APZs will be required:

- A 15 m wide perimeter NVZ/APZ to achieve BAL-29 or lower on the envelope.
 - Ideally the perimeter NVZ/APZs around transformers should be non-combustible (constructed of concrete, mineral earth or non-combustible mulch) and free of vegetation as much as practical, or otherwise compliant with the APZ standards from the WA PBG, with no plant or equipment unless non-combustible.

Additionally, all land within the transformer perimeter APZs is to be non-combustible (constructed of concrete, mineral earth or non-combustible mulch etc) and free of vegetation and obstructions at all times, with no plant or equipment unless totally non-combustible. At the time of inspection, this land was currently non-vegetated.

5.3 [Vehicular Access](#)

Vehicular access requirement to the proposed renewable energy facility is to comply with private driveway specifications of the WA PBG (see Appendix E), with additional guidance provided from CFA Renewables Guideline where required. This is largely to be provided by the existing internal road network at the Chandala facility, with some extension to the proposed BESS.

As depicted on Figure 5-1, vehicular access to the existing Chandala facility is via an 6 m wide internal road from Brand Highway, that extends to the administration carpark, or into the greater facility via a security-controlled access point. There are a number of existing internal roads within the industrial part of the facility that would be available for use by emergency services to access the BESS facility and transformers in a bushfire emergency, with several of these roads depicted on Figure 5-1.

To provide vehicular access to, and around, the BESS facility from the existing internal road network, a new internal road is to be constructed as depicted on Figure 5-1.

Where new internal roads are proposed (including any gates and signage), they are to be constructed and maintained for the operational life of the project.

5.3.1 [Vehicular access – BESS](#)

There shall be provision of at least two (2) vehicular access points to the BESS compound, to/from the existing internal road network, to ensure emergency services can be achieved during a bushfire or onsite BESS fire emergency. The existing internal road network (see Figure 5-1) enables attending emergency services vehicles to approach the BESS site from either the north or the east, and given the use by heavy vehicles, is considered appropriate for emergency service use.

A new internal road is to be extended from the existing internal road (see Figure 5-1) and shall comply with the following requirements:

- Comply with the technical specifications of private driveway from the WA PBG (see Appendix E), noting the following:
 - All roads within BESS compound are to be minimum of 6 m wide.

- Provides a perimeter road access around the BESS compound.
- At least 2 entrance/exit gates are to be provided to the BESS compound
- Any new gates are to be as follows:
 - Provide at least 6m clear horizontal width
 - If locked, any keys are issued to DFES and any local fire brigade, unless Tronox can ensure onsite personnel can provide access at all times.

5.3.2 Vehicular access – Transformers

Given the location of Transformer 1, there is existing internal road access to the transformer envelope, that appears compliant with the private driveway specifications of the WA PBG.

Vehicular access to Transformer 2 will be provided by the access route to the BESS compound detailed in Section 5.3.1.

5.4 Firewater Supply

The following assumes that there is no reticulated town main water supply to the site as is currently the case.

Covey understand the following firewater system is onsite:

- 1 combined process/firewater tank (overall capacity of 1735 kL with minimum fire reserve of 415 kL)
- 2 fire pumpsets to two fire hydrant ring mains (one to MRP ring main, and the other to SRP ring main)
- Fire hydrants and fire hose reels off each ring main, providing coverage of the existing facility

Further information regarding firewater requirements is provided in the subsections below.

It is also acknowledged that the fixed firewater systems are supplemented by the existing mobile onsite appliances at the facility as follows, which is especially important for trained staff to undertake first response suppression of onsite fire or spot fire, where safe to do so:

- 1 Fire Truck with 3000 L tank, rear mount pump, fire branches and hoses, and various firefighting and communication equipment.
- 1 Light Fire Tanker (4WD) with 800 L tank, small pump, hose reel, extinguishers, and various firefighting and communication equipment.
- 1 Mobile Fire Trailer, with 500 L tank and small pump and hose reel; and
- 1 Emergency Response Vehicle with fire branches and hoses, and various firefighting and communication equipment.

5.4.1 Firewater - BESS

The CFA Renewable Guidelines for centralised BESS facilities in areas without reticulated water supply recommend:

- *The firewater supply must be of a quantity no less than 288,000L or as per the provisions for Open Yard Protection of AS 2419.1-2021, flowing for a period of no less than four hours at 20L/s, whichever is the greater.*
- *The quantity of static firewater storage is to be calculated from the number of hydrants required to flow from AS 2419.1-2021: Fire hydrant installations, Table 2.2.5(D).*
- *Fire hydrants must be provided and located so that every part of the battery energy storage system is within reach of a 10m hose stream issuing from a nozzle at the end of a 60m length of hose connected to a fire hydrant outlet.*

- *The firewater supply must be located at vehicle entrances to the facility, at least 10m from any renewable energy infrastructure and buildings.*
- *The firewater supply must be reasonably adjacent to the battery energy storage system and shall be accessible without undue danger in an emergency. (e.g. Fire water tanks are to be located closer to the site entrance than the battery energy storage system).*
- *The firewater supply must comply with relevant Australian Standards (including AS 2419.1)*

As the BESS modules are approximately 1,700 m² in area, the 415 kL firewater reserve stored in the existing combined tank at Chandala has the potential to provide sufficient onsite static firewater supply to meet the requirements of the CFA Renewable Guidelines, however this is to be confirmed by a suitably qualified Fire Protection Engineer. Additionally, fire hydrant coverage to the proposed BESS may need to be extended from the existing hydrant system/s, to achieve compliance coverage, which would also require review and design by a suitably qualified Fire Protection Engineer.

Should new firewater tank/s be required (including supplementing the existing firewater tank), they will need to consider the following:

- All firewater tanks will need to comply with the standards from the WA PBG (see Appendix F), and consider the following recommendation from the CFA Renewables Guideline:
 - Must be an above-ground water tank constructed of concrete or steel and must comply with AS 2419.1 and signage indicating 'FIRE WATER' (or similar approved) and the tank capacity must be fixed to each tank.
 - The tank suction point must be within 4 m of a road or hardstand
- All firewater tanks are to be sited further than 10 m from the renewable energy infrastructure, as well as in an area of BAL-29 or lower
 - To ensure this is implemented, a suitably sized NVZ/APZ is required around the perimeter of the tank/s
- Vehicular access to the firewater tank/s is to be via proposed or existing internal roads.
 - Vehicular access (compliant through or loop road or with turning head) is to be provided to within 4 m of the tank suction point.

Given the substantial amount of firewater currently onsite, no additional capacity is proposed for bushfire fighting purposes.

The firewater tanks, pumps and hydrants (including any alterations) are to be:

- Designed by a suitably qualified Fire Protection Engineer to ensure compliance with the above codes or Australian Standards and recommendations from the CFA Renewables Guidelines,
- Constructed and maintained for the operational life of the project.
- Documented in the Emergency Information Book and Signage (see Section 5.9) is to be provided at the site entrance (or location agreed with DFES), to inform attending emergency services personnel.
 - This is to include the location of all onsite firewater tanks and the internal access routes to these tanks.

5.4.2 [Firewater – Transformers](#)

- There is no specific firewater provisions required for the transformers, however the existing firewater systems onsite, and for the BESS facility, will provide sufficient nearby firewater for bushfire fighting around both transformer options should it be required.

5.5 Renewable Energy Infrastructure Design

The following measures are required for the proposed renewable energy infrastructure to manage the risk of fires, with more specific guidance provided in subsections below:

- All electrical equipment, including electrical cabling, junction boxes, inverters and transformers, must comply with relevant design, construction and installation standards of electrical equipment including relevant Australian Standards, and manufacturers recommendations.
- Appropriate system monitoring for all renewable energy infrastructure must be provided, especially the BESS unit BMS and fire/gas detection, to ensure that any electrical or equipment failures with the potential to ignite or propagate fire are rapidly identified and relevant site personnel notified to enable early fire brigade notification.
 - Monitoring is to be configured to provide warning to relevant onsite and offsite personnel.

5.5.1 BESS System

- Ensure the following elements are considered in the BESS:
 - External module is to be non-combustible material (e.g. metal).
 - Use suitable Li-ion batteries (or appropriate alternative), with sufficient cell quality and barriers, to limit potential for thermal runaway generating from internal cell defects and cascading thermal runaway.
 - Battery management/monitoring systems for monitoring and managing the state of battery systems including shutdown if any of the voltage, current, or temperature changes are out of limit.
 - Systems to prevent heat/fire spread within battery containers (such as thermal barriers, shut-down separators, isolation systems, cooling systems).
 - Detection systems for smoke, heat (thermal), fire and toxic gas (off-gassing) within battery containers.
 - Appropriate suppression systems for fire within battery containers.
 - Systems to prevent explosion within battery containers by safely ventilating the system in a controlled manner to reduce the flammability of the atmosphere, such as ventilation, pressure relief and exhaust systems, including incorporation of adequate explosion prevention protection, where applicable.
 - Warning and alarm systems within the battery containers, and/or the facility, to enable early warning for faults, operation of the battery energy storage system above 'normal'/safe parameters, smoke, off-gassing, and fire.
 - Consideration of direct alarm monitoring to the fire brigade for BESS automatic detection systems
 - Provide suitable ember protection (e.g. BAL-12.5 construction) to prevent embers from penetrating battery containers/enclosures including, but not limited to:
 - Battery enclosures via any external walls/roofs (if not completely sealed) and gas ventilation inlets/outlets.
 - Thermal management system (chiller) inlets and outlets
 - Any unsealed penetrations are to be appropriately sealed (with non-combustible material) or gaps/openings (>2mm) are to be screened with non-combustible (aluminium, steel, bronze) screening with maximum aperture <2mm.
 - BESS installation is on a non-combustible surface (e.g. concrete)

5.5.2 Transformers

- Transformers are to be designed, constructed and maintained to relevant Australian Standards.
- Ensure transformer is designed to minimise fire risk, incorporates either oil bund or flame trap, and is provided with required separation from adjacent infrastructure and the combustible vegetation, in accordance with relevant Australian Standards and manufacturer specifications.

5.6 Bushfire resilient construction

- Bushfire construction provisions of the National Construction Code require that buildings comply with the AS 3959 construction requirements, in accordance with the assessed BAL under AS 3959, provided the building is a Class 1, 2, 3 or associated Class 10a building/deck, or a “certain Class 9” building.
 - The renewable energy infrastructure (BESS, transformers) will not be any of the classifications nominated above, therefore in accordance with the National Construction Code, and as such, there is no statutory requirement to meet the construction requirements of AS 3959.
- As detailed in Section 5.5.1, BESS construction is guided by the CFA Renewable Guidelines with the following recommendations:
 - Container construction is to be non-combustible material (e.g. metal).
 - Ember protection is to be provided to parts of the BESS container, in accordance with AS 3959 BAL-12.5 specifications

5.7 Construction and Commissioning

- Ensure an emergency communication system must be provided that is reliable and will operate in the event of power failure
- Ensure all electrical equipment (e.g. electrical cabling, junction boxes, inverters and transformers) complies with relevant design, construction and installation standards of electrical equipment including relevant Australian Standards, and manufacturers recommendations.
- Install and commission fire detection, alarm and suppression systems as early as practical during construction, and prior to commissioning.
- Provide first response firefighting equipment (e.g. extinguishers) at all construction portables/buildings onsite, in the vicinity of all construction activities, and in site-based vehicles.
- Ensure sufficient training provided to relevant personnel on the use of on-site firefighting equipment and first-aid, and responsibilities during emergencies
- Provide required fire protection equipment for Dangerous Goods as per relevant Australian Standards.
- Ensure tight ignition source control measures, including hot works and restriction of smoking to prescribed areas.
- Conduct any required vegetation management.
- Undertake all required infrastructure, equipment and vehicle maintenance.
- Incorporate emergency management procedures into the Construction Management Plan (or other relevant document) for the construction and commissioning phase of the facility, adopting similar concepts to those in Section 5.11, for the operational BESS facility, which includes:
 - Adhere to restrictions and guidance during days of Fire Danger Rating of High to Catastrophic, and Total Fire Ban days and Harvest Movement Ban days.
 - Regularly monitor for, and otherwise be aware of, bushfires in the local area, and evacuate offsite prior to bushfire impact onsite.

- Emergency procedures for identified risks and hazards of the renewable energy infrastructure, including but not limited to:
 - Bushfires
 - Onsite fire in renewable energy infrastructure (e.g. electrical infrastructure faults and fire in renewable energy infrastructure)
- Ensure the response for any onsite fire or bushfire is the immediate notification of DFES.
- The priority response action for a bushfire is immediate evacuation of all onsite personnel to offsite safer location (away from bushfire) ahead of bushfire impact on the site, and before bushfire impact (including smoke) on the vehicular access network to the offsite location.
- Notification of fire brigade at least seven days prior to the commissioning of any renewable energy infrastructure at the facility, especially the BESS modules.
- Engage with fire brigade to offer a familiarisation visit prior to commissioning, as detailed in Section 5.10.

5.8 Operation, Maintenance and Housekeeping

- Ensure ongoing compliance with the endorsed BMP is achieved, especially prior to, and during, bushfire season. This includes all vegetation management, internal driveway access, fire system and firewater obligations.
- Ensure any Dangerous Goods (if any) comply with all relevant legislation, Australian Standards and the requirements detailed in Section 5.12.
- Ensure the Emergency Information Book and/or signage is appropriately stored at all nominated site entrances, and reviewed on an annual basis (see Section 5.9).
- Develop, implement and review the Emergency Management Plan including all preparedness, pre-emptive and response actions, as required, and ensure ongoing liaison with DFES and regular staff training and exercises are conducted (see Section 5.11 below).
- Ensure inspection, maintenance and any required repair activities are conducted for all renewable energy infrastructure, associated equipment, fire systems, communication systems, and vehicles at the facility, in line with relevant Australian Standards and manufacturers requirements.
 - With respect to the BESS units, this should include the following:
 - A schedule, list of activities and accountabilities for the inspecting, testing, monitoring and servicing of the battery and its monitoring, safety and protective systems.
 - Monthly inspections of battery enclosures/ containers and related infrastructure for physical damage. Any damage must be immediately assessed and rectified by a suitably qualified person.
 - Regular inspection and removal of all combustible materials near the battery enclosures/containers and related infrastructure.

5.9 Emergency Information Book and Signage

An Emergency Information Book and/or signage must be located at the nominated site entrance to the facility (or main administration building), with any plans or information books provided in a weatherproof container (unless otherwise agreed with DFES).

The Emergency Information Book and/or signage is intended to provide to emergency responders with an overview of the facility. This information should be developed in liaison with relevant emergency services representatives (if possible) and should seek to include the following:

-
- A description of the premises, its infrastructure and operations.
 - Up-to-date contact details for site personnel and regulatory authorities.
 - Site plans that depict the entire site layout, including:
 - Buildings, substations and renewable energy infrastructure (including BESS),
 - Internal driveways and surrounding public roads
 - Fire protection systems and equipment, including firewater tanks
 - Grid connections, drains and isolation valves,
 - Dangerous goods storage areas
 - Neighbouring landowners, and any relevant infrastructure (e.g. dwellings), and
 - North direction and scale
 - The following BESS details and plans
 - Schematics and technical data for BESS units, the number of units on-site, and the number of battery racks or modules within each unit.
 - Details of the hazards for the BESS, including thermal events/runaway, electrical safety hazards, explosion hazards, dangerous goods hazards (including off-gassing), and the effects of fire on the BESS (e.g., explosion, release of toxic gases).
 - Details of all provided battery failure/safety and protective systems, including a description, the activation process/automatic trigger, and any hazards associated with these systems.
 - Specifications for safe operating conditions for temperature.
 - Details of the elements monitored/controlled by the Battery Management System (BMS), including internal temperature, state of charge, voltage, etc. and the locations this information is available.
 - The shutdown and/or isolation procedures if the BESS are involved in fire or emergency incident, and appropriate personnel contact details for verifying that the battery enclosure/container system has been isolated/shutdown and de-energised during emergencies.
 - Details of any emergency equipment, including the type and location of fire and gas detection and suppression systems.
 - A manifest of dangerous goods (if required) and Safety Data Sheets (SDS) for dangerous goods stored on-site.
 - Procedures for the management of emergencies, including evacuation, shelter-in-place (for facilities at risk of bushfire), containment of spills and leaks, and fire procedures (including infrastructure/plant fires, vehicle fires, bushfire).

A review of the information contained within the facility's Emergency Information Book and signage must be undertaken prior to commencement of bushfire season annually.

5.10 Emergency Services Familiarisation

Prior to commissioning of the facility, a familiarisation visit and explanation of the proposed facility, the specific hazards, the proposed fire safety systems and management measures, and the emergency procedures, is to be offered to local fire brigades and other emergency services.

The opportunity should be taken to ensure that the information in the proposed Emergency Information Book/Signage (see Section 5.9) is appropriate for their needs, and that they are familiar with where this will be located.

Additionally, it should be confirmed that any required keys or access codes to any secured parts of the site have been (or will be) supplied to the relevant fire brigade personnel, or that onsite personnel will be available at all times to brigade access.

A schedule for ongoing site familiarisation to account for changing personnel, facility infrastructure and hazards, and emergency exercises should be developed in conjunction with the local fire brigade.

5.11 Emergency Management Plan

An Emergency Management Plan (EMP) is to be developed for the BESS facility, or make amendment to the existing site EMP if relevant, detailing the procedures for preparing and responding to off-site bushfire, and on-site fire emergencies impacting the BESS including:

- BESS facility details including key contacts and technical support during an emergency, site plan, details of renewable energy infrastructure, details of fire and emergency systems, and a manifest of dangerous goods.
- The identified risks and hazards associated with the renewable energy infrastructure, such as onsite fire and bushfires.
- Detail preparedness and pre-emptive actions to address the above hazards, including the following for onsite BESS fires and bushfire:
 - Ongoing compliance with the approved BMP, including ensuring regular vegetation management requirements are achieved, vehicular access routes and firewater systems are maintained and available, and conducting regular bushfire housekeeping inspections.
 - Ensuring ongoing maintenance of all infrastructure, fire and communication systems.
 - Determining forecast Fire Danger Rating (FDR), Total Fire Bans (TFB) and Harvest Vehicle Movement Bans (HVMB), during bushfire season
 - Modifying Site Activities (based on Forecast FDR and TFB/HVMB) including limiting activities which may introduce bushfire ignition (hot works, unnecessary vehicle movement etc).
 - Monitoring DFES Bushfire Emergency Warnings for bushfire (and/or other signs of bushfire activity) within 50 km of the facility, and understanding the decision-making triggers.
- Detail emergency response procedures to address to all identified hazards (including for onsite BESS fires and bushfire).
- For a bushfire emergency, the response should include the following:
 - The immediate response to any onsite bushfire, or bushfire observed in the local area, is to notify DFES and local fire brigade immediately.
 - Conducting early offsite evacuation of all staff away from the bushfire if safe to do so (preferred response), ideally offsite to Ellenbrook or Gingin in a direction away from approaching bushfire.
 - Only if permitted by authorized DFES/local fire brigade personnel, only essential staff may remain onsite where perhaps required for operational management and/or shutdown procedures
 - Conduct BESS facility shutdown, if safe to do so prior to staff evacuation:

- Reduce the facility to a low energy state (including discharging the BESS), in consultation with authorised DFES personnel (where possible)
 - Ensure all other plant is properly secured.
 - Ensure all vehicular access routes are unlocked (if possible) and available for use.
 - Ensure all fire and communications systems are ready for use.
- If there is insufficient time to safely travel offsite without being impacted by bushfire, conduct onsite shelter in place as directed by Tronox personnel.
- Response to onsite fire is to include:
 - Immediately notify DFES to enable a rapid turnout, and relevant Tronox personnel
 - Strongly consider full emergency shutdown of the BESS and transformers unless there are mitigating circumstances. This should be conducted in consultation with authorised DFES personnel (where possible).
 - If fire is within the BESS unit/s, ensure staff relocate as far as possible from the fire, and no less than 50 m away.
 - If fire is not in BESS modules (e.g. existing facility), and only if safe to do so, trained personnel to conduct first attack response on any spot fires to prevent bushfire ignition, until DFES arrival. Onsite staff are not expected to fight onsite infrastructure fires (unless trained), but only limit any potential for bushfire ignition where safe to do so.
 - Notify neighbouring landowners (if relevant).

The emergency management plan is to be reviewed regularly, and the relevant staff will need appropriate training and to conduct regular exercises to ensure everyone is fully conversant with the requirements of the plan and able to respond as required during all emergencies. Training should be conducted annually prior to bushfire season, and regular exercises conducted throughout the year.

The above is a high-level summary, with further specific detail on the requirements of the emergency management plan relating to bushfire and onsite BESS infrastructure fire is provided in Appendix H.

5.12 Dangerous Goods

Strict controls are required on these potential ignition sources, such as storage and handling controls in accordance with the Dangerous Goods legislation and code, relevant Australian Standards and restrictions on hot works and electrical equipment within any on-site hazardous areas.

Should the facility propose any additional significant quantities of dangerous goods onsite such that the storage and use of these could potentially increase the risk of fire ignition at the proposed development, the following is required as a minimum, with the final siting and bushfire risk management to be assessed by an accredited bushfire practitioner:

- Ensure they are sited in areas of BAL-29 or lower as a minimum, and suitably protected from bushfire impact.
- Ensure there are strict controls on these potential ignition sources, such as storage and handling controls in accordance with the Dangerous Goods legislation, codes, and relevant Australian Standards.
- Restrictions on hot works and electrical equipment within any on-site hazardous areas.

5.13 Compliance with annual firebreak notices

Compliance with the current Shire of Chittering annual firebreak notice is required, as amended (refer to Appendix F), however it is noted that the APZ and vehicular access requirements for this BESS development are addressed more specifically by this BMP.

The firebreak notice does provide the following relevant information which is to be complied with where relevant:

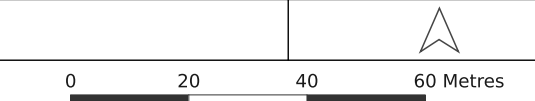
- Nominates bushfire season as being between 16 October and 31 May
- Nominates the following burning times and details actions permitted/prohibited during these times:
 - Prohibited – 1 December to 31 March
 - Restricted – 1 October to 30 November, and 1 April to 31 May
- Details on how to determine the Fire Danger Rating and actions for Total Fire Ban days

Additionally, the firebreak notice states that all properties with approved Bushfire Management Plans and Emergency Management Plans, are to comply with the plan in its entirety.



Legend

- Mitigation Measures
- Existing Fire Hydrant System Infrastructure
 - Proposed Development
- Internal Road
- Internal Road
 - New Internal Road
 - Upgraded Existing Internal Road
- Infrastructure Outline
- Cadastre
 - Asset Protection Zone
- Classified Vegetation
- Excluded Clause 2.2.3.2(f)
 - Modified to non vegetated and low threat



Tronox (Chandala) - BESS Facility

Bushfire Management Measures

© 2026. GIS Pro makes no claims, no representations, and no warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the GIS data and GIS data products, including the implied validity of any uses of such data. Street Map Sources: Map data ©2021 Google. Hybrid Imagery: Images © Google Imagery, CNES, Airbus, Maxar Technologies. Date Printed: 03-08-2026

6 CFA Renewable Guidelines Assessment

As detailed in Section 1.3 of this BMP, the project voluntarily adopted the Model Requirements from the CFA Renewable Guidelines to develop the bushfire risk management strategy, albeit rationalised for a WA context where required (e.g. use of WA standards for APZs, driveways, firewater tanks etc).

The proposed bushfire management strategy and mitigation measures have been detailed above in Section 5, with an assessment of these measures against the Model Requirements of the CFA Renewable Guidelines provided below in Table 4.

The assessment demonstrates that alignment has been achieved with the Model Requirements, other than some rationalisations for the WA context. As previously noted, not all Model Requirements relate to bushfire impact on the proposed development, however the management of many of these internal hazards is also critical to avoid ignition of bushfires, so have been discussed as much as relevant.

Table 4: Summary of Renewable Energy Facility recommendations relating to bushfire and the development response (CFA, 2025)

CFA Guideline Section	Recommendation	Type	Assessment of Mitigating Measures
Section 3: Fire Risk Management	<u>Risk Management Plan</u> - A Risk Management Plan must be developed for all renewable energy facilities, before development starts. <u>Additional Recommendations from CFA Renewable Guidelines</u> - A Risk Management Plan (RMP) is critical in informing fire risk management in the design and operation of facilities, particularly where infrastructure or operations pose additional hazards to the landscape, occupants and emergency responders.	<u>All Facilities</u>	- This Bushfire Risk Management Plan assesses the bushfire hazards and risks for the proposed renewable energy infrastructure against the recommendations of the CFA Renewable Guidelines, and details how the risk has been appropriately managed. - The required mitigation measures for the renewable energy infrastructure, has been incorporated into the project Bushfire Management Plan, to ensure they are implemented and maintained for the operational life of the project. Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
Section 4: Facility Location	<u>Landscape Risk to Facility</u> - An assessment that considers: - The impact of bushfire on the infrastructure (e.g. ember attack, radiant heat impact, flame contact).	<u>All Facilities</u>	- The proposed BESS is on the southern side of an existing industrial facility, with the bushfire risk primarily from forest and scrub vegetation to the south of the proposal. - As detailed in Section 3.3, while bushfires have historically been a regular occurrence in the local region especially in areas of retained vegetation to the west of Brand Highway, there have been few that have approached within 2 km of the Chandala facility likely due to the surrounding agricultural land. Notwithstanding, there is continuous forest vegetation within and surrounding the Chandala site, and there would be opportunity for steady-state bushfire to impact the proposed development. - The focus on addressing landscape risk of bushfire to the facility, is primarily through the provision of the following: - Onsite vegetation management, including NVZ/APZs around renewable energy infrastructure, to reduce bushfire impact to moderate levels, especially on the basis that the BESS modules are largely non-combustible materials and the anticipated bushfire behaviour - The sizing of the NVZ and APZ is commensurate with the surrounding bushfire hazard (i.e. increasing in width to provide more separation from the hazard where it presents greater potential for significant bushfire behaviour). - The BESS units are more susceptible to elevated heat which could potentially trigger thermal runaway, and on this basis, the NVZ/APZ has been sized to achieve a target of 10 kW/m², but with a minimum width of 25 m to address any explosion risk. - The remainder of the renewable energy infrastructure (transformers) has greater resilience to bushfire and as such, the NVZ/APZ has been sized to achieve a target of BAL-29. - Vehicular access and firewater recommendations for the renewable energy infrastructure have been determined through application of the CFA Renewable Guidelines and provide significant resources for attending firefighters to fight bushfires at the BESS site: - The internal road network enables attending firefighters to access all proposed BESS and the transformers, including the provision of multiple entrances to the site and the use of loop perimeter roads. - The onsite firewater supplies, provide a significant quantity of firewater for attending firefighters to refill appliances, without extended travel time. - The BESS modules are designed to incorporate bushfire resilience through non-combustible construction and targeted ember protection. Additionally, the BESS units are designed with a number of fire and safety systems to limit the potential for thermal runaway, fire and explosion from the unit, including - Battery management/monitoring systems - Thermal management/monitoring systems - Fire detection, alarm and suppression systems - Explosion management systems - System monitoring for all electrical infrastructure must be provided, especially the BESS unit BMS and fire/gas detection, to ensure that any electrical or equipment failures with the potential to ignite or propagate fire are rapidly identified and relevant site personnel notified to enable early fire brigade notification. - Strong liaison with DFES and local fire brigade from facility commissioning and for the duration of operation

CFA Guideline Section	Recommendation	Type	Assessment of Mitigating Measures
			Emergency Management Plan that addresses bushfire preparedness, prevention and response activities, including notification of DFES, facility shutdown and offsite evacuation. • Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
	<u>Facility Risk to Landscape</u> - As assessment that considers the following and details how the proposal will reduce risks on site to an acceptable level: - The impact of any ignitions arising from the infrastructure on nearby communities, infrastructure and assets.	<u>All Facilities</u>	- As detailed in Section 4, based on historical occurrences in Australia, there appears to be a relatively low likelihood of BESS or transformer fires. It is noted that these types of grid scale BESS facilities are also relatively new, therefore the opportunity for fire damage and loss is limited. BESS fires in Australian appear to have generally been contained to 1 or 2 BESS units, with limited spread across adjacent BESS. - The focus on addressing risk to the landscape is primarily through prevention of uncontrolled BESS fire and explosion, in order to prevent fire spread to vegetation, through the provision of the following: - The BESS modules are designed to incorporate bushfire resilience through non-combustible construction and targeted ember protection. Additionally, the BESS units are designed with a number of fire and safety systems to limit the potential for thermal runaway, fire and explosion from the unit, including - Battery management/monitoring systems - Thermal management/monitoring systems - Fire detection, alarm and suppression systems - Explosion management systems - Appropriate separation of renewable energy infrastructure (in particular BESS units) to avoid spread of fire between infrastructure. - System monitoring for all electrical infrastructure must be provided, especially the BESS unit BMS and fire/gas detection, to ensure that any electrical or equipment failures with the potential to ignite or propagate fire are rapidly identified and relevant site personnel notified to enable early fire brigade notification. - Onsite vegetation management, including NVZ/APZs around renewable energy infrastructure, to limit the ability of onsite fire in the renewable energy infrastructure to escape to surrounding unmanaged vegetation. - Vehicular access and firewater recommendations for the renewable energy infrastructure have been determined through application of the CFA Renewable Guidelines and provide significant resources for attending firefighters to fight fire within the facility: - The internal road network enables attending firefighters to access all proposed BESS infrastructure, and the transformers, including the provision of multiple entrances to the site and the use of loop perimeter roads. - The onsite firewater supplies, provide a significant quantity of firewater for attending firefighters to control or suppress onsite fires. - Strong liaison with DFES and local fire brigade from facility commissioning and for the duration of operation - Emergency Management Plan that addresses bushfire preparedness, prevention and response activities, including notification of DFES, facility shutdown and offsite evacuation. • Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
<u>Section 4: Facility Design</u>	<u>Non-Vegetated Zones (NVZ) and Asset Protection Zones (NVZ)</u> - The provision of NVZ and/or APZ: - Around the perimeter of control rooms, electricity compounds, substations and all other buildings onsite. - Of a width of at least 10m, and at least the distance where radiant heat flux (output) from the vegetation does not create the potential for ignition of on-site infrastructure - A NVZ must be: - Non-combustible, constructed of concrete, mineral earth or non-combustible mulch such as crushed rock.	<u>All Facilities</u> <u>BESS</u>	- Vegetation modification and management recommendations for the renewable energy infrastructure has been determined through application of the CFA Renewable Guidelines and detailed in Section 5.2: - The BESS units are to have a 52.8 m wide perimeter NVZ/APZ to achieve 10 kW/m² or lower and address any explosion risk for bushfire ignitions, consisting of the following: - A 10 m wide NVZ adjacent to the BESS units, that is non-combustible (constructed of concrete, mineral earth or non-combustible mulch etc) and free of vegetation and obstructions at all times, with no plant or equipment unless totally non-combustible. - All land within the BESS NVZ is to be non-combustible (constructed of concrete, mineral earth or non-combustible mulch etc) and free of vegetation.

CFA Guideline Section	Recommendation	Type	Assessment of Mitigating Measures
	- Free of vegetation and obstructions at all times. - No plant or equipment of any kind is to be stored in fire breaks. <u>Additional Recommendations for BESS</u> - The provision of a NVZ and/or APZ around battery energy storage systems and related infrastructure.		- Outside the 10 m NVZ, the remaining 42.8 m can be non-vegetated or otherwise comply with the APZ standards from the WA PBG, with the following clarifications: - Have no trees located close enough to BESS's such that any falling branches or trees could mechanically damage the BESS - Transformer 1 is to have a 9 to 15 m wide perimeter NVZ/APZ to achieve no less than BAL-29, while Transformer 2 requires a 9 to 27 m wide NVZ/APZ to achieve BAL-29. - In order to limit the chance of electrical faults in the transformers from igniting a bushfire, all within the transformer NVZ/APZs consisting entirely of non-vegetated elements. - These vegetation modification and management recommendations are to be maintained in for the operational life of the project. • Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
	<u>Emergency Vehicle Access</u> - Construction of a minimum four (4) metre perimeter road within the perimeter fire break. - Roads must be of all-weather construction and capable of accommodating a vehicle of fifteen (15) tonnes (e.g., no compacted earth). - Constructed roads should: - Be a minimum of four (4) metres in trafficable width with a four (4) metre vertical clearance for the width of the formed road surface. - Incorporate passing bays at least every 600 metres, which must be at least twenty (20) metres long and have a minimum trafficable width of six (6) metres. Where roads are less than 600 metres long, at least one passing bay must be incorporated. - Otherwise comply with the private driveway specifications of the WA PGB - Ensure any fencing along access routes allows for width of fire trucks. - Road networks must enable responding emergency services to access all areas of the facility, including fire service infrastructure, buildings, and related renewable energy infrastructure. - The provision of at least two (2) but preferably more access points to each part of the facility. <u>Additional Recommendations for BESS</u> - The provision of at least two access points into each section where battery energy storage systems are located.	<u>All Facilities</u> <u>BESS</u>	- Vehicular access recommendations for the renewable energy infrastructure have been determined through application of the CFA Renewable Guidelines and detailed in Section 5.3, and include use of the existing internal road network, supplemented by a section of new road to the BESS facility which includes the following: - Provide at least 2 entrance/exit gates are to be provided to the BESS compound, and the internal road to be configured as loop road, to avoid creation of any internal dead-end roads. - To align with local expectations, the internal road specifications are to comply with the private driveway specifications of the WA PBG, rather than the CFA Guidelines from Victoria. • Based on the above, the requirements of CFA Guidelines are in alignment, albeit adopting the internal road specifications from the WA PBG.
	<u>Firefighting Water Supply</u> - Water access points must be clearly identifiable and unobstructed to ensure efficient access. - Static water storage tank installations must comply with relevant Australian Standards (including AS 2419.1) and the technical requirements of the WA PBG: - The static water storage tank(s) must be an aboveground water tank constructed of concrete or steel. - An external water level indicator must be provided to the tank and be visible from the hardstand area. - Signage indicating 'FIRE WATER' and the tank capacity must be fixed to each tank. - Signage must be provided at each vehicle entrance to the facility, indicating the direction to the nearest static water tank(s). - The static water storage tank(s) must be capable of being completely refilled automatically or manually within 24 hours. - The static water storage tanks must be located at vehicle access points to the facility and must be positioned at least ten (10) metres from any infrastructure	<u>All Facilities</u> <u>BESS</u>	- The firewater recommendations for the renewable energy infrastructure have been determined through application of the CFA Renewable Guidelines and detailed in Section 5.4 and include: - The existing fire hydrant system (including existing 415 kL fire tank reserve) have the potential to be altered and extended (if required) to the BESS site to provide sufficient fire hydrant coverage, but this requires review and design by suitable qualified Fire Protection Engineer. - Should new firewater tank/s be required, they will need to consider the specifications detailed in Section 5.4, derived from CFA Renewable Guidelines and WA PBG. - Given the substantial amount of firewater required, no additional capacity is proposed for bushfire fighting purposes. - There is also a number of mobile fire appliances at the existing facility which will be able to undertake first response suppression of onsite fire or spot fire, where safe to do so. • Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.

CFA Guideline Section	Recommendation	Type	Assessment of Mitigating Measures
	- The hard-suction point must be provided with a 150mm full bore isolation valve equipped with a Storz connection (or approved alternative), sized to comply with the required suction hydraulic performance. - The hard-suction point must be protected from mechanical damage where necessary. - The hard-suction point must be positioned within four (4) metres to a road or hardstand area and provide a clear access for emergency services personnel. - An all-weather road access and hardstand, compliant with the private driveway specifications of the WA PBG and at least 6 m wide and 8 m long, must be provided to the hard-suction point. - The road access and hardstand must be kept clear at all times. - Where the access road has one entrance, an 18 metre diameter turning circle must be provided at the tank. <u>Additional Recommendations for BESS (Centralised)</u> - Where reticulated water is available, the provision of a fire hydrant system that meets the requirements of AS 2419.1-2021 Clause 3.9: Open Yard Protection, and Table 2.2.5(D): Number of Fire Hydrants Required to Flow Simultaneously - Open Yards. OR - Except, that fire hydrants must be provided and located so that every part of the battery energy storage system is within reach of a 10m hose stream issuing from a nozzle at the end of a 60m length of hose connected to a fire hydrant outlet. - Where no reticulated water is available, provision of a fire water supply in static storage tanks, where: - The fire water supply must be of a quantity no less than 288,000L or as per the provisions for Open Yard Protection of AS 2419.1-2021, flowing for a period of no less than four hours at 20L/s, whichever is the greater. - The quantity of static fire water storage is to be calculated from the number of hydrants required to flow from AS 2419.1-2021: Fire hydrant installations, Table 2.2.5(D). - Fire hydrants must be provided and located so that every part of the battery energy storage system is within reach of a 10m hose stream issuing from a nozzle at the end of a 60m length of hose connected to a fire hydrant outlet. - The fire water supply must be located at vehicle entrances to the facility, at least 10m from any renewable energy infrastructure and buildings. - The fire water supply must be reasonably adjacent to the battery energy storage system and shall be accessible without undue danger in an emergency. (e.g. Fire water tanks are to be located closer to the site entrance than the battery energy storage system). - The fire water supply must comply with relevant Australian Standards (including AS 2419.1) and the technical requirements of the WA PBG		
	<u>Fire Detection and Suppression Equipment</u> - For on-site buildings and structures, according to the requirements of the National Construction Code. - For storages of Dangerous Goods, according to the requirements of any Australian Standards for the storage and handling of Dangerous Goods. - For electrical installations, a minimum of two suitable fire extinguishers must be provided within 3m-20m of each PCU. - In all vehicles and heavy equipment, each vehicle must carry at least a nine (9)-litre water stored pressure fire extinguisher with a minimum rating of 3A, or other firefighting equipment as a minimum when on-site during the Fire Danger Period.	<u>All Facilities</u>	<u>National Construction Code (NCC) compliance</u> - No buildings are proposed as part of this development <u>Dangerous Goods compliance</u> - Should significant quantities of dangerous goods be stored or handled onsite: - These will also need to comply with all relevant Dangerous Goods legislation, codes and standards - They should be reviewed by a BPAD Level 3 bushfire practitioner to ensure they are sited in areas of BAL-29 or lower, and appropriately protected from bushfire impact. <u>Portable fire extinguishers</u> - Portable fire extinguishers are to be provided in (or near) the following in accordance with Australian Standards: - Each BESS module

CFA Guideline Section	Recommendation	Type	Assessment of Mitigating Measures
	<u>Design Specific to Facility Type</u> <u>Additional Recommendations for BESS</u> - Facility design that incorporates: - A separation distance that prevents fire spread between battery containers/enclosures and other site elements. - Separation must be at least the distance where the radiant heat flux (output) from a battery energy storage system container/enclosure fully involved in fire does not create the potential for ignition of these site elements. - A NVZ and/or APZ around the battery energy storage system and related infrastructure, of a width of no less than 10m (or greater where determined). - NVZ must be non-combustible, constructed of concrete, mineral earth or non-combustible mulch such as crushed rock. - The width must be calculated based on the ignition source being radiant heat of surrounding vegetation, including landscaping. - A layout of site infrastructure that: - Considers the safety of emergency responders. - Minimises the potential for grassfire and/or bushfire to impact the battery energy storage system. - Minimises the potential for fires in battery containers/enclosures to impact on-site and offsite infrastructure. - Battery energy storage systems must be: - Located so as to be reasonably adjacent to a site vehicle entrance (suitable for emergency vehicles). - Located so that the site entrance and any fire water tanks are not aligned to the prevailing wind direction (therefore least likely to be impacted by smoke in the event of fire at the battery energy storage system.) - Provided with in-built fire and gas detection systems. - Provided with explosion prevention via sensing and venting, or explosion mitigation through deflagration panels. - Provided with suitable ember protection. - Provided with suitable access roads for emergency services vehicles. - Installed on a non-combustible surface. - Provided with suitable ventilation. - Provided with suitable impact protection. - Provided with enclosed wiring and buried cabling, except where required to be above-ground for grid connection. - Provided with spill containment that includes provision for management of fire water runoff.	<u>BESS</u>	<i>Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.</i> <u>Separation Distance</u> - The expectation is this will be addressed by complying with relevant codes and standards, including Australian Standards, and any manufacturers recommendations. <u>NVZ/APZ around BESS and Related Infrastructure</u> - Vegetation modification and management recommendations for the renewable energy infrastructure has been determined through application of the CFA Renewable Guidelines and detailed in Section 5.2, which are to be maintained for the operational life of the project. <u>BESS Design Requirements</u> - The BESS related design recommendations have been nominated as per the stated CFA Renewable Guidelines, and summarised in Section 5.5.1. <i>Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.</i>
<u>Section 5: Facility Construction and Commissioning</u>	<u>Emergency Plan (Construction)</u> - An Emergency Plan must be developed for the construction and commissioning phase of the facility. <u>Additional Guidance from CFA Renewable Guidelines</u> - An emergency communication system must be provided that is reliable and will operate in the event of power failure. - Install and commission fire detection and suppression systems for the facility at the earliest possible stage of construction.	<u>All Facilities</u>	- Emergency procedures for the construction phase are to be incorporated in the Construction Management Plan as mentioned in Section 5.7. - It is recommended that the bushfire emergency management concepts summarised in Section 5.11 for the operational BESS facility, are incorporated into the Construction Management Plan for bushfire preparedness and response, as much as applicable. - Additional bushfire related construction and commissioning recommendations for the renewable infrastructure, has been determined through application of the CFA Renewable Guidelines and documented in Section 5.7,

CFA Guideline Section	Recommendation	Type	Assessment of Mitigating Measures
	• Provide first-aid firefighting equipment, such as fire extinguishers (and where possible, portable fire hose reels), appropriate to the identified emergency scenarios, at all construction portables/buildings onsite, in the vicinity of all construction activities, and in site-based vehicles. • Provide training for personnel in the use of on-site first-aid firefighting equipment, and responsibilities during emergencies. • Provide the required fire protection equipment for any storages of dangerous goods as per the relevant Australian Standards. • It is recommended the development of safe work procedures for the facility, encompassing but not limited to: ○ Electricity and chemical management. ○ Vegetation management. ○ Ignition source control, including hot works. ○ Infrastructure, equipment and vehicle maintenance. ○ Emergency management • Adhere to restrictions on Total Fire Ban or days of elevated fire danger • Restrict smoking to prescribed areas and provide suitable ash and butt disposal facilities. • Fire brigade must be notified at least seven (7) days prior to the commissioning of any high-risk infrastructure at the facility (e.g., battery energy storage systems).		including the specific requirement to notify DFES ahead of commissioning any renewable energy infrastructure. • Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
Section 6: Facility Operation	<u>Fire Management Plan</u> • A Fire Management Plan must be developed for the facility, before development starts. <u>Additional Guidance from CFA Renewable Guidelines</u> • A Fire Management Plan is based on the outcomes of the Risk Management Plan and outlines the activities, processes and accountabilities for the ongoing management of fire risk at the facility including: ○ A summary of fire hazards and risks to and from the site, specific to its location, infrastructure, activities and occupancy. ○ Description of control measures to prevent fire occurring and limit the consequences of fire at the facility. ○ Description of control measures to prevent and reduce the consequences of external fire impacting the facility. ○ Details of equipment and resources to manage fire at the facility ○ Policies and procedures that ensure all control measures are appropriate and effective, and remain so. ○ Procedures for review of the Plan <u>Additional Recommendations for BESS</u> • A Fire Management Plan for a facility that incorporates a battery energy storage system must also include: ○ A schedule, list of activities and accountabilities for the inspecting, testing, monitoring and servicing of the battery and its monitoring, safety and protective systems. ○ Monthly inspections of battery enclosures/ containers and related infrastructure for physical damage. Any damage must be immediately assessed and rectified by a suitably qualified person. ○ Seismic activity as a trigger for inspecting, testing and servicing of the battery energy storage system and its related infrastructure. Any damages or changes in operating parameters must be immediately assessed and rectified by a suitably qualified person. ○ Regular inspection and removal of all combustible materials near the battery enclosures/containers and related infrastructure.	<u>All Facilities</u> <u>BESS</u>	• The bushfire related siting, design, construction and maintenance recommendations for the renewable infrastructure, has been determined through application of the CFA Renewable Guidelines and summarised in Section 5, including the nomination of responsible entities for implementation and ongoing management. • The additional BESS recommendations are captured as ongoing operation, maintenance and housekeeping and are documented in Section 5.8, while the required information to include in the Emergency Information Book for attending firefighters has been addressed in Section 5.9. • Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
	<u>Bushfire and Grassfire</u>	<u>All Facilities</u>	• Bushfire preparedness and response actions for the renewable energy infrastructure has been determined

CFA Guideline Section	Recommendation	Type	Assessment of Mitigating Measures
	- If your facility is at-risk of bushfire, prevention and preparedness activities must be detailed in the Fire Management Plan. <u>Additional Guidance from CFA Renewable Guidelines</u> - Your facility may be at-risk of bushfire if it is: - Located in an area close to or amongst dense or open bush, unmanaged grassland, near coastal scrub, or at an urban fringe. - Identified as being in a Designated Bushfire Prone Area. - Address bushfire prevention and preparedness activities		through application of the CFA Renewable Guidelines and documented in Section 5.11. Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
	<u>Vegetation Management</u> - Facility operators must undertake the following measures during the nominated bushfire season (as per Local Government firebreak notice): - Grass must be maintained at or below 100mm in height during the nominated bushfire season. - Long grass and/or deep leaf litter must not be present in areas where heavy equipment will be working, during construction or operation. - Restrictions and guidance must be adhered to during the nominated bushfire season, days of High (and above) fire danger and declared Total Fire Ban days <u>Additional Recommendations for BESS</u> - Containers/enclosures and infrastructure for battery energy storage systems must be maintained to be clear of vegetation, including grass, for at least 10 m on all sides (or greater where determined).	<u>All Facilities</u> <u>BESS</u>	- Vegetation modification and management recommendations for the renewable energy infrastructure have been determined through application of the CFA Renewable Guidelines and detailed in Section 5.2, which are to be maintained for the operational life of the BESS facility. - The non-vegetated zone within, and surrounding, the BESS modules - Compliance with restrictions and guidance on days of elevated Fire Danger Rating, and Total Fire Ban days is summarised in Section 5.11. Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
	<u>Facility and System Monitoring</u> - Appropriate monitoring for facility infrastructure must be provided, to ensure that any shorts, faults or equipment failures with the potential to ignite or propagate fire are rapidly identified and controlled, and any fire is notified to 000 immediately. <u>Additional Recommendations for BESS</u> - For battery energy storage systems, appropriate monitoring and intervention measures must be provided to ensure that the following are rapidly identified and notified to 000 immediately: - Any shorts, faults, temperature increases above normal parameters (e.g., precursor to thermal events/runaway). - Equipment failures with the potential to ignite or propagate fire. - Off-gassing, smoke or fire. - The provision for direct alarm monitoring to the fire brigade for battery energy storage system automatic detection systems must be considered	<u>All Facilities</u> <u>BESS</u>	- The proposed facility is to be monitored, both onsite (during business hours) and offsite (at all times) as detailed in Section 5.5. - The following emergency response procedures for an onsite fire (in particular a BESS fire) are included in the bushfire emergency management arrangements summarised in Section 5.11 and expanded upon in Appendix H: - Immediately notify DFES to enable a rapid turnout - If possible, ensure relevant vehicular access routes are open and available, to enable attending firefighters to gain access to the location of the fire. - Ensure all fire and communications systems are ready for use. - Ensure attending firefighters have access to any relevant specialist technical personnel (onsite or offsite), to assist by providing technical advice. - If the fire in in the BESS, ensure no staff approach the BESS (if there are any onsite). Staff should move to safe distance from the subject site, no less than 50 m (or as advised). - Strongly consider full emergency shutdown of the BESS and transformers unless there are mitigating circumstances. This should be conducted in consultation with authorised DFES personnel (where possible). - Notify neighbouring landowners. Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
	<u>Maintenance and Housekeeping</u> - Inspection, maintenance and any required repair activities must be conducted for all infrastructure, equipment and vehicles at the facility. - Maintenance must be in line with any relevant Australian Standards, the manufacturer's requirements. - Site-wide housekeeping inspections must be conducted regularly at facility. If your facility is at-risk of bushfire, site-wide bushfire preparedness housekeeping inspections must be conducted at least three months, and again one month, prior to the Fire Danger Period.	<u>All Facilities</u>	- The bushfire related siting, design, construction and maintenance recommendations for the renewable infrastructure, has been determined through application of the CFA Renewable Guidelines, with the specific recommendations during the operation phase relating to maintenance and housekeeping detailed in Section 5.8. - These bushfire risk management measures for the renewable energy infrastructure, including ongoing maintenance and management recommendations, have also been summarised in Section 5, including the nomination of responsible entities for ongoing management on Table 5. Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.

CFA Guideline Section	Recommendation	Type	Assessment of Mitigating Measures
	<u>Safe Dangerous Goods Storage and Handling</u> <u>Additional Guidance from CFA Renewable Guidelines</u> • Signage and labelling compliant with the Dangerous Goods (Storage and Handling) Regulations 2022 and the relevant Australian Standards must be provided at the site entrance, dangerous goods storage locations, and storage tanks where applicable. • Appropriate material for cleaning up dangerous goods spills and leaks (including absorbent, neutralisers, tools, disposal containers and personal protective equipment) must be provided and available on-site. • Training must be provided for site personnel on the hazards, safe use and emergency response for spills, leaks and fire involving dangerous goods. • All dangerous goods stored on-site must have a current Safety Data Sheet (SDS). Safety Data Sheets must be provided within the facility's Emergency Information Book(s), in the Emergency Information Container(s). • The requirements of the dangerous goods legislative framework, and all relevant Australian Standards must be complied with for all facilities, including facilities with battery energy storage systems.	<u>All Facilities</u>	• The proposed BESS units will contain Li-ion batteries (or similar) that will be classified as Dangerous Goods. ○ This BMP demonstrates the bushfire risk management measures align with the recommendations from CFA Renewable Guidelines, including reviewing and assessing the potential risk to and from the BESS units. ○ Notwithstanding, these Dangerous Goods will also need to comply with all relevant Dangerous Goods legislation, codes and standards. • Additionally, should significant quantities of dangerous goods (other than the BESS batteries) be stored or handled onsite: ○ These will also need to comply with all relevant Dangerous Goods legislation, codes and standards ○ They should be reviewed by a BPAD Level 3 bushfire practitioner to ensure they are sited in areas of BAL-29 or lower, and appropriately protected from bushfire impact as detailed in Section 5.12. • The Emergency Information Book is to contain a current manifest of dangerous goods (if required) and Safety Data Sheets (SDS) for Dangerous Goods stored on-site. • Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
	<u>Fire Risk Review</u> <u>Additional Guidance from CFA Renewable Guidelines</u> • Fire risk must be effectively managed at operating facilities to meet obligations for providing a safe workplace under the OHS Act. • Fire brigade recommends that facility operators consider the design guidelines and model requirements contained in this document and develop procedures to ensure that: ○ The Fire Management Plan is reviewed and updated regularly, in line with any reviews and changes to hazards and risk management as per the Risk Management Plan, and where there is a near-miss or incident at the facility. ○ The Emergency Plan is reviewed and updated to reflect any changes in the Fire Management Plan, including where fire risks emerge or change, risk controls are added or modified, or where there is a near miss or incident at the facility. • Where substantive changes are made to these documents, fire brigade recommends considering peer-review by a suitably qualified, independent third party.	<u>All Facilities</u>	• Like any BMP, if there are significant changes to the development, they should be reviewed, and if required amended, to reflect those changes. • The Emergency Management Plan for the facility is to be reviewed and amended as summarised in Section 5.11. • Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.
<u>Section 7: Emergency Planning</u>	<u>Emergency Plan (Operational)</u> • An Emergency Plan must be developed for the operational phase, specific to the facility, before development starts. <u>Additional Guidance from CFA Renewable Guidelines</u> • An Emergency Plan (EP) details the arrangements for managing emergencies, including the facility details, structures, procedures, resources and training. EP's must be specific to the infrastructure, operations and location of facilities, and informed by a sound risk management process. • The EP should address the following for each hazard: ○ Emergency Response Procedures (including evacuation or onsite shelter-in-place as required) ○ Personnel Training ○ Emergency Exercises • The EP is a 'living document' that must be regularly reviewed to ensure their currency and effectiveness. <u>Additional Recommendations for BESS</u> • Emergency Plans for facilities with battery energy storage systems must additionally include: ○ Contact information for 24/7/365 specialist technical support for the battery energy storage system. ○ Emergency response procedures based on identified risks and hazards of the battery energy storage system and related infrastructure, including but not limited to:	<u>All Facilities</u> <u>BESS</u>	• Bushfire emergency management preparedness and response concepts for the renewable energy infrastructure has been summarised in Section 5.11 (and Appendix H) are to be incorporated into the overall BESS facility Emergency Management Plan. • The additional recommendations for BESS facilities documented in the CFA Renewable Guidelines, have been included in the Emergency Information Book and signage for attending firefighters, and the site Emergency Management Plan • Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.

CFA Guideline Section	Recommendation	Type	Assessment of Mitigating Measures
	▪ Electrical infrastructure faults and fire. ▪ Battery energy storage system damage or faults, including battery monitoring faults, temperature increases above normal operating parameters, electrical faults, chemical spills or reactions, off-gassing, thermal events/runaway, smoke and fire. ▪ Bushfire and grassfire. ▪ The management of fire water runoff. ○ Details of the elements monitored/controlled by the Battery Management System (BMS), including internal temperature, state of charge, voltage, etc. and the locations this information is available (e.g., at the BESS containers, in an on-site control room, off-site monitoring facilities). ○ A plan for partial and full decommissioning of the battery energy storage system in the event of an emergency incident that renders the facility inoperable or unsafe, before its anticipated end-of-life. ○ Any information that supports the considerations in Appendix B: Emergency Response Considerations for Large-Scale Battery Energy Storage Systems. • This information must also be provided within the facility's Emergency Information Book.		
<u>Section 8. Provision of Emergency Information</u>	<u>Developing an Emergency Information Book</u> • An Emergency Information Book must be developed and available to emergency responders, and include the following: ○ A description of the premises, its infrastructure and operations. ○ Site plans that include the layout of the entire site, including buildings, internal roads, infrastructure, fire protection systems and equipment, dangerous goods storage areas, gas detectors, battery energy storage systems, substations/terminals, grid connections, drains and isolation valves, neighbours and the direction of north. ○ A manifest of dangerous goods (if required) as per Schedule 3 of the Dangerous Goods (Storage and Handling) Regulations 2022. ○ Procedures for the management of emergencies, including evacuation, shelter-in-place (for facilities at risk of bushfire/grassfire), containment of spills and leaks, and fire procedures (including infrastructure/plant fires, vehicle fires, grassfire/bushfire) ○ Details of emergency equipment, including the type and location of gas detectors. ○ Up-to-date contact details for site personnel, regulatory authorities and site neighbours. ○ Safety Data Sheets (SDS) for dangerous goods stored on-site. • Emergency Information Books must be located weatherproof container, at each vehicle entrance the facility • Prior to commissioning of the facility, a familiarisation visit and explanation of emergency procedures is to be offered to local fire brigades and other emergency services. ○ A schedule for ongoing site familiarisation to account for changing personnel, facility infrastructure and hazards, and emergency exercises should be developed in conjunction with the local fire brigade. ○ A review of the information contained within the facility's Emergency Information Book must be undertaken prior to commencement of bushfire season annually.	<u>All Facilities</u>	• The Emergency Information Book and signage, and emergency service familiarisation process for the renewable energy infrastructure, has been determined through application of the CFA Renewable Guidelines and detailed in Sections 5.9 and 5.10. • <i>Based on the above, all recommendations from the CFA Renewable Guidelines are in alignment.</i>

7 Implementation and management of the bushfire measures

The BMP will be implemented to ensure bushfire management measures are adopted and implemented on an ongoing basis. Table 5 has been included to drive implementation of all bushfire management works associated with this project.

Table 5: Implementation and management of the bushfire measures

Implementation/management table	
No	Implementation action
Prior to commissioning and facility operation	
1	Establish NVZs and APZs around all nominated renewable energy infrastructure (BESS, transformers), in accordance with the dimensions and standards detailed in Section 5.2 of the BMP.
2	Construct the internal driveway network to the renewable energy infrastructure (BESS), in accordance with the dimensions and standards detailed in Section 5.3 of the BMP. Construct any required gates to the standards stated in the BMP, and ensure keys to any locked gates are provided to all relevant staff and onsite personnel, as well as being made available to DFES and local fire brigade.
3	Ensure sufficient firewater is provided to the renewable energy infrastructure (BESS) in accordance with the recommendations detailed in Section 5.4 of the BMP and relevant Australian Standards.
4	Incorporate all the renewable energy infrastructure design, construction, installation and commissioning recommendations detailed in Sections 5.5, 5.6 and 5.7 of the BMP for the proposed facility.
5	Ensure any facility operation, maintenance and housekeeping recommendations are in place prior to operation, as detailed in Section 5.8 of the BMP.
6	Prepare and install the Emergency Information Book and signage in accordance with the recommendations of Section 5.9 of the BMP.
7	Conduct the emergency services familiarisation site visit, in accordance with the recommendations of Section 5.10 of the BMP.
8	Develop and implement the BESS facility emergency management plan, incorporating the recommended procedures for bushfire and onsite fire, detailed in Section 5.11 of the BMP
9	Comply with any relevant Dangerous Goods compliance requirements, as detailed in Section 5.12 of the BMP.
10	Comply with the Shire of Chittering firebreak notice as it applies to the BESS facility, as detailed in Section 5.13 of the BMP.
Ongoing (for the operational life of the project)	
1	Maintain the NVZs and APZs around all nominated renewable energy infrastructure (BESS, transformers) in accordance with the dimensions and standards detailed in Section 5.2 of the BMP.
2	Maintain the internal driveway network to the renewable energy infrastructure in accordance with the dimensions and standards detailed in Section 5.3 of the BMP.
3	Maintain the firewater system/s for the renewable energy infrastructure in accordance with the requirements detailed in Section 5.4 of the BMP and relevant Australian Standards. Ensure the firewater tanks remains filled at all times, especially during bushfire season.

Implementation/management table	
No	Implementation action
4	Undertake the ongoing operation and maintenance recommendations for the renewable energy infrastructure are detailed in Section 5.8 of the BMP for the BESS facility.
5	Review, and if required update, the Emergency Information Book and signage in accordance with the recommendations of Section 5.9 of the BMP.
6	Continue the emergency services familiarisation visits, in accordance with the recommendations of Section 5.10 of the BMP.
7	Review, and if required updated, the BESS facility emergency management plan, incorporating the recommended procedures for bushfire and onsite fire, detailed in Section 5.11 of the BMP
8	Review onsite Dangerous Goods (associated with BESS facility) and ensure ongoing compliance with the requirements detailed in Section 5.12 of the BMP.
9	Comply with the Shire of Chittering firebreak notice as it applies to the BESS facility, as detailed in Section 5.13 of the BMP.

8 References

- Country Fire Authority (CFA) 2025, *Design Guidelines and Model Requirements for Renewable Energy Facilities v4 (June 2025)*, State of Victoria
- Department of Fire and Emergency Services (DFES) 2025, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from: <https://maps.slip.wa.gov.au/landgate/bushfireprone/>,
- Department of Mines and Petroleum (DMP) 2010, *Storage and handling of dangerous goods - code of practice (2nd edition)*, Resources Safety, Department of Mines and Petroleum, Western Australia.
- DNV GL - Energy (DNV-GL) 2020, *McMicken Battery Energy Storage System Event Technical Analysis and Recommendations*, DNV GL – Energy, Chalfont, Pennsylvania,
- Department of Planning (DoP) 2016, *Visual guide for bushfire risk assessment in Western Australia*, Department of Planning, Perth.
- Energy Safe Victoria (ESV) 2021, *Statement of Technical Findings: Fire at Victorian Big Battery*, Victorian State Government
- Fire Protection Research Foundation (FPRF) 2016, *Hazard assessment testing of Lithium-Ion battery energy storage systems*, NFPA, Massachusetts
- Fisher Engineering Inc (FEI) 2020, *UL9540A Test Results: Interpretive Report and FPE Code Narrative*, Palo Alto, California
- Fisher Engineering Inc (FEI) 2022, *Victorian Big Battery Fire: July 30, 2021*, Johns Creek Georgia
- Hines J 2023, *Tesla battery on fire at Bouldercombe energy storage site, Genex confirms*, ABC News
- Peacock B 2023, *Queensland Bouldercombe battery fire ignited on grid side, not within Megapack, analysis finds*, PV Magazine
- Standards Australia (SA) 2018, *Australian Standard AS 3959–2018 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.
- Underwriters Laboratories (UL) 2020, *Four Firefighters Injured In Lithium-Ion Battery Energy Storage System Explosion - Arizona*, Underwriters Laboratories Inc, Columbia, Maryland
- Western Australian Planning Commission (WAPC) 2024, *State Planning Policy 3.7: Bushfire*, November 2024, Western Australian Planning Commission, Perth.
- Western Australian Planning Commission (WAPC) 2024, *Planning for Bushfire Guidelines*, November 2024, Western Australian Planning Commission, Perth.

Appendix A

Vegetation plot photos and description



Photo ID: 1a



Photo ID: 1b



Photo ID: 1c



Photo ID: 1d



Photo ID: 1e



Photo ID: 1f

Plot number	Plot 1
Vegetation classification	Class A Forest
Description / justification	Trees 10-30 m high at maturity, dominated by Eucalypts, multi-tiered structure comprising tall canopy layer, shrubby middle layer and grass/herb/sedge understorey



Photo ID: 1g



Photo ID: 1h



Photo ID: 1i



Photo ID: 1j



Photo ID: 1k



Photo ID: 1l

Plot number	Plot 1
Vegetation classification	Class A Forest
Description / justification	Trees 10-30 m high at maturity, dominated by Eucalypts, multi-tiered structure comprising tall canopy layer, shrubby middle layer and grass/herb/sedge understorey



Photo ID: 1m



Photo ID: 1o



Photo ID: 1q



Photo ID: 1n



Photo ID: 1p

Plot number	Plot 1
Vegetation classification	Class A Forest
Description / justification	Trees 10-30 m high at maturity, dominated by Eucalypts, multi-tiered structure comprising tall canopy layer, shrubby middle layer and grass/herb/sedge understorey



Photo ID: 1r



Photo ID: 1s

Plot number

Plot 1

Vegetation classification

Class A Forest

Description / justification

Trees 10-30 m high at maturity, dominated by Eucalypts, multi-tiered structure comprising tall canopy layer, shrubby middle layer and grass/herb/sedge understorey



Photo ID: 2a



Photo ID: 2b



Photo ID: 2c



Photo ID: 2d



Photo ID: 2e



Photo ID: 2f

Plot number	Plot 2
Vegetation classification	Class D Scrub
Description / justification	Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity



Photo ID: 2g



Photo ID: 2h



Photo ID: 2i



Photo ID: 2j



Photo ID: 2k



Photo ID: 2l

Plot number	Plot 2
Vegetation classification	Class D Scrub
Description / justification	Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity



Photo ID: 2m



Photo ID: 2n

Plot number	Plot 2
Vegetation classification	Class D Scrub
Description / justification	Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity



Photo ID: 3a



Photo ID: 3b

Plot number	Plot 3
Vegetation classification	Class C Shrubland
Description / justification	Shrub vegetation less than 2 m high at maturity



Photo ID: 4a



Photo ID: 4c



Photo ID: 4b



Photo ID: 4d



Photo ID: 4e

Plot number	Plot 4
Vegetation classification	Class G Grassland
Description / justification	Grassland at maturity, greater than 100 mm in height



Photo ID: 4f



Photo ID: 4g



Photo ID: 4h

Plot number	Plot 4
Vegetation classification	Class G Grassland
Description / justification	Grassland at maturity, greater than 100 mm in height



Photo ID: 5a



Photo ID: 5b



Photo ID: 5c



Photo ID: 5d



Photo ID: 5e



Photo ID: 5f

Plot number	Plot 5
Vegetation classification	Excluded – Non-vegetated (Clause 2.2.3.2 [e])
Description / justification	Existing non-vegetated land, including buildings, roads and carparks.



Photo ID: 5g



Photo ID: 5h



Photo ID: 5i



Photo ID: 5j



Photo ID: 5k



Photo ID: 5l

Plot number	Plot 5
Vegetation classification	Excluded – Non-vegetated (Clause 2.2.3.2 [e])
Description / justification	Existing non-vegetated land, including buildings, roads and carparks.



Photo ID: 5m



Photo ID: 5n



Photo ID: 5o



Photo ID: 5p



Photo ID: 5q

Plot number	Plot 5
Vegetation classification	Excluded – Non-vegetated (Clause 2.2.3.2 [e])
Description / justification	Existing non-vegetated land, including buildings, roads and carparks.



Photo ID: 7a



Photo ID: 7b



Photo ID: 7c

Plot number	Plot 7
Vegetation classification	Excluded – Low threat (Clause 2.2.3.2 [f])
Description / justification	Existing low threat landscaping that is located within the proposed APZ, and will be subject to some modification and management to comply with APZ standards for the operational life of the project.



Photo ID: 8a



Photo ID: 8b



Photo ID: 8c



Photo ID: 8d



Photo ID: 8e



Photo ID: 8f

Plot number	Plot 8
Vegetation classification	Modified to non-vegetated (exclusion 2.2.3.2 [e])
Description / justification	Existing vegetation within the BESS compound, and the surrounding 10 m, that is to be established and maintained in a non-vegetated state for the operational life of the project.



Photo ID: 8g



Photo ID: 8h



Photo ID: 8i



Photo ID: 8j

Plot number	Plot 8
Vegetation classification	Modified to non-vegetated (exclusion 2.2.3.2 [e])
Description / justification	Existing vegetation within the BESS compound, and the surrounding 10 m, that is to be established and maintained in a non-vegetated state for the operational life of the project.



Photo ID: 9a



Photo ID: 9c



Photo ID: 9e



Photo ID: 9b



Photo ID: 9d



Photo ID: 9f

Plot number	Plot 9
Vegetation classification	Modified to non-vegetated (exclusion 2.2.3.2 [e]) and/or low threat (exclusion 2.2.3.2 [f]) state
Description / justification	Existing vegetation within the BESS compound APZ, but further than 10 m the BESS compound, to be modified to non-vegetated elements or low threat landscaping compliant with the APZ standards, for the operational life of the project.



Photo ID: 9g



Photo ID: 9h



Photo ID: 9i



Photo ID: 9j



Photo ID: 9k



Photo ID: 9l

Plot number	Plot 9
Vegetation classification	Modified to non-vegetated (exclusion 2.2.3.2 [e]) and/or low threat (exclusion 2.2.3.2 [f]) state
Description / justification	Existing vegetation within the BESS compound APZ, but further than 10 m the BESS compound, to be modified to non-vegetated elements or low threat landscaping compliant with the APZ standards, for the operational life of the project.



Photo ID: 9m



Photo ID: 9n



Photo ID: 9o



Photo ID: 9p



Photo ID: 9q



Photo ID: 9r

Plot number	Plot 9
Vegetation classification	Modified to non-vegetated (exclusion 2.2.3.2 [e]) and/or low threat (exclusion 2.2.3.2 [f]) state
Description / justification	Existing vegetation within the BESS compound APZ, but further than 10 m the BESS compound, to be modified to non-vegetated elements or low threat landscaping compliant with the APZ standards, for the operational life of the project.

Appendix B

APZ Standards from WA PBG

An APZ is a low fuel area maintained around a habitable building to increase the likelihood that it will survive a bushfire, by providing a defensible space and reducing the potential for direct flame contact, radiant heat exposure and ember attack. The APZ allows emergency services access and provides an area for firefighters and home-owners to defend their property.

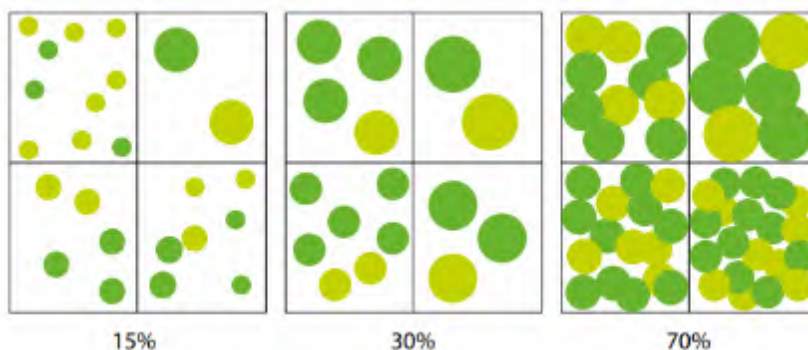
An APZ should not be seen as an area entirely cleared of vegetation, but as a strategically designed space that considers how existing and future mature vegetation, and combustible and non-combustible features interact with and affect the building's resilience to bushfire.

Vegetation management within an APZ should provide defensible space and be maintained to a low threat state, for the operational life of the project, in accordance with the requirements outlined below.

Table 9: Asset Protection Zone Technical Requirements

- **Trees* (> 6 metres in height)**

- Trunks at maturity should be a minimum distance of six metres from all elevations of the building.
- Branches at maturity should not touch or overhang a building or powerline.
- Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation.
- Canopy cover within the APZ should be <15 per cent of the total APZ area.
- Tree canopies at maturity should be at least 5 metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ.



- **Shrub* and Scrub* (0.5 metres to 6 metres in height)**

- Should not be located under trees or within three metres of buildings.
- Should not be planted in clumps >5 square metres in area.
- Clumps should be separated from each other and any exposed window or door by at least 10 metres.
- Shrub and scrub >6 metres in height are to be treated as trees.

- **Ground covers (<0.5 metres in height)**

- Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load'.
- Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
- Ground covers >0.5 metres in height are to be treated as shrubs

- **Grass**

Table 9: Asset Protection Zone Technical Requirements

- Grass should be maintained at a height of 100 millimetres or less, at all times.
- Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
- **Fine Fuel load (combustible dead vegetation mater <6 mm in thickness)****
 - Should be managed and removed on a regular basis to be maintained as low threat vegetation.
 - Should be maintained at <2 tonnes per hectare (on average).
 - Mulches should be non-combustible such as stone, gravel, shells, rock or crushed mineral earth or wood mulch >5 millimetres in thickness.
- **Defendable Space**
 - Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.
- **Fences within the APZ**
 - Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and wire, or bushfire-resisting timber referenced in Appendix F of AS 3959)
- **LPG Cylinders**
 - Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building.
 - The pressure relief valve should point away from the house.
 - No flammable material within six metres from the front of the valve.
 - Must sit on a firm, level and non-combustible base and be secured to a solid structure.

* Plant flammability, landscaping design and maintenance should be considered – refer to explanatory notes

** Fine fuel load:

- *is the combustible, dead or dry vegetation matter on the ground, near ground, or elevated. Fine fuel includes grass, leaves, bark and twigs less than six millimetres in diameter that ignite readily and are burnt rapidly when dry.*
- *Fine fuel should be maintained at less than 2t/ha (100gm/m² equates to 1t/ha).*
 - *To estimate a fuel load (in t/ha), collect the dry fine fuel from a representative one square meter and weigh (in grams using kitchen scales) and multiply the weight by 0.01.*

Figure 25: Design of an Asset Protection Zone



B.2.2 Designing an Asset Protection Zone

An APZ should not be seen as an area entirely cleared of vegetation, but as a strategically designed space that considers how existing and future mature vegetation, and combustible and non-combustible features interact with and affect the building's resilience to bushfire.

An APZ should provide the greatest level of vegetation management within at least three metres of a habitable building, to ensure adequate unobstructed defensible space for emergency services to operate. This area should contain minimal vegetation and be free of combustible materials and obstructions. Within the remainder of the APZ, planting of vegetation can increase as you move farther away from the building.

The placement of plants within an APZ is a key design technique. Separation of garden beds with areas of low fuel or non-combustible material will break up fuel continuity and reduce the likelihood of vegetation within an APZ supporting a bushfire. It is important to consider the plant density and final structure and form of plants in their mature state.

Strategic landscaping measures can be applied, such as replacing weeds with low flammability vegetation to create horizontal and vertical separations between the retained vegetation.

Mulches used within the APZ should be non-combustible. The use of stone, gravel, shells, rock and crushed mineral earth is encouraged. Very fine or light mulch (such as shredded pine bark, pine needles, or poplar woodchips) less than five millimeters in diameter should be avoided. It is recommended that wood mulch is used in garden beds or areas where the moisture level is higher by regular irrigation, and these areas are separated with non-combustible elements, such as pathways and open spaces.

Incorporation of landscaping features, such as masonry feature walls, can provide habitable buildings with barriers to wind, radiant heat and embers. These features can include noise walls or wind breaks. Use of Appendix F of AS 3959 for bushfire resistant timber selection or the use of non-combustible fencing materials such as iron, brick, limestone, metal post and wire is encouraged within an APZ

B2.3 Management of an Asset Protection Zone

Ongoing maintenance of an APZ is usually enforced through a condition of a development approval, which should refer to Table 9 APZ technical requirements within this Appendix.

In addition to regular maintenance of an APZ, further bushfire protection can be provided by:

- ensuring gutters are free from vegetation
- installing gutter guards or plugs
- regular cleaning of underfloor spaces, or enclosing them to prevent gaps
- trimming and removing dead plants or leaf litter
- pruning climbing vegetation (such as vines) on a trellis, to ensure it does not connect to a building, particularly near windows and doors
- removing vegetation in close proximity to a water tank to ensure it is not touching the sides of a tank
- following the requirements of the relevant local government firebreak notice, which may include additional provisions such as locating wood piles more than 10 metres from a building.

Preparation of a property prior to the bushfire season and/or in anticipation of a bushfire is beneficial even if your plan is to evacuate. Embers can travel up to several kilometres from a bushfire and fall into small spaces and crevices or land against the external walls of a building.

Best practice recommends objects within the APZ are moved away from the building prior to any bushfire event.

Objects may include, but are not limited to:

- door mats
- outdoor furniture
- potted plants
- shade sails or umbrellas
- plastic garbage bins
- firewood stacks
- flammable sculptures
- playground equipment and children's toys.

B2.4 Plant Flammability

There are certain plant characteristics that are known to influence flammability, such as moisture or oil content and the presence and type of bark. Plants with lower flammability properties may still burn during a bushfire event, but may be more resistant to burning and some may regenerate faster post-bushfire.

There are many terms for plant flammability that should not be confused, including:

- **Fire resistant** – plant species that survive being burnt and will regrow after a bushfire and therefore may be highly flammable and inappropriate for a garden in areas of high bushfire risk.
- **Fire-retardant** – plants that can absorb more of the heat of the approaching bushfire without burning, compared to more flammable plants.
- **Fire wise** – plants that have been identified and selected based on their low flammability properties and linked to maintenance advice and planting location within a garden.

Although not a requirement of these Guidelines, local governments may develop their own list of fire wise or fire-retardant plant species that suit the environmental characteristics of an area.

When developing a recommended plant species list, local governments should consult with ecologists, land care officers or environmental authorities to ensure the plants do not present a risk to endangered ecological communities, threatened, or endangered species or their habitat.

When selecting plants, private landholders and developers should aim for plants within the APZ that have the following characteristics:

- grow in a predicted structure, shape and height;
- are open and loose branching with leaves that are thinly spread;
- have a coarse texture and low surface-area-to-volume ratio;
- will not drop large amounts of leaves or limbs, that require regular maintenance;
- have wide, flat, and thick or succulent leaves;
- trees that have bark attached tightly to their trunk or have smooth bark;

- have low amounts of oils, waxes, and resins (which will often have a strong scent when crushed);
- do not produce or hold large amounts of fine dead material in their crowns; and/or
- will not become a weed in the area.

Appendix C

AS 3959 Clause 2.2.3.2 (e) and (f) – Low threat Vegetation and Non-Vegetated Areas

2.2.3.2 Exclusions—Low threat vegetation and non-vegetated areas

The following vegetation shall be excluded from a BAL assessment:

- (a) Vegetation of any type that is more than 100 m from the site.
- (b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified vegetation.
- (c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified vegetation.
- (d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified vegetation.
- (e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.
- (f) Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.

NOTES:

- 1 Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).
- 2 A windbreak is considered a single row of trees used as a screen or to reduce the effect of wind on the leeward side of the trees.

Appendix D

Method 2 Calculation – Plot 1



NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 20/07/2026

Assessment Date: 20/07/2026

Site Street Address: Tronox Chandala - BESS, Chandala

Assessor: Linden Wears;

Local Government Area: WA

Alpine Area: No

Equations Used

Transmissivity: Fuss and Hammins, 2002

Flame Length: RFS PBP, 2001/Vesta/Catchpole

Rate of Fire Spread: Noble et al., 1980

Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005

Peak Elevation of Receiver: Tan et al., 2005

Peak Flame Angle: Tan et al., 2005

Run Description: Plot 1

Vegetation Information

Vegetation Type: Forest

Vegetation Group: Forest and Woodland

Vegetation Slope: 2 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 25

Overall Fuel Load(t/ha): 35

Vegetation Height(m): 2

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 52.8

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg): 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 80

Program Outputs

Level of Construction: BAL 12.5

Peak Elevation of Receiver(m): 10.57

Radiant Heat(kW/m²): 9.98

Flame Angle (degrees): 73

Flame Length(m): 22.11

Maximum View Factor: 0.171

Rate Of Spread (km/h): 2.76

Inner Protection Area(m): 37

Transmissivity: 0.769

Outer Protection Area(m): 16

Fire Intensity(kW/m): 49822

Appendix E

Vehicular Access Technical Standards of the WA PBG

Private driveways

Acceptable Solution A3.1

There are no private driveway technical requirements (prescribed by these Guidelines) where the private driveway is within a lot serviced by reticulated water and is no greater than 70 metres in length between the most distant external part of the habitable building and the public road.

In circumstances where the above conditions are not met, the private driveway is to meet all of the following requirements:

- requirements in Appendix B.3 Table 10, Column 5; and
- passing bays every 200 metres with a minimum length of 20 metres and a minimum additional carriageway width of 2 metres
- (i.e. the combined carriageway width of the passing bay and constructed private driveway to be a minimum 6 metres); and
- turn-around area (Figure 30) and within 30 metres of the habitable building (Figure 38).

Explanatory note B3.8

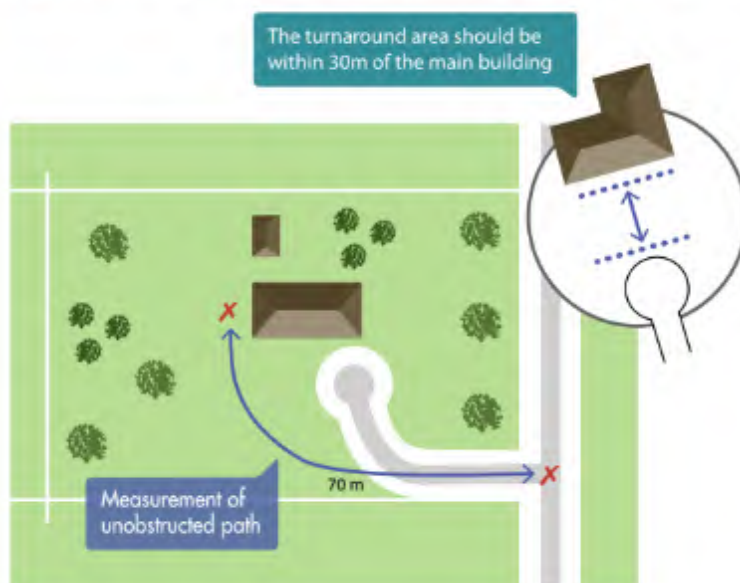
Emergency services vehicles typically operate from the street frontage in areas serviced by reticulated water and where the distance from the public road to the farthest part of the habitable building is no greater than 70 metres.

In the event the habitable building cannot be reached by hose reel from the public road, emergency services vehicles will need to gain access via the driveway to the property. Emergency services vehicles will also need to gain access to the property where access to water is provided by onsite water tanks. In these situations, the driveway and battle-axe access leg (if applicable) will need to be wide enough for access by an emergency services vehicle and a vehicle to evacuate.

It is acceptable for a private driveway to have a carriageway width of four metres with a traversable verge of one metre on either side of the carriageway.

Turn-around areas (**Figure 38**) should be available for conventional two-wheel drive vehicles and type 3.4 fire appliances and should be located within 30 metres of habitable buildings. Circular and loop driveway design may also be considered.

Figure 38: Design requirements for a private driveway where required



Private driveways

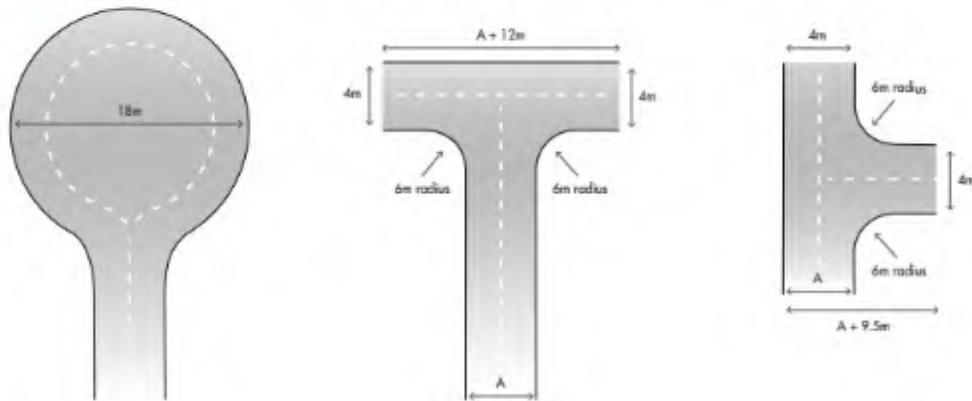
Figure 30: Design requirements for a turn-around area

Table 10: Vehicular access technical requirements

	1		2		3		4		5	
TECHNICAL REQUIREMENTS	PERIMETER ROADS		PUBLIC ROADS		EMERGENCY ACCESS WAY ³		FIRE SERVICE ACCESS ROUTE ³		BATTLE-AXE & PRIVATE DRIVEWAYS ¹	
MAP OF BUSH FIRE PRONE AREAS DESIGNATION	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1
Minimum horizontal clearance (metres)	12	8	See note 5		10	6	10	6	6	
Minimum vertical clearance (metres)	4.5									
Minimum weight capacity (tonnes)	15									
Maximum grade unsealed road ²	See note 5		See note 5		1:10 (10% or 6°)					
1:7 (14.3% or 8°)										
1:10 (10% or 6°)										
8.5										
Maximum grade sealed road ^{2,4}										
Maximum average grade sealed road										
Minimum inner radius of road curves (metres)										

Notes:

- ¹ Driveways and battle-axe legs to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision where not required to comply with the widths in this Appendix or the Guidelines.
- ² Dips must have no more than a 1 in 8 (12.5% - 7.1 degrees) entry and exit angle.
- ³ To have crossfalls between 3 per cent and 6 per cent.
- ⁴ For sealed roads only the maximum grade of no more than 1 in 5 (20 per cent) (11.3 degrees) for no more than 50 metres is permissible, except for short constrictions to 3.5 metres for no more than 30 metres in length where an obstruction cannot be reasonably avoided or removed.
- ⁵ As outlined in the Institute of [Public Works Engineering Australasia \(IPWEA\) subdivision guidelines](#), [Liveable Neighbourhoods](#), [Austroads Standards](#) Main Roads standard, supplement, policy or guideline and/or any applicable or relevant local government standard or policy.

Appendix F

Water Technical Standards of the WA PBG

Appendix B.4 – Water Supply
B4.1 Construction and Design Technical requirements
• An above-ground tank and associated stand should be constructed of non-combustible material. • Below-ground tanks should have a 200 millimetres diameter access hole to allow tankers or emergency services vehicles to refill direct from the tank, with the outlet location clearly marked on the surface. • Above and below ground tanks may need to comply with AS/NZS 3500.1:2018. • An inspection opening may double as the access hole provided that the inspection opening meets the requirements of AS/NZS 3500.1:2018. • Where an outlet for an emergency services vehicle is provided, then an unobstructed, hardened ground surface is to be supplied within four metres of any water supply.
<u>B4.1.1 Pipes and Fittings</u>
• All above-ground, exposed water supply pipes and fittings should be metal. • Fittings should be located away from the source of bushfire hazard and be in accordance with the applicable section below, unless otherwise specified by the local government.
<u>B4.1.2 Fittings for above-ground water tanks</u>
• Commercial land uses: 125mm Storz fitting; or • Strategic water tanks: 50mm or 100mm (where applicable and adapters are available) male camlock coupling with full flow valve; or • Standalone water tanks: 50mm male camlock coupling with full flow valve; or • Combined water tanks: 50mm male camlock coupling with full flow valve or a domestic fitting, being a standard household tap that enables an occupant to access the water supply with domestic hoses or buckets for extinguishing minor fires.
<u>B4.1.3 Remote outlets</u>
• In certain circumstances, it may be beneficial to have the outlet located away from the water supply. In instances in which a remote outlet is to be used, the applicant should consult the local government and DFES on their proposal.
B4.2 Use of Water Supply
• The combination of drinking water and water for firefighting purposes is not recommended, as stagnant water may alter the quality of the drinking water and the emergency services, by law, may not be able to take water from the water supply to suppress a bushfire. • Combining drinking water and water for firefighting purposes is contrary to provisions within clause 4.2.3 of AS/ NZS 3500.1:2021
B4.3 Independent Water and Power Supply
• Water tank/s are to be provided in accordance with Table 11, Water supply dedicated for bushfire firefighting purposes.
B4.5 Location of Water Tanks and Hydrants
• Surrounding vegetation should be considered when locating a water tank. • Avoid locations where the tank will be situated underneath existing vegetation or where vegetation will grow against or overhang the tank, (Figure 39). Where a tank is on the bushfire hazard side of a building, sufficient shielding for the protection of firefighters should be provided. In addition to the tank location, the fitting should be positioned and/or shielded from the bushfire hazard to allow access by emergency services.

Appendix B.4 – Water Supply

Figure 39: A good and bad example of landscaping around a water tank



Table 11: Water supply dedicated for bushfire firefighting purposes

SECTIONS FROM THE PLANNING FOR BUSHFIRE GUIDELINES					
SECTION 5 ² STRUCTURE PLANS AND SUBDIVISION APPLICATIONS		SECTION 6 ² DEVELOPMENT – RESIDENTIAL	SECTION 7 ² DEVELOPMENT – COMMERCIAL & INDUSTRIAL	SECTION 8 ² – DEVELOPMENT – VULNERABLE LAND USES	
One additional lot	10,000 litre water tank per lot	10,000 litre water tank per habitable building	For each habitable building - 10,000 litre per 1,500 m ² of floor space up to 50,000 litre. Provided in a water tank	Camping ground	At the discretion of the local government
Three to 24 lots	10,000 litre water tank per lot ¹ or 50,000 litre strategic water tank				
25 lots or more	50,000 litre per 25 lots or part thereof, provided as a strategic water tank(s) and/or 10,000 litre water tank per lot			Other vulnerable land uses	For each habitable building - 10,000 litre per 500 m ² of floor space up to 50,000 litre. Provided in a water tank

Notes:

¹ Evidence that the identified water supply amounts in either column denoted is to be provided at the relevant planning stage.

² where more than one habitable building is proposed, strategic water tanks are to be provided in accordance with Section 5 requirements and at the discretion of the Local Government.

Appendix G

Shire of Chittering Firebreak Notice



FIREBREAK & BUSHFIRE HAZARD REDUCTION NOTICE 2025/26

**FIRST AND FINAL NOTICE TO ALL OWNERS
AND OCCUPIERS OF LAND
SITUATED IN THE SHIRE OF CHITTERING**

COMPLIANCE DUE BY 16 OCTOBER 2025



SHIRE OF CHITTERING FIREBREAK & BUSHFIRE HAZARD REDUCTION NOTICE 2025/26

As a measure to assist in the control of bushfires and pursuant to Section 33 of the Bush Fires Act 1954, all owners and occupiers of land within the Shire of Chittering are required before the 16 October in each year or within 14 days of becoming the owner or occupier of land (if after that date) to clear firebreaks and/or take measures in accordance with this notice and to maintain those firebreaks and measures in accordance with this notice up to and including the 31st day of May in the following year.

ADDITIONAL WORKS

In addition to the requirements of this notice, regardless of land size and location, you may be required to carry out further bushfire preparedness works to reduce fire hazards considered necessary by an Authorised Officer. Any further requirements will be specified in a work order forwarded to the address of the owner(s) and/or occupier.

FAILURE TO COMPLY

Where the owner and/or occupier of the land fails or neglects to comply with the requisitions of this Notice within the specified time, the Shire of Chittering may, by its Authorised Officers and such servants, workmen and contractors enter upon the land and carry out the requisitions of this Notice which have not been complied with. The costs and expenses incurred may be recovered from the owner and/or occupier of the land by the Shire of Chittering. The Shire's Fire Control Officers are authorised under the Bush Fires Act 1954 (WA) and have powers to enter land pursuant to Section 14 of the Act. **Failure or neglect to comply with this notice is an offence and may result in a penalty of up to \$5000.**

1. ALL PROPERTIES OF ANY SIZE

- Maintain grassed areas to a height of no more than 50 millimetres by slashing / mowing or grazing by livestock, as far as reasonably practicable.
- You must create an Asset Protection Zone (APZ) by installing and maintaining a 20 metre fuel reduced zone around all buildings or an asset of value. "Fuel reduced" is a reduction in the vegetation so as to reduce the impact of a bushfire on that asset.
- Trees over 5 metres in height within the APZ, must be under pruned to a clearance of 2 metres from the ground and should not overhang the asset..
- Trees and shrubs within 2 metres of the asset, must not exceed 2 metres in height.
- Ensure the roofs, gutters and walls of all buildings on the land are free of flammable matter.
- Properties that have haystacks or fuel storage areas must ensure there is a bare earth firebreak, not less than 5 metres wide, with a 4 metre vertical clearance completely surrounding haystacks and/or fuel storage areas. This requirement is in addition to firebreak requirements inside property boundaries.

Firebreaks may be constructed by one or more of the following methods: ploughing, cultivating, scarifying, raking, burning, chemical spraying or other approved method.

2. PROPERTIES 5000M² (½ HECTARE) AND LARGER

- Install and/or upgrade firebreaks.
- Clear a bare earth firebreak by removing all flammable material. The firebreak should be 3 metres wide, with a 4 metre vertical clearance (trafficable) along the inside of all the property boundaries.
- Properties with an area of 120 hectares or more must have a firebreak in such a position which divides the land into areas not exceeding 120 hectares. Firebreaks should be located as close as possible to all the property boundaries.

Firebreaks should be located as close as possible to the property boundaries. If for any reason it is not possible to comply with any of the requirements of the Firebreak and Bushfire Hazard Reduction Notice, you will need to apply for a 'variation'. All variation requests must be received and approved by the Shire of Chittering before 1 October in any given year. Applications must be in writing and provide details or a map of the proposed alternative measures. If approved, the firebreak variation will form an individual notice for the property and remain in place until revoked.

**Follow the QR code
to learn more about
Property Preparation**



3. BUSHFIRE AND EMERGENCY MANAGEMENT PLANS

All properties with a Bushfire Management Plan, Emergency Management Plan, or an approved Bushfire Attack Level assessment (BAL), approved as part of a Local Planning Scheme, subdivision approval, development approval or a building permit for an individual, or group of properties, shall comply with the plan in its entirety.

All bushfire management plan requirements are in addition to the requirements of this notice. Compliance is required throughout the year, each and every year.

4. PLANTATIONS

In accordance with the requirements of a Fire Management Plan approved in writing by the Shire; Install and maintain external perimeter and internal firebreaks that form compartment cells, and engage in hazard reduction measures that reduce fuel loads so as to protect neighbouring communities and essential infrastructure, Or;

Meet requirements and specifications set out within the *Department of Fire & Emergency Services Guidelines for Plantation Fire Protection 2011* publication.

If, for any reason, it is considered impractical to carry out the requirements as outlined above, plantation owners and managers may apply in writing to the Shire for permission to implement an alternative plan. A Fire Management Plan may be required to be developed and submitted.

Follow the QR Code
for resources on:

- Asset Protection Zones
- Firebreaks
- Contractor List



BEFORE



AFTER



ASSET PROTECTION ZONE



BURNING TIMES, BANS & OTHER RELATED INFORMATION

BURNING TIMES					
RESTRICTED		PROHIBITED		RESTRICTED	
Permits required for all burning activities		Burning strictly prohibited		Permits required for all burning activities	
From	Until	From	Until	From	Until
1 Oct	30 Nov	1 Dec	31 Mar	1 Apr	31 May
DATES MAY BE CHANGED ACCORDING TO SEASONAL CONDITIONS					
If it is deemed that your property is not compliant, a Fire Control Officer may refuse to issue you a Permit to Burn. Permits are not valid on any Sunday or Public Holiday, or when the Fire Danger Rating is High, Extreme or Catastrophic. For all hazard reduction burns please advise DFES Communications Centre on 9395 9209					
FIREBREAK & BUSHFIRE HAZARD REDUCTION DEADLINES					
INSTALL BEFORE 16 OCTOBER			MAINTAIN UNTIL 31 MAY		

Follow the QR Code for more information on Burning Times on our website



Burning of Shire Verges

The burning of roadside verges is prohibited without written approval from the Shire of Chittering. Approvals are only available between June and September each year where no alternative method exists to reduce the hazard.

Follow the QR Code for a checklist on year-round property preparation



Fire Danger Rating (All Year Round)

No fire of any kind may be lit on a day when the forecast Fire Danger Rating for the district is High, Extreme or Catastrophic. The Chittering fire weather district is 'Swan Inland North'. The Fire Danger Rating is supplied daily by the Bureau of Meteorology (BoM). This information is also available from the Shire, DFES and Emergency WA websites, BoM Weather Service on Ph: 1300 183 341, The Bureau of Meteorology website (www.bom.gov.au) and is displayed on the information boards located at: Great Northern Highway, Muchea; John Glenn Park, Muchea; Muchea East Road, Lower Chittering; Great Northern Highway, Bindoon; Corner of Crest Hill and Mooliabeenee Roads, Bindoon.

Follow the QR Code to sign up for Fire Ban Notifications



Burning of Garden Refuse, Camping & Cooking Fires

Pursuant to Section 24G(2) and Section 25(1a) of the Bush Fires Act 1954 and applicable to all persons, the burning of garden refuse and lighting of camping or cooking fires is prohibited within the Shire of Chittering during the Prohibited Burning Time.

Furthermore, pursuant to Section 24G(2) of the Bush Fires Act 1954 and applicable to all persons, the burning of garden refuse is prohibited within the Shire of Chittering during the Restricted Burning Times unless a valid permit to burn has been obtained from a Fire Control Officer.

Other than during the RESTRICTED or PROHIBITED Burning Times, garden refuse may be burnt at any time, but care must be exercised. For all burning, please advise **DFES Communications Centre on 9395 9209**. Please note that excessive smoke from the burning of garden refuse may cause nuisance and annoyance to neighbours, other residents and danger to motorists.

It is an offence under the Health Local Law 2017 to burn damp, wet or green material causing excessive nuisance smoke. Please consider this and plan to minimise smoke. Please note it is also an offence to burn hazardous/toxic materials (e.g. tyres), household or commercial waste.

Wood Fired Ovens & Solid Fuel Barbecues in Restricted Burning Times

Wood fired pizza ovens and solid fuel barbecues in the open air do not require a Permit to Burn however, they may NOT be used in the restricted burning times unless the following conditions are met:

1. The Bureau of Meteorology Fire Danger Rating forecast is not High, Extreme or Catastrophic - at any time over the whole day.
2. The fire is only burning between 6pm and midnight, and completely extinguished when finished.
3. There is a minimum 5 metre firebreak, clear of flammable material surrounding the pizza oven or BBQ. (10 metre diameter).
4. At least 1 adult person is in attendance at all times.
5. The wood fired pizza oven or solid fuel BBQ is fitted with a spark arrester to the chimney and the door to the oven mouth (if specified and fitted by the manufacturer) is used to prevent the escape of embers and burning material.
6. There is a means of extinguishing a fire available at all times (e.g. garden hose, knapsack spray or fire unit).

Control of Operations Likely To Cause a Fire

Hot works including the operation of welding equipment and angle grinders, are activities likely to create a fire danger when used in the open air.

A person shall provide at least one fire extinguisher at the place where welding or cutting operations are carried out and surround this place with a firebreak which is at least 5 metres wide.

A ban on hot works, harvesting and movement of machinery and vehicles is likely to be imposed on days of adverse fire weather conditions. For updates on these bans please ring the information line on **9576 4666** (recorded message) or register with the SMS warning system with the Shire to receive a text when a ban is implemented.

Harvesting Operations (including Stubble Processing)

The Shire will permit harvesting operations, including stubble processing, during the Restricted and Prohibited Burning Times on the following conditions:

- That a fully operational firefighting unit (inclusive of associated pump, hose system and a minimum of 600 litres of water is present) at all times.
- Harvesting operations, and stubble processing, are not permitted when the Shire has declared a Harvest and Vehicle Movement Ban, including Hot Works Activities.

In addition to the conditions above, Harvesting Operations (including stubble processing) on Sundays and Public Holidays will be permitted on the following conditions,

- The local Fire Control Officer (FCO) is notified.
- Two able-bodied adult persons are present during the harvesting operations, only one of whom may be harvesting.

Hot Works, Harvest and Vehicle Movement Bans will be in place for Christmas Day, Boxing Day and New Year’s Day.



LOCAL BUSH FIRE CONTROL OFFICERS

Fire Control Officers are not obliged to issue permits and may advise on alternatives to burning. Please remember Fire Control Officers are volunteers and their availability to issue permits may vary, assist them by planning in advance. Permits cannot be issued over the phone and should a Fire Control Officer refuse to issue a permit, it is a breach of the Act to request a permit from another Fire Control Officer.

MUCHEA		
James Marotta	0432 234 741	
Tammy Foster	0422 150 479	
LOWER CHITTERING		
Daniel Bates	0422 143 311	
Graham Furlong	0476 881 796	
UPPER CHITTERING		
Aaron Cover	0410 594 221	
Will Lee	0415 154 715	
BINDOON		
Paul Groves	0400 172 560	
Dennis Badcock	0428 947 853	
WANNAMAL		
Kim Haeusler	0428 559 043	
Clayton Smith	0427 090 548	
SHIRE FIRE CONTROL OFFICERS		
Rangers & Bush Fire Risk Officer	9576 4600	
COMMUNITY EMERGENCY SERVICES MANAGER		
CHIEF BUSH FIRE CONTROL OFFICER	9576 4600	

Applications for Permits during the Restricted Burning Time should be applied for through the Shire website:

www.chittering.wa.gov.au/permitstoburn

FOR ALL FIRES, CALL 000

**HOT WORKS, HARVEST AND
MOVEMENT OF MACHINERY BANS
INFORMATION LINE 9576 4666**

**FOR FURTHER INFORMATION ON THIS NOTICE
CONTACT THE SHIRE OF CHITTERING**

Phone: 9576 4600

Email: chatter@chittering.wa.gov.au

Facebook: www.facebook.com/groups/chitteringbushfireready

Web Site: www.chittering.wa.gov.au

By order of the Shire of Chittering
Melinda Prinsloo
Chief Executive Officer



Appendix H

Bushfire Emergency Management Plan Requirements

Develop an emergency management plan for the BESS facility, or make amendment to the existing site EMP if relevant, detailing the procedures for preparing and responding to off-site bushfire, and on-site fire emergencies impacting the BESS including:

- BESS facility details including:
 - Facility description, including infrastructure details, operations, number of personnel, and operating hours.
 - Up-to-date contact details for facility personnel, and any relevant off-site personnel that could provide technical support during an emergency including contact information for 24/7/365 specialist technical support for the renewable energy infrastructure.
 - Site plans that depict the entire site layout, including:
 - Buildings, substations and renewable energy infrastructure,
 - Internal driveways and surrounding public roads
 - Fire protection systems and equipment, including firewater tanks
 - Grid connections, drains and isolation valves,
 - Dangerous goods storage areas
 - Neighbouring landowners, and any relevant infrastructure (e.g. dwellings), and
 - North direction and scale
 - The following BESS details and plans
 - Schematics, technical data and overall configuration of the BESS units.
 - Details of the hazards for the BESS, including thermal events/runaway, electrical safety hazards, explosion hazards, dangerous goods hazards (including off-gassing), and the effects of fire on the BESS (e.g. explosion, release of toxic gases).
 - Details of all protection and safety systems, including a description and the activation process/automatic trigger for these systems.
 - Specifications for safe operating conditions for temperature.
 - Details of the elements monitored/controlled by the Battery Management System (BMS), including internal temperature, state of charge, voltage, etc. and the locations this information is available.
 - The shutdown and/or isolation procedures if the BESS are involved in fire or emergency incident, and appropriate personnel contact details for verifying that the battery enclosure/container system has been isolated/shutdown and de-energised during emergencies.
 - Details of any emergency resources, including fire detection and suppression systems and equipment; emergency eye-wash and shower facilities; spill containment systems and equipment; emergency warning systems; communication systems; personal protective equipment; first aid.
 - A manifest of dangerous goods (if required under the applicable Dangerous Goods legislation and codes, and relevant Australian Standards), including Safety Data Sheets (SDS).
- The identified risks and hazards associated with the renewable energy infrastructure, including but not limited to:

- Electrical faults and renewable energy infrastructure fire
- Bushfire
- Detail preparedness and pre-emptive actions to address the above hazards, including the following for bushfire:
 - Ongoing compliance with the approved BMP, including ensuring regular vegetation management requirements are achieved, vehicular access routes and firewater systems are maintained and available, and conducting regular bushfire housekeeping inspections.
 - Ensuring ongoing maintenance of all relevant infrastructure.
 - Ensuring ongoing maintenance of all fire and communication systems.
 - Determining forecast Fire Danger Rating (FDR), Total Fire Bans (TFB) and Harvest Vehicle Movement Bans (HVMB), during bushfire season
 - A Harvest Vehicle Movement Ban is a notice issued by the local council or shire (Shire of Chittering) during days of elevated fire weather danger. Specific instructions must be adhered to when a HVMB is issued by the Shire (<https://www.chittering.wa.gov.au/services/bushfire-emergency-services/fire-bans-fire-danger-rating.aspx>)
 - A Total Fire Ban is a notice issued by the Department of Fire and Emergency Services during days of elevated fire weather danger. Specific instructions must be adhered to when a TFB is issued by DFES ([Total fire ban - Department of Fire and Emergency Services](#))
 - Modifying Site Activities (based on Forecast FDR and TFB/HVMB)
 - Monitoring DFES Bushfire Emergency Warnings for bushfire (and/or other signs of bushfire activity) within 50 km of the facility, during bushfire season, and understanding the decision-making triggers.
- Detail emergency response procedures to address the nominated hazards, including for:
 - Bushfire and
 - Onsite fire in renewable energy infrastructure

Bushfire preparedness and pre-emptive activities

Year-round (with focus on the month prior to bushfire season)

- Ensure ongoing compliance with endorsed BMP including:
 - Vegetation management must be conducted as per the BMP including maintenance of NVZs and APZs.
 - Gutters, roof surfaces and valleys, kerbs, traps, sumps, bunds, drains, rooves or any other accumulation points for leaf litter, dry vegetation, or any other combustible materials must be cleared, and the debris removed from site.
 - Extraneous or unnecessary materials (fuel loads) must be removed from site (e.g. dilapidated/stored vehicles, plant or equipment; excess fuel/chemicals; any combustible waste materials).
- Bushfire preparedness housekeeping inspections:
 - Vegetation management as per BMP
 - Ensure all vehicle site access points, including emergency access points, are clear and accessible.
 - Ensure that all fire protection systems and equipment is unobstructed, in service and performing optimally.

- Fire detection, alarm and suppression systems, and any other communication and emergency equipment must be maintained in accordance with relevant codes and standards, and be in effective working order at all times
 - Any defects, faults or matters affecting the performance of systems must be identified through routine testing and servicing, with any maintenance activities and rectifications to be closed-out prior to bushfire season.
- Ensure Emergency Information Book and signage is up to date with the latest information, especially key contact names and phone numbers, as detailed in Section 5.9.
- Ensure local fire brigade is engaged with on an ongoing basis, to ensure they are familiar with the site layout, specific hazards and fire detection and suppression systems as detailed in Section 5.10.
- If possible, ensure the facility has registered with the Shire of Chittering for SMS notifications for Harvest Vehicle Movement Bans (HVMB).

During the bushfire season

Monitor Forecast Fire Danger Rating (FDR) and Total Fire Ban Days (TFB)

- A nominated person/role is to be responsible for identifying, responding to and communicating the Fire Danger Rating, ideally four days ahead:
 - <http://www.bom.gov.au/wa/forecasts/fire-danger-ratings.shtml> [4 day FDR forecast]
 - or
 - <https://www.emergency.wa.gov.au/index.html#firedangerratings> [current/next day FDR]
 - <https://www.emergency.wa.gov.au/#totalfirebans> [Total Fire Ban]
- This information must be communicated to everyone likely to be present on-site, and relevant off-site personnel.
- Undertaken any modification of site activities based on forecast FDR or TFB (see below).

Modifying Site Activities (based on Forecast FDR and TFB)

- **Moderate FDR or No Rating**
 - No specific daily monitoring or actions unless conditions change.
- **High FDR**
 - Alert all site personnel and visitors of bushfire risk
 - No specific daily monitoring but remain vigilant to potential bushfires through visual checks, occasional check of online resources for emergency warnings and bushfires in the local area.
 - Conduct daily checks of vegetation, rubbish and extraneous storage accumulation, vehicular access routes and fire systems to ensure they are fit-for-purpose in a bushfire emergency.
- **Extreme FDR**
 - Alert all site personnel and visitors of elevated bushfire risk and communicate modified activities including requirement to be prepared for site shutdown and offsite evacuation, if required.
 - Conduct regularly visual checks throughout the day

- Regularly check online resources for emergency warnings and bushfires in the local area.
- Consider minimisation of site personnel and visitation requiring travel to and from the facility, as well as non-essential activities and high-risk maintenance activities.
- Include bushfire ignition hazards in any Job Hazard Analysis or similar activity-based risk management process for site activities.
- Conduct daily checks of vegetation, rubbish and extraneous storage accumulation, vehicular access routes and fire systems to ensure they are fit-for-purpose in a bushfire emergency.
- ***Catastrophic FDR and TFB declared days***
 - Alert all site personnel and visitors of elevated bushfire risk and communicate modified activities including requirement to be prepared for rapid site shutdown and offsite evacuation, if required
 - Conduct hourly visual checks throughout the day
 - Conduct hourly check online resources for emergency warnings and bushfires in the local area.
 - Postpone non-essential activities or high-risk maintenance activities at the facility.
 - Minimise site personnel and visitation to only essential personnel.
 - Include bushfire ignition hazards in any Job Hazard Analysis or similar activity-based risk management process for site activities.
 - Conduct daily checks of vegetation, rubbish and extraneous storage accumulation, vehicular access routes and fire systems to ensure they are fit-for-purpose in a bushfire emergency.
 - Comply with all Total Fire Ban requirements including:
 - No fire or flames allowed in the open air
 - No open fires for the purpose of cooking or camping are not allowed
 - No 'hot work' such as metal work, grinding, welding, soldering, gas cutting or similar is allowed unless a formal exemption has been obtained
 - No use of chainsaws, plant or grass trimmers or lawn mowers in bushland areas
 - No other activities that may start a fire
 - Ensuring equipment or machinery is mechanically sound
 - Ensuring all reasonable precautions are taken to prevent a bushfire igniting, including postponing any activity that could result in a bushfire ignition.

Bushfire Monitoring, Triggers and Decision-Making

Bushfire Monitoring

Bushfire monitoring involves the identification of the DFES Bushfire Emergency Warnings (ADVICE, WATCH & ACT AND EMERGENCY) and/or bushfire activity within 50km of the facility, through the use of the Emergency WA website app (<https://www.emergency.wa.gov.au/>), or ABC local radio.

- ***If ADVICE warning or bushfire is within 25 km – 50 km of the site***
 - If possible, liaise with the DFES if fire travelling toward the site.

- If located at the BESS, consider reducing numbers of onsite personnel to essential staff only, and relocate all other staff and visitors to nominated offsite safer location (e.g. Ellenbrook or Gingin depending on direction of fire travel).
- Make preparations to shutdown facility and conduct offsite evacuation procedures, depending on bushfire location and direction of spread, including:
 - Ready the BESS facility to reduce to a low energy state (including discharging the BESS) if it is required
 - Ensure all other infrastructure and plant are properly secured.
 - Ensure all vehicular access routes are unlocked and available for use.
 - Ensure all fire and communications systems are ready for use.
- Continue monitoring and re-evaluating situation depending on bushfire behaviour, and liaising with DFES as required.
- ***If WATCH & ACT warning or bushfire is within 10 km – 25 km of the site***
 - If possible, liaise with the DFES if fire travelling toward the site.
 - Prepare or commence shutdown facility, depending on bushfire location and direction of spread, including:
 - Reducing the facility to a low energy state (including discharging the BESS), in consultation with authorised DFES personnel (where possible)
 - Ensure all other infrastructure and plant are properly secured.
 - Ensure all vehicular access routes are unlocked and available for use.
 - Ensure all fire and communications systems are ready for use.
 - Prepare or commence offsite evacuation procedures depending on bushfire location and direction of spread, including:
 - Early reduction of numbers of onsite personnel to essential staff only, and relocate all other staff and visitors to nominated offsite safer location.
 - If possible, ensure relocation of all personnel to the offsite safer location ahead of any bushfire impact on road network (including smoke impact).
 - Continue monitoring and re-evaluating situation depending on bushfire behaviour, and liaising with DFES as required.
- ***If EMERGENCY warning or if bushfire is <10km or impact is imminent:***
 - If possible, liaise with the DFES.
 - If safe to do so, commence or conduct facility shutdown depending on bushfire location and direction of spread, including:
 - Reducing the facility to a low energy state (including discharging the BESS), in consultation with authorised DFES personnel (where possible)
 - Ensure all other infrastructure and plant are properly secured.
 - Ensure all vehicular access routes are unlocked and available for use.
 - Ensure all fire and communications systems are ready for use.
 - Urgently undertake offsite evacuation procedures (if safe to do so) depending on bushfire location and direction of spread, including:
 - Relocate all site personnel and visitors to nominated offsite safer location ahead of any bushfire impact on road network.
 - If there is insufficient time to safely travel offsite without being impacted by bushfire, conduct onsite shelter in place in building furthest from approaching fire, or as directed by Tronox personnel.

- Continue monitoring and re-evaluating situation depending on bushfire behaviour, and liaising with DFES as required.

Offsite Evacuation and Onsite Shelter-in-Place Procedures

Ahead of deciding to evacuate offsite or remain onsite to shelter-in-place (which is the last resort response if unsafe to evacuate offsite), the following should be conducted:

- Assess the bushfire situation:
 - Review available information to determine bushfire location, direction and speed of travel
 - Determine if there are any DFES Bushfire Warnings issued
 - Contact and liaise with DFES for further information and guidance
 - Make a decision whether it is safe to evacuate to nominated offsite safer location (e.g. Ellenbrook or Gingin depending on direction of fire travel), or whether it is safer to shelter onsite (which should be a last resort action only).
 - Advise DFES of the decision, if possible.

Offsite Evacuation (and Facility Shutdown)

- Assemble all site personnel and visitors
 - Brief them of the bushfire situation and the plan to shutdown facility (if sufficient time) and evacuate to nominated offsite safer location.
 - Ensure sufficient transport is available for all personnel to travel to nominated offsite safer location with sufficient fuel to travel 100 km, water, fire extinguishers (if possible)
- Conduct facility shutdown actions (if sufficient time) including
 - Ensure all vehicular access routes are unlocked and available for use.
 - Ensure all fire systems are ready for use.
 - Ensure all other infrastructure and plant are properly secured.
- Brief evacuees on offsite evacuation particulars including:
 - Confirm the offsite safer location (e.g. Ellenbrook or Gingin depending on direction of fire travel)
 - The evacuation route to travel to the off-site safer location
 - The need to travel in convoys in case of vehicle failure
 - Ensure final evacuating personnel are in no less than 2 vehicles.
- Monitor the leaving of site and arrival at nominated offsite safer location, and if anyone is missing, notify DFES immediately.

Onsite Shelter-in-place (and Facility Shutdown) – Last Resort Action Only

- Assemble all site personnel and visitors at the identified onsite building furthest from approach bushfire
 - Brief them of the bushfire situation and the plan to shutdown facility (if sufficient time) but remain onsite to shelter in place.
- Prepare identified onsite building for shelter (NOTE: The existing onsite buildings are not bushfire refuge buildings and should only be used as a last resort if offsite evacuation is not possible)

- Check the perimeter of building and put away all external combustible items and any loose items that could be projectiles
- Close all doors and windows
- Ensure all firefighting, emergency communication equipment and first aid supplies are available and ready for use, including hose reel coverage around the building from the mobile fire trailer.
- Ensure all internal access routes within the building are open to enable people move to the available spaces
- If installed, ensure any evaporative air-conditioning (HVAC) can be easily shutdown ahead of the fire impact. If possible, keep the water running and turn off the fan, otherwise shutdown completely.
- Begin storing water for drinking (in containers) and review food stores
- Consider collecting any blankets and fire extinguishers from other buildings
- Soak towels and rugs in water and lay them along the inside of external doorways or block any other gaps for embers or smoke
- Conduct facility shutdown actions (if sufficient time and safe to do so) including
 - Reducing the facility to a low energy state (including discharging the BESS), in consultation with authorised DFES personnel (where possible)
 - Ensure all vehicular access routes are unlocked and available for use.
 - Ensure all fire systems are ready for use.
 - Ensure all other infrastructure and plant are properly secured.
- As bushfire impacts the facility:
 - All remaining occupants are to be within the identified onsite building
 - Immediately before the fire arrives, wet down building exterior, decks and landscaping close to the building. Turn off evaporative air-conditioning if not already done.
 - Ensure occupants to get down low to limit exposure to smoke and drink plenty of water to avoid becoming dehydrated.
 - Regularly inspect the condition of the building including:
 - Regular inspection of the inside of the building, including the roof space for sparks and embers, and extinguish where possible and safe to do so.
 - If safe to do so, organise for regular patrols of the outside of the building to check for any signs of bushfire ignition and extinguish where possible and safe to do so. Those conducting the patrols are to wear appropriate PPE.
- Stay inside while the fire front is passing and don't leave until advised by that the fire is no longer a threat or offsite evacuation can be conducted (or decided by Chief Fire Warden).
- If the building catches fire and/or conditions inside become unbearable:
 - Leave through the door furthest from the approaching fire
 - Relocate all occupants to the following locations furthest from the fire or previously burned land.
- Once the fire has passed, and approval is provided to leave the building:
 - Go outside and extinguish any fires on the building or in adjacent landscaping.
 - Regularly inspect the inside and outside of the building for several hours.
 - Do not approach the renewable energy infrastructure until advised by DFES.

Onsite Renewable Energy Infrastructure Fire Response

The emergency response to any onsite fire in renewable energy infrastructure (especially BESS), is to include the following:

- Immediately notify the following of onsite fire, including location:
 - DFES to enable rapid turnout to site
 - Relevant staff
 - Relevant neighbouring landowners
- Strongly consider full emergency shutdown of the BESS and transformers unless there are mitigating circumstances. This should be conducted in consultation with authorised DFES personnel (where possible).
- If fire is within the BESS unit/s, ensure staff relocate as far as possible from the fire, and no less than 50 m away.
- If possible, ensure relevant vehicular access routes are unlocked and available, to enable attending firefighters to gain access to the location of the fire.
- Ensure all fire and communications systems are ready for use.
- If safe to do so, conduct first attack response on any spot fires with mobile fire appliances, until DFES arrival.
- Ensure attending firefighters have access to any relevant specialist technical personnel (onsite or offsite), to assist by providing technical advice.

Emergency Management Plan Review, Training and Exercises

The emergency management plan is to be reviewed regularly as follows:

- At least annually to ensure currency and effectiveness
- Following any changes to the risk on-site pertaining to site infrastructure and operations
- After any activation of the plan or incident involving notification to the emergency services.
- After emergency exercises.

In addition to the review of the emergency management plan, it is critical to regularly train relevant staff and conduct exercises to ensure everyone is fully conversant with the requirements of the plan and able to respond as required during all emergencies. It also presents an opportunity to test the effectiveness of the plan and refine as required.

- Training should be conducted annually prior to bushfire season, as a minimum, and also at the commencement of employment.
- Exercises should be conducted annually prior to bushfire season, as a minimum, but ideally on a regular basis.