Wollemi Eco-Logical

Environmental Project Management | Bushfire Assessment | Vegetation Management

Bushfire Management Plan

Gin Gin Battery Energy Storage System (BESS)

Lot 22 Monduran Dam Road, Gin Gin

Lot 22 on SP109996

Bundaberg Regional Council, Qld

Prepared by:

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Project Reference: **23563**

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It should be noted that the recommendations within this BMP have been formulated based on site conditions at the time of writing and utilising current best-practise hazard and impact assessment methodologies, and have been developed to reduce the potential severity of impacts on the proposed development in the event of a bushfire emergency rather than prevent impacts altogether. No guarantee is provided or assumed that the area will not be affected by bushfire at some time.

1.0 INTRODUCTION

Wollemi Eco-Logical has been commissioned to undertake a Site Specific Bushfire Hazard Assessment and to prepare a Bushfire Management Plan for a proposed development on the subject site (**Figure 1**).

This report aims to assess the Bushfire Hazard and risk to the proposed development with regard to: the Queensland State Government Single State Planning Policy - Part E (SPP 2017); & the Bushfire Resilient Communities Technical Reference Guide (QFES, 2019); the *Australian Standard – Construction in Bushfire Prone Areas (AS3959:2018);* and the *Bundaberg Regional Council Planning Scheme 2015 – Bushfire Hazard Overlay Code (Part 8.2.5)*, where applicable. These detail State and Council requirements and guidelines, with regard to Bushfire Hazard Assessment and Risk Mitigation, for the purpose of informing suitability of development applications.

The potential Bushfire Hazard acting on the proposed development, is informed by vegetation composition and extent, slope and industry standard fuel load classifications, and assessment methodologies. Bushfire Risk Mitigation Measures are subsequently detailed in order to demonstrate compliance with Councils Planning Scheme Performance Outcomes, and to inform the safety of people and property in the event of a bushfire emergency.

1.1 Suitably Qualified Person

This BMP has been prepared by Scott Edwards, a suitably qualified and experienced Bushfire Consultant with over 23 years of relevant experience in Environmental Management & Bushfire Planning and Design experience specific to South East Queensland. Scott is the Managing Director of Wollemi Eco-Logical Pty Ltd, and has Degree qualifications in Environmental Science supported by diverse experience in Ecological Assessment, Land Management and Environmental Resource Management consistent with the requirements for suitably qualified persons as per the SPP *State Planning Policy (SPP) – Natural Hazards, Risk & Resilience – Bushfire* (DSDMIP 2019) and the supporting document *Bushfire Resilient Communities Technical Reference Guide* (QFES, 2019).

1.2 Subject Site

Address: Lot 22 Monduran Dam Road, Gin Gin - BESS.

Titles: Lot 22 on SP109996

Local Government: Bundaberg Regional Council

Zoning: Rural

Topography: The development site has a low gradient to the southern extent adjacent with the Bruce Highway, and rising upslope to the north through northeast.

Current Use: Established rural land uses & Transmission Lines.

Figure 1: Subject Site (Development Footprint)

1.3 Proposed Development

It is understood a new Battery Energy Storage System (BESS), and associated easement is proposed on the subject site. The proposed development layout is represented in **Figure 2**.

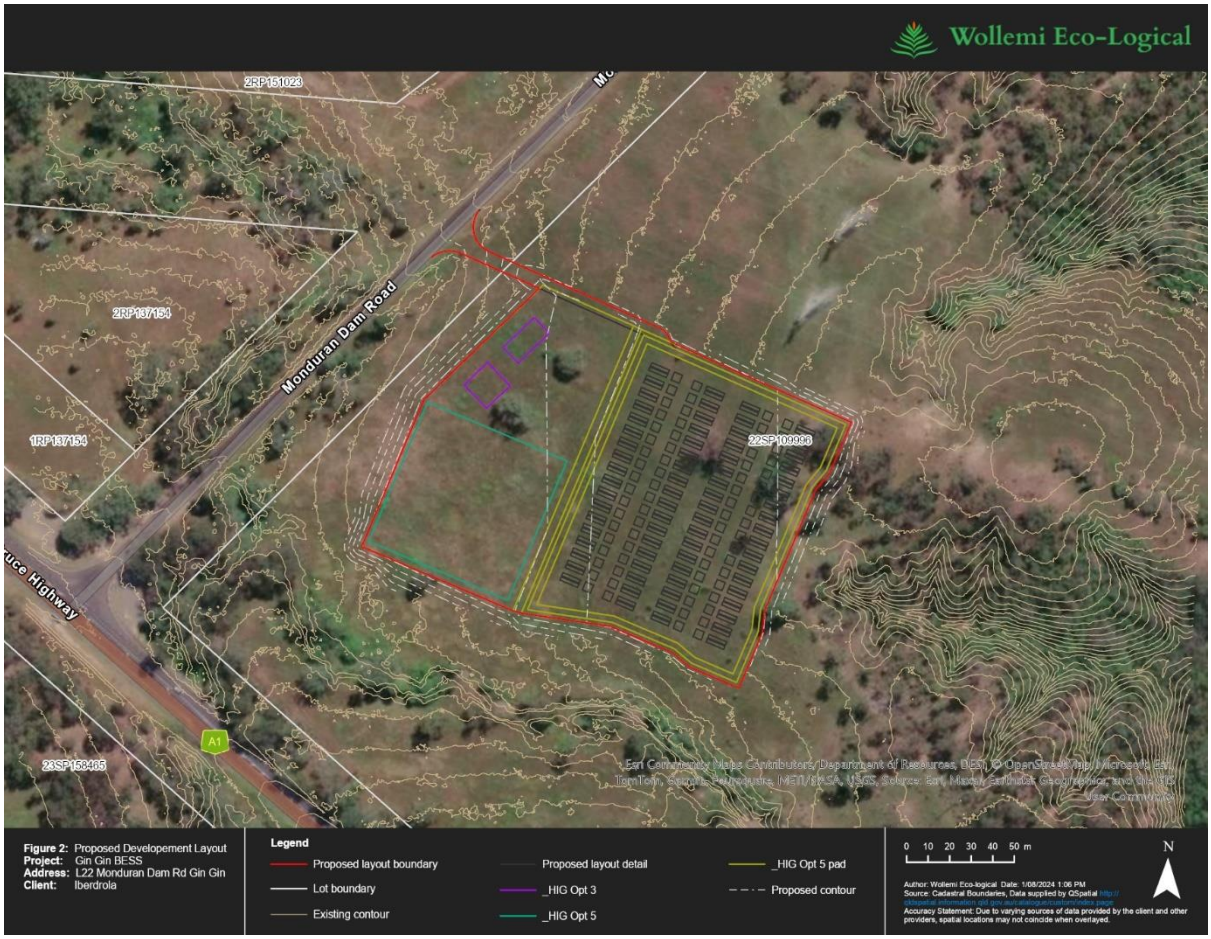

Figure 2: Proposed Development Layout

2.0 Bushfire Hazard Assessment

The prevalence of Bushfire in the landscape is dependent on vegetation type and fuel load available to sustain a bushfire. Bushfire intensity and rate of spread are influenced by fuel load, (including type and extent of vegetation), topography and to a lesser extent aspect. Land uses surrounding potentially hazardous vegetation, and consequently the connectivity of vegetation communities, all influence the potential for a bushfire to develop and be sustained.

2.1 Current Bushfire Hazard Mapping

A review of State Bushfire Hazard Overlay Mapping, as maintained by the Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP), revealed the site is within a potential bushfire hazard area (**Figure 3**).

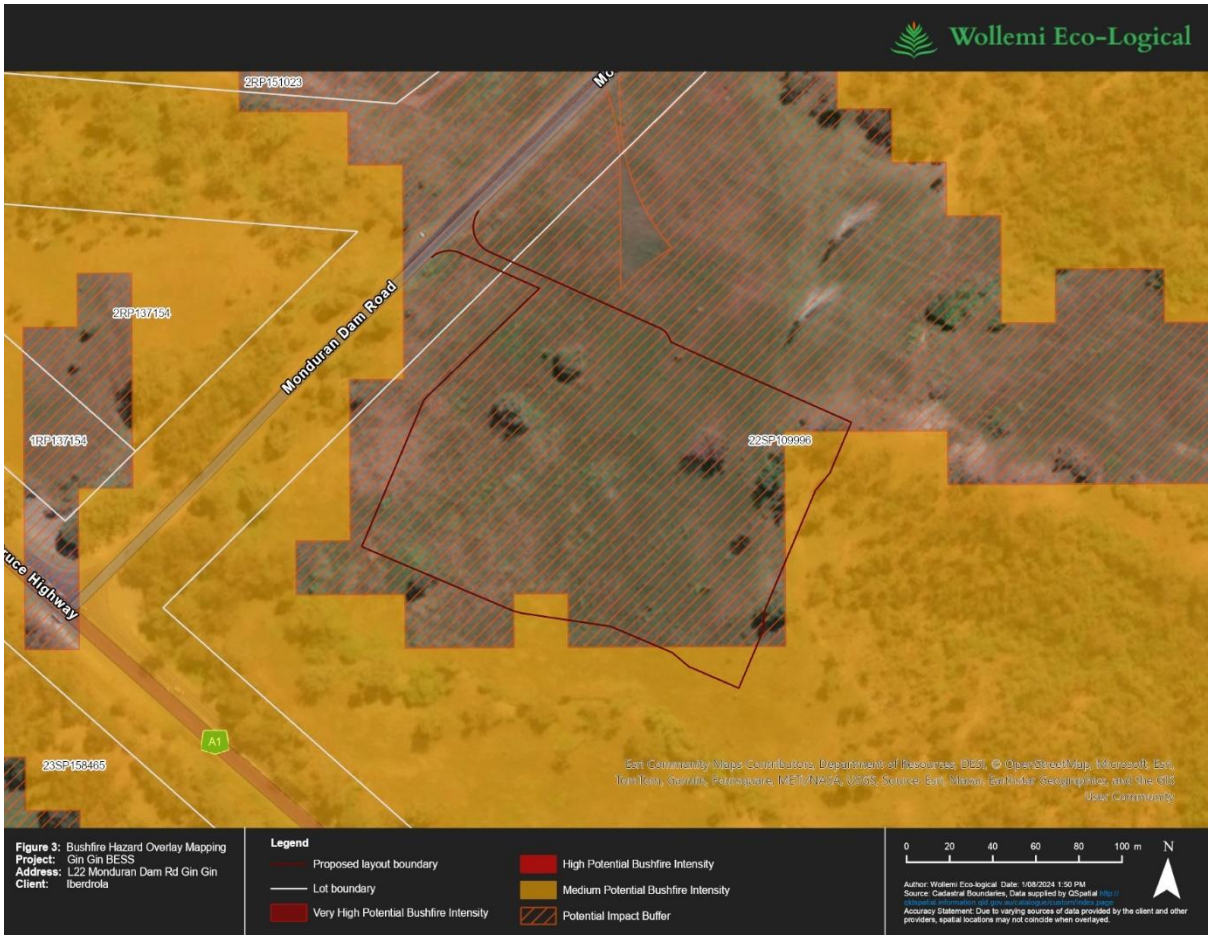

Figure 3: State Bushfire Hazard Overlay Mapping

To verify the Bushfire Hazard mapping, a Site-Specific Bushfire Hazard Assessment is triggered, and is addressed below.

2.2 On-Site Hazard Assessment

This Site-Specific Bushfire Hazard Assessment references: Vegetation Hazard Classification & Potential Fire-line Intensity for Queensland sourced from *A new methodology for state-wide mapping of bushfire prone areas in Queensland.* CSIRO, Australia. (2014)[1]; *the Bushfire Resilient Communities Technical Reference Guide (QFES, 2019)*[2]; Bushfire Attack Level (BAL), Building setback requirements and Construction Standards as per the Australian Standard *AS 3959- 2018 - Construction of buildings in bushfire prone areas*[3]; and Bushfire Risk Mitigation

[1] Leonard, J., Newnham, G., Opie, K., and Blanchi, R. (2014) A new methodology for state-wide mapping of bushfire prone areas in Queensland, CSIRO, Australia. This methodology updates the calculations apparent in the Australian Standard AS3959: 2018 based on current fire weather modelling and includes 43 detailed Vegetation Hazard Classes and associated fuel load potential.
[2] The Bushfire Resilient Communities Technical Reference Guide (QFES, 2019), supports the SPP 2017 by providing technical guidance for bushfire hazard assessment and bushfire management Planning.
[3] The Australian Standard AS3959: 2018 defines Fire Danger Index as the chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long- and short-term drought effects.

Measures in compliance with current industry best-practice assessment methodologies. Vegetation composition and extent, slope and industry standard Fuel Load calculations will be used to determine the Potential Bushfire Hazard acting on the proposed development. Additionally, this BMP will address the requirements of the proposed development against *Bundaberg Regional Council Planning Scheme 2015 – Bushfire Hazard Overlay Code (Part 8.2.5)* with regard to the proposed development.

Two key features of the landscape strongly contribute towards the behaviour of bushfires:

1. Vegetation community structure/composition
   The structure and composition of vegetation communities determine the rate at which dry fuel accumulates. Some vegetation communities protect fuel from drying out in all but extreme bushfire seasons, making the vegetation susceptible to very destructive bushfires, whilst other vegetation communities may expose fuels to drying and therefore be frequently available for burning.
2. Slope
   As a general rule, bushfire intensity and the rate of spread of bushfires rises in proportion to slope, with bushfires burning faster uphill and slower downhill. Studies have shown that the speed and intensity of fires moving up slopes generally doubles every 10 degrees of slope. Steeper slopes also increase the difficulty of constructing ring roads and firebreaks and limit the access for emergency crews.

Several investigative tools were utilised to determine the site specific bushfire hazard risk including:

- A review of local aerial photography;
- A review of site and local topography;
- Review of site development plan;
- A review of DERM Regional Ecosystem Mapping; and
- An inspection of the site.

The risk assessment comprised an analysis of the site and the surrounding lands (i.e. within 100m) to determine characteristic bushfire risk based on Vegetation Hazard Classifications for vegetation within 100m of the site.

2.2.1 Site Inspection & Findings

A site inspection was completed on the 9th February 2024 to verify the bushfire hazard mapping over the site and surrounds. All vegetated areas of the site and within 100m of the proposed development site were assessed during the site investigations.

A summary of the findings of the site inspection is provided:

1. Site access is via Monduran Dam road, a formed bitumen public roadway to the immediate west of the proposed BESS on Lot 22.
2. The site is currently used for grazing land management and associated rural land uses, and both have established transmission line easements.
3. The development site has a low gradient to the southern extent adjacent with the Bruce Highway, and rising upslope to the north through northeast.
4. Regulated Vegetation as maintained by Qld Department of Natural Resources & Mines (DNRM), maps the site, north of the existing powerline easement, as containing Regional Ecosystem (RE) 12.11.6, and described as '*Corymbia citriodora subsp. variegata, Eucalyptus crebra woodland on metamorphics +/- interbedded volcanics*' (Refer **Figure 4**). Site assessment found vegetation generally consistent with the above described structure and composition. However, it is noted that this vegetation is located >100m from the proposed development footprint.
5. Adjacent vegetation to the east of the proposed BESS contains regrowth woodland communities with composition and structure similar to the above described RE, all-be-it disturbed by grazing land management and fragmentation.
6. Adjacent vegetation to the west of the proposed BESS, to the existing substation, contains scattered trees associated with managed grassland.
7. Adjacent vegetation to the south of the proposed BESS consists of scattered trees, and fragmented regrowth woodland associated with grazing land, and roadside vegetation associated with the Bruce Highway. It is noted that vegetation to the south of the Bruce Highway is located >100m from the proposed development footprint

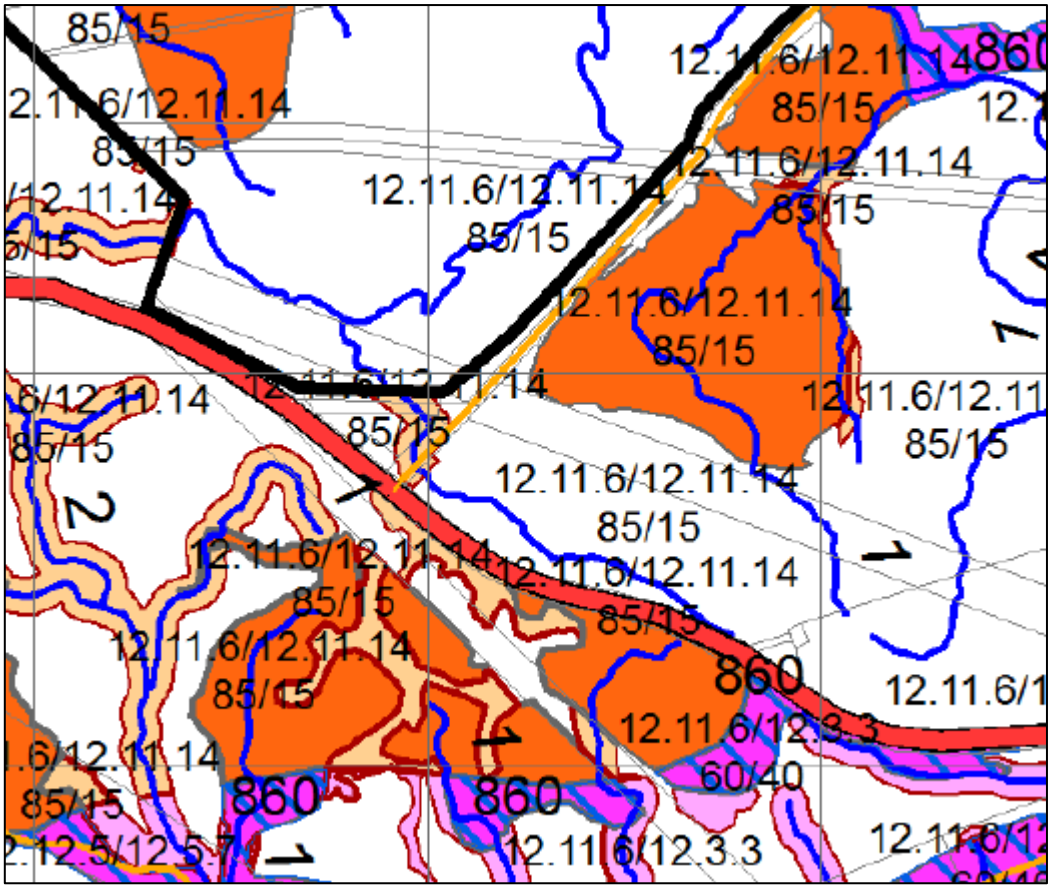

Figure 4: Regional Ecosystem Mapping

2.2.2 Vegetation Classification

The structure and composition of vegetation communities determine the rate at which dry fuel accumulates. Some vegetation communities protect fuel from drying out in all but extreme bushfire seasons, making the vegetation susceptible to very destructive bushfires, whilst other vegetation communities may expose fuels to drying and therefore be frequently available for burning.

Vegetation communities surrounding the proposed development were referenced against mapped RE's in the general vicinity, and Vegetation Hazard Classifications and Potential Fire-line Intensity calculations as detailed in Leonard et.al. (2014), and reflected in the BRCTRG 2019. Potential Fuel Load calculations were undertaken on site to validate vegetation classifications and subsequently potential bushfire hazard to the proposed development.

Vegetation ecotones result in varying fuel load availability. Subsequently, vegetation communities have been referenced against predominant vegetation with highest fuel loads with regard to potential sources of Bushfire Hazard posed to the proposed development. Observed vegetation communities are described in **Table 1**. It is understood the majority of site vegetation associate with the BESS, and future proposed powerline easements, will be

removed for the purpose of the development, and is consequently no longer considered as part of this assessment.

N.B. regrowth vegetation has been assessed as having reached full maturity to account for potential bushfire hazard where this vegetation is left unmanaged. It is also noted that requirements for future easements are addressed **Section 3.1.2** of this report.

Table 1 Vegetation Hazard Classifications

Direction of Bushfire Hazard	Vegetation Description (Sub-Unit – if relevant)	DNRM Regional Ecosystem	Vegetation Hazard Class (CSIRO, 2014)	Potential Fuel Load (t/ha)	Potential Fire-line Intensity (kw/m)	Potential Bushfire Hazard
Subject site	Vegetation to be removed for the proposed development	NA	Class 40.4 Continuous low grass or tree cover	5t/ha	<4000	Low
North of proposed BESS (within 100m)	Managed grassland associated with established powerline easement	NA	Class 40.4 Continuous low grass or tree cover	5t/ha	<4000	Low
South of proposed BESS (within 100m)	Scattered trees associated with manage grassland	NA	Class 40.4 Continuous low grass or tree cover	5t/ha	<4000	Low
East through northeast of proposed BESS (within 100m)	Regrowth woodland communities	NA	Class 10.2 Spotted gum dominated woodlands	18t/ha	<10,570	Medium
West of proposed BESS (within 100m)	Scattered trees associated with manage grassland	NA	Class 40.4 Continuous low grass or tree cover	5t/ha	<4000	Low

2.2.3 Potentially Hazardous Vegetation

Based on the above assessment, vegetation posing a Medium Potential Bushfire Hazard to the proposed development is present to the east through northeast of the subject site. These vegetation communities have the potential to accumulate moderate potential fuel loads and subsequently present a potential Bushfire Hazard to the proposed development. This classification is represented in **Figure 5**.

It is noted that vegetation to the north through west to south has been classified as posing a Low Potential Bushfire hazard). It is understood that site and adjacent vegetation is understood to be subject to ongoing maintenance to maintain observed low potential hazard.

Figure 5: Vegetation Hazard Classification

The following section details Bushfire Risk Mitigation measures to be implemented on the site to address the Bushfire Hazard and compliance requirements acting on the proposed development.

3.0 Bushfire Risk Mitigation Measures

The following section describes Bushfire Risk Mitigation measures, recommended to be utilised at the subject site to reduce the risk of Bushfire impacting on people and property.

The scope of proposed Bushfire Risk Mitigation Measures have been drawn from the following sources:

- the *Queensland State Government Single State Planning Policy* - Part E (SPP 2017);
- *the Bushfire Resilient Communities Technical Reference Guide (QFES,2019);*
- the *Bundaberg Regional Council Planning Scheme 2015 – Bushfire Hazard Overlay Code (Part 8.2.5)*; and
- the Australian Standard (AS 3959:2018) - *Construction of buildings in bushfire prone areas*.

The intent of the above legislation is to protect people and premises in the event of a bushfire emergency, through achieving acceptable Performance Outcomes for the development given the identified bushfire hazard. Performance Outcomes are generally achieved by appropriate separation of a development from bushfire hazard, appropriate access for fire-fighting vehicles, and appropriate construction standards of buildings. Additional factors are detailed where considered appropriate.

3.1 Asset Protection Zones

Asset protection zones (APZ's) provide a defensive tool to assist in the reduction of potential bushfire impact to people and property situated in bushfire prone areas. APZ's are the most strategically valuable defence against radiant heat and flame, and to a lesser extent, embers.

Whilst APZ's should prevent buildings from being subjected to direct contact from flames, and reduced levels of radiant heat in the event of a bushfire, building construction standards will also be key to ensuring the performance of buildings subjected to ember attack. Bushfire Attack Level for the proposed development is determined in **Section 3.2**.

Based on the above Bushfire Hazard Assessment, APZ's may be required adjacent the proposed development. These are detailed in the following section.

3.1.1 Performance Outcomes

APZ and setback distances have not been prescribed in the SPP 2017. The SPP refers to '*provision of appropriate defendable space between structures and medium or above Bushfire Hazard*'. The *Bushfire Resilient Communities Technical Reference Guide* (QFES, 2019), refers to determining APZ's based on achieving a 29kW/m^2 fireline intensity. This is achieved by using either the *Method 2 Bushfire Attack Level Assessment as per the AS3959:2018 for Construction of Buildings in Bushfire Prone Areas* or *Bushfire Asset Protection Zone Width*

Calculator (QFES, 2019), which uses the calculations underpinned by the AS3959:2018 calculation.

The *Bundaberg Regional Council Planning Scheme 2015 – Bushfire Hazard Overlay Code (Part 8.2.5* does not prescribe APZ requirements for proposed developments.

Consequently, and as per the *Bushfire Resilient Communities Technical Reference Guide* (QFES, 2019), the required setbacks (APZ's) detailed in the AS3959:2018, with regard the minimum distance required to achieve a maximum radiant heat flux exposures for the proposed development, are considered appropriate to inform the identified bushfire hazard to the proposed development and consequently meeting the intent of Councils Planning Scheme and State Methodologies. Requirements specific to electricity infrastructure is detailed in the following section.

3.1.2 Management of Electricity Infrastructure

QFES Policy Approaches, as detailed in the BRCTRG, refers to *Community Infrastructure for Essential services* (Policy 10). Although the term 'Community infrastructure' is not defined in the SPP, it generally refers to infrastructure for essential services, and being able to operate during and after a bushfire event. In this context, the proposed electricity infrastructure is considered '*Community Infrastructure*' for the purpose of informing the mitigation of bushfire hazard to an acceptable or tolerable risk.

It is important to appropriately manage the impacts of bushfire on above ground electricity infrastructure, during and after a bushfire. As detailed above, electricity infrastructure it is recommended to maintain APZ's consistent with achieving a maximum radiant heat flux exposure of ≤10kW/m² for the electricity infrastructure (BESS and transmission lines), and a maximum radiant heat flux exposure of 29kW/m^2 for a solar array where proposed. These APZ requirements are detailed in the following section.

3.2 Bushfire Hazard & Asset Protection Zone Modelling

The Bushfire Hazard & Asset Protection Zone (APZ) calculations in this BMP have been undertaken in accordance with the SPP and BRCTRG 2019, and the AS3959:2018. As per the BRCTRG 2019, acceptable radiant heat flux exposures for above ground electricity infrastructure (refer **Section 3.1.2**), are informed by APZ's achieving a maximum radiant heat flux exposure of ≤10kW/m² for the electricity infrastructure (i.e. BESS, Substations and transmission lines), and a maximum radiant heat flux exposure of 29kW/m^2 for a solar array where proposed. This is considered an acceptable or tolerable level of bushfire risk given the nature of the proposed development and associated infrastructure.

It is noted that the proposed development does not constitute Class 1-3 structures, consequently Building Construction Standards, as detailed in the Australian Standard – Construction of Buildings in Bushfire-prone Areas (AS3959:2018), are not deemed applicable.

These APZ's are calculated using the methodology described in Section 5.5 of the BRCTRG 2019, being:

- *the QFES -Bushfire asset protection zone width calculator; **or***
- *Method 2 of AS 3959–2018, subject to adoption of:*
  - *Site specific values of FFDI (5% AEP fire weather event) determined in accordance with procedure 5.4.2, Step 1 in BRCTRG 2019.*
  - *Site specific vegetation hazard classes and their associated potential fuel loads determined in accordance with procedure 5.4.2 Step 2 of BRCTRG 2019, together with modified surface fuel loads (w) for certain vegetation hazard classes.*

In accordance with the above, and as detailed in this BMP, the APZ's have been calculated using the Method 2 as per AS3959:2018, and with regard to the potential Bushfire Hazard adjacent the proposed development location as detailed above in **Table 2**.

This assessment has been based on the following assumptions:

- A Fire Danger Index (FDI) of 52 (QFES, 2024);
- The Proposed development footprint, i.e. built infrastructure, will be located as represented in the proposed Site Plan detailed in **Figure 2**.
- Classification of relevant, assessable vegetation communities have been detailed in **Table 1**.

Additional parameters used to determine applicable APZ's are detailed in the following Table.

Table 2: BAL Requirements - Potentially Hazardous Vegetation: East through Northeast of Proposed BESS

Calculated February 14, 2024, 1:04 pm (MDc v.4.9)

Gin Gin – BESS – Site A - East of BESS

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	52	Rate of spread	1.13 km/h
Vegetation classification	Woodland	Flame length	9.539999999999999 m
Understorey fuel load	17 t/ha	Flame angle	54 °, 65 °, 73 °, 78 °, 80 ° & 85 °
Total fuel load	18 t/ha	Elevation of receiver	3.72 m, 4.13 m, 4.28 m, 4.26 m, 4.21 m & 3.47 m
Vegetation height	n/a	Fire intensity	10,570 kW/m
Effective slope	1 °	Transmissivity	0.882, 0.868, 0.847, 0.824, 0.8110000000000001 & 0.742
Site slope	1 °	Viewfactor	0.5914, 0.4379, 0.2939, 0.1987, 0.1614 & 0.0442
Flame width	100 m	Minimum distance to < 40 kW/m²	7.9 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	10.7 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	15.9 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	23.2 m
		Minimum distance to < 10 kW/m²	28 m

In accordance with AS3959:2018 and the BRCTRG 2019 the required setbacks (APZ's) achieving a maximum radiant heat flux exposure of ≤10kW/m² for the electricity infrastructure (BESS, Substations and transmission lines), and a maximum radiant heat flux exposure of 29kW/m² for a solar array, where proposed, has been determined. Based on this assessment, managed setbacks of ≥28m is required to vegetation to the east through

northeast of the proposed BESS. The proposed transmission lines are to the west of the BESS location and APZ's, where applicable, are considered to be readily able to be achieved within the easements as represented in **Figure 2**.

It is noted that adjacent vegetation to the north, west and south of the proposed BESS has been classified as low threat vegetation, and consequently no additional APZ's are applicable. However, due to the uncertainty of fuel load accumulation on adjacent sites, it is also recommended that a nominal ≥10m to the north, west and south of the proposed BESS be maintained, by way of managed grassland.

Required APZ's adjacent the proposed BESS are represented in **Figure 6**.

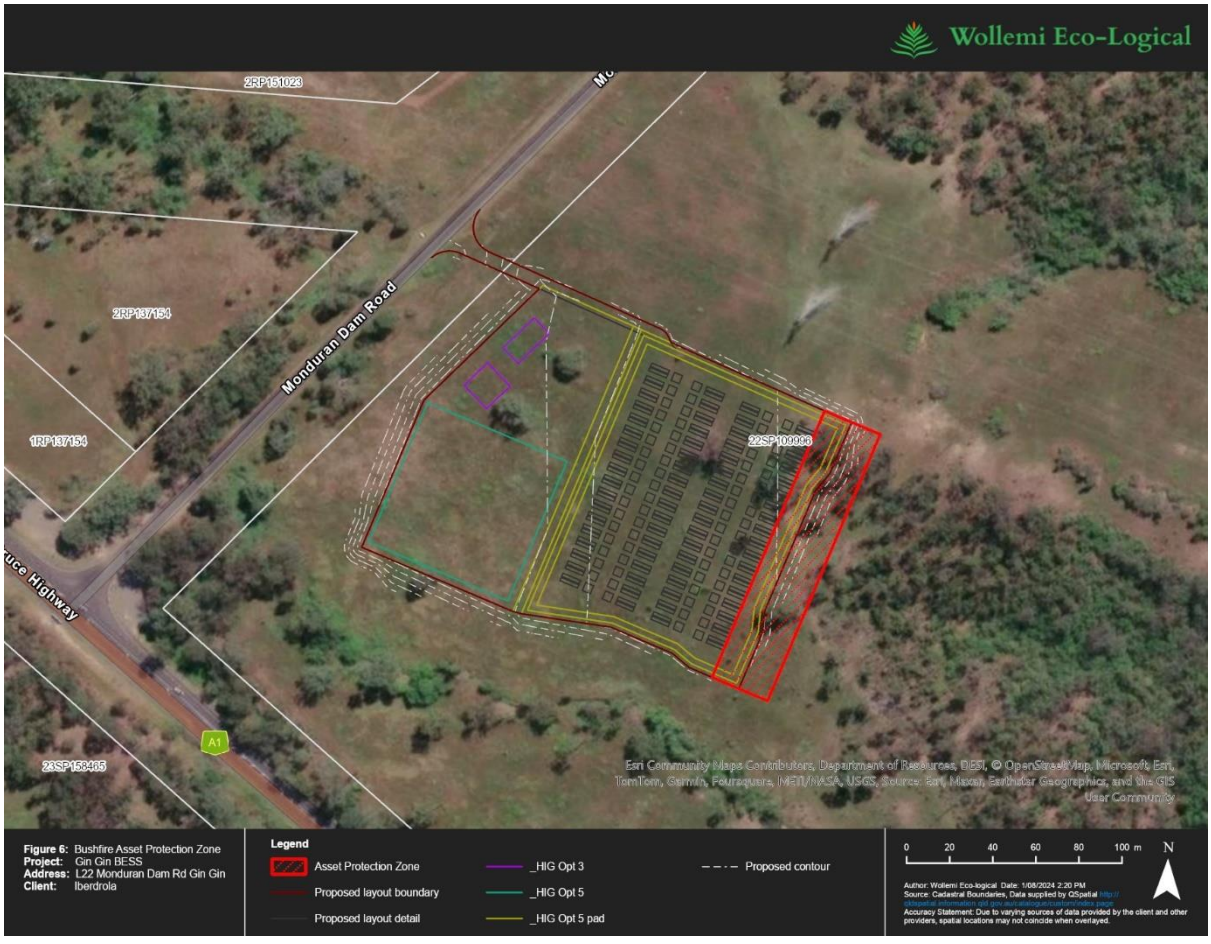

Figure 6: BESS APZ Requirements

3.3 Landscaping and Vegetation Management

The landscaping and ongoing management of vegetation in areas susceptible to Bushfire Hazard is an important tool to mitigate bushfire risk. Previously detailed APZ's should prevent buildings from being subjected to direct contact from flames, and reduced levels of radiant heat in the event of a bushfire.

Landscaping and vegetation retention within the APZ should consider the following guidelines:

- Immediately adjacent proposed structure should either be fully cleared and regularly maintained (i.e. lawn) or retain trees as clumps or islands and provide a tree canopy cover of less than 15% and tree canopies should be located greater than 2 metres from any part of structures. Any trees should have lower limbs removed up to a height of 2 metres above the ground.
- Any landscaping performed on site shall maintain the APZ effectively free of available fuel. Landscaping plants may be used in this area so long as they are selected for their low combustibility, by virtue of high moisture content, low volatile oil content, high leaf mineral levels, large fleshy leaves, and absence of shedding bark. They should be placed so as to not provide either vertical or horizontal connectedness of plant material, and avoid overhanging rooflines or contact with flammable parts of structures. Any planted trees should be of species which grow to over 2m, to maintain separation between lower canopy and the ground.
- Turf is to be maintained regularly to reduce the potential for long grass to fuel an advancing fire toward buildings.

3.4 Emergency Access & Egress

New developments in bushfire prone areas should be serviced by safe access/exit points for both residents and emergency services personnel in the event of an emergency. Development should avoid entrapment potential, provide safe and effective access for emergency services vehicles and safe evacuation routes for occupants.

The BRC Bushfire Hazard Overlay Code (PO6) prescribes '*Where development involves provision of a new public or private road, the layout, design and construction of the road:- (a) allows easy and safe movement away from any encroaching fire; (b) allows easy and safe access for fire fighting and other emergency vehicles; and (c) provides for alternative safe access and evacuation routes should access in one direction be blocked in the event of a fire*'.

It is noted that the area immediately adjacent the west of the proposed BESS contains a formed bitumen public roadway, Monduran Dam Road. It is understood site access to the proposed development is to be via this road, with a formed all-weather access to be constructed to service the site.

Given the nature of the proposed development, and the achievement of managed APZ's as recommended in Section 3.2 of this report, proposed site access and egress is considered appropriate to service the site during and after a bushfire. It is considered that the proposed development will readily be able to achieve the above access arrangements appropriate to enable both safe evacuation and direct access for emergency service vehicles in the event of a bushfire emergency consistent with the requirements and intent of the Bushfire overlay code requirements.

Ongoing workforce on site is understood to be limited to a maintenance and/or period workforce. In the event an emergency Warning is issued for the area is recommended to

evacuate all site personnel from site. In the event personnel are required on site, it is recommended this be undertaken in direct consultation with Queensland Fire & Emergency Services (QFES).

It is noted that the proposed development is considered to have a limited exposure to site personnel in the both the construction and operational phases.

3.5 Water Availability for Fire-Fighting Purposes

The BRC Bushfire Hazard Overlay Code (PO9) prescribes '*Development provides an adequate water supply for fire fighting purposes which is reliable, safely located and freely accessible water requirements for fire-fighting purposes*'.

Example solutions to achieve the PO include*: AO9.1 Premises are connected to a reticulated water supply with a minimum pressure and flow of 10 litres a second at 200kPA at all times. OR Where there is no reticulated water supply:- (a) the premises has a minimum water supply capacity of 5,000L dedicated for fire fighting purposes; and (b) the water supply dedicated for fire fighting purposes is sourced from:- (i) a separate tank; or (ii) a reserve section in the bottom part of the main water supply tank; or (iii) a swimming pool; or (iv) a dam. AO9.2 The water supply outlet for fire fighting purposes is:- (a) located remote from any potential fire hazards such as venting gas bottles; (b) provided with an outlet pipe 50mm in diameter and fitted with a 50mm male camlock (standard rural fire brigade fitting); and (c) provided with an appropriate area stabilised for all-weather use by fire vehicles and which is located within 6m of the outlet or, where applicable, a swimming pool or dam.*

The proposed development is understood to not be serviced by a reticulated water supply. Given the nature of the project i.e. battery storage and associated electricity infrastructure, fighting structural fires on site with water is not appropriate and creates a potential increase in associated hazard. Consequently, a dedicated water for fire-fighting is not considered a requirement for the proposed development. The above described APZ requirements are considered appropriate to separate the proposed development from direct impacts of heat and flame from bushfires.

However, where required by Council, fire-fighting water supply are to be in accordance with Qld Urban Utilities Standards, and/or the QFES guideline 'Fire Hydrant & Vehicle Access Guidelines for Residential, Commercial & Industrial Lots (2015)'. Where required, the proposed development is recommended to be serviced by tank water including the following:

- Metal or concrete tank with a minimum capacity of 10,000 Litres;
- All fire-fighting water storage tanks, are fitted with the standard rural fire brigade fittings' being '50mm outlet fitted with 50mm ball valve and 50mm female camlock (standard rural fire brigade fittings);

- *Water supply provided for fire fighting purposes is safely located and accessible for fire-fighting purposes at all times*' being '*at least 9m from any potential fire hazards such as venting gas bottles and combustible structures*';
- Have *a safe assessable hard stand area capable of accommodating a fire fighting vehicle, not more than 6m from the water supply outlet*';
- Above ground plumbing to be of metal construction;
- Hydrants to be positioned to enable emergency services safe and effective access, identified with marker posts or blue cats eye markers on the road, to facilitate visibility at all hours.

Subsequently, with above recommendations being met, the proposed development will be considered to be in compliance with Councils code requirements.

3.6 Potentially Hazardous Materials

BRC Bushfire Hazard Overlay Code (PO5) prescribes '*Public safety and the environment are not adversely affected by the detrimental impacts of bushfire on hazardous materials manufactured or stored in bulk'.*

It is understood the proposed development BESS will not involve any of the chemicals listed in *Schedule 15 of the Work Health and Safety Regulation 2011.* Notwithstanding, Part 7.1(4)(a) of the Work Health and Safety Regulation 2011, prescribes that *hazardous chemicals do not apply to batteries when incorporated in plant*. Therefore, on the confirmation from the proponent that the proposed BESS will not involve any other listed chemicals and that the Work Health and Safety Regulation does not consider chemicals in batteries as 'Hazardous', the proposed development is not considered to involve hazardous materials manufactured or stored in Bulk.

In addition, where apparent substation facilities are required to be bunded with sufficient capacity to contain the volume of transformer oil in the event of a major leak and maintain bunds to ensure that they remain clear and that leaks do not present a fire hazard. It is also noted that the above detailed APZ's are considered sufficient to appropriately separate the proposed development footprint from potentially hazardous vegetation. This is considered to be in accordance with the intent of PO5 of the Bundaberg Regional Councils Bushfire Hazard Overlay Code.

4.0 Recommendations and Conclusions

This report details the assessment of Bushfire Hazard and risk mitigation measures acting on the proposed development, with consideration to the requirements of: the *Queensland State Government Single State Planning Policy - Part E* (SPP 2017); *the Bushfire Resilient Communities Technical Reference Guide (QFES,2019);* the Australian Standard (AS3959:2018) - *Construction of buildings in bushfire prone areas;* and the *Bundaberg Regional Council Planning Scheme 2015 – Bushfire Hazard Overlay Code (Part 8.2.5).*

This assessment has confirmed vegetation posing a Medium Potential Bushfire Hazard to the proposed development is present to the east through northeast of the subject site. These vegetation communities have the potential to accumulate moderate potential fuel loads and subsequently present a potential Bushfire Hazard to the proposed development. It is noted that vegetation to the north through west and to the south within 100m has been classified as low threat vegetation. It is noted that site vegetation is understood to be substantially removed for the purpose of the proposed development and will subsequently be classified as low threat vegetation.

The following Bushfire Risk Mitigation Measures, as detailed above, are considered appropriate to substantially mitigate the Bushfire Hazard acting on the proposed development:

- Asset Protection Zone (APZ) widths have been determined for areas of the proposed development (refer Section 3.1). In accordance with AS3959:2018 and the BRCTRG 2019 the required setbacks (APZ's) achieving a maximum radiant heat flux exposure of ≤10kW/m² for the electricity infrastructure (BESS, Substations and transmission lines), and a maximum radiant heat flux exposure of 29kW/m^2 for a solar array, where proposed, has been determined. Based on this assessment, managed setback of ≥28m is required to vegetation to the east through northeast of the proposed BESS.

  It is noted that adjacent vegetation to the north, west and south of the proposed BESS has been classified as low threat vegetation, and consequently no additional APZ's are applicable. However, due to the uncertainty of fuel load accumulation on adjacent sites, it is also recommended that a nominal ≥10m to the north, west and south of the proposed BESS be maintained, by way of managed grassland.

- BAL determination and Construction Standard requirements have been considered for the proposed development (refer Section 3.2). The proposed development does not constitute Class 1-3 structures, consequently Building Construction Standards, as detailed in the Australian Standard – Construction of Buildings in Bushfire-prone Areas (AS 3959, 2018), are not deemed applicable.
- Vegetation management within the APZ has been detailed to ensure low fuel availability and reduced connectivity to buildings (refer Section 3.3).

- Vehicular Access and Egress of the proposed development has been considered (refer Section 3.4). It is noted that the area immediately adjacent the west of the proposed BESS contains a formed bitumen public roadway, Monduran Dam Road. It is understood site access to the proposed development is to be via this road, with a formed all-weather access to be constructed to service the site. It is considered that the proposed development will readily be able to achieve the above access arrangements appropriate to enable both safe evacuation and direct access for emergency service vehicles in the event of a bushfire emergency consistent with the requirements and intent of the Bushfire overlay code requirements.
- Water Availability for Fire-fighting Purposes as per Councils Planning Scheme has been considered (refer Section 3.5). Given the nature of the project i.e. battery storage and associated infrastructure, fighting structural fires on site with water is not appropriate and creates a potential increase in associated hazard. Consequently, a dedicated water for fire-fighting is not considered a requirement for the proposed development.

  However, where required by Council, fire-fighting water supply are to be in accordance with Qld Urban Utilities Standards, and/or the QFES guideline 'Fire Hydrant & Vehicle Access Guidelines for Residential, Commercial & Industrial Lots (2015)'. Recommendations have been made for the maintenance of and accessibility to a water supply for bushfire fighting where required by Council.
- Consideration of Potential Hazardous Materials has been undertaken with regard to the proposed development (refer Section 3.6) It is understood the proposed development BESS will not involve any of the chemicals listed in *Schedule 15 of the Work Health and Safety Regulation 2011*. The Work Health and Safety Regulation 2011, prescribes that *hazardous chemicals do not apply to batteries when incorporated in plant*. Therefore, on the confirmation from the proponent that the proposed BESS will not involve any other listed chemicals and that the Work Health and Safety Regulation does not consider chemicals in batteries as 'Hazardous', the proposed development is not considered to involve hazardous materials manufactured or stored in Bulk. In addition, where apparent substation facilities are required to be bunded with sufficient capacity to contain the volume of transformer oil in the event of a major leak and maintain bunds to ensure that they remain clear and that leaks do not present a fire hazard. It is also noted that the above detailed APZ's are considered sufficient to appropriately separate the proposed development footprint from potentially hazardous vegetation. This is considered to be in accordance with the intent of PO5 of the Bundaberg Regional Councils Bushfire Hazard Overlay Code.

This assessment has been undertaken based on vegetative condition and bushfire hazards identified on and adjacent the subject site in February 2024.

It should be noted that the recommendations within this BMP have been formulated based on site conditions at the time of writing and utilising current best-practise hazard and impact assessment methodologies, and have been developed to reduce the potential severity of

impacts on the proposed development in the event of a bushfire emergency rather than prevent impacts altogether. No guarantee is provided or assumed that the area will not be affected by bushfire at some time.

Site occupants should seek advice from the local fire authority every 5 years (as a minimum) to ensure the subject recommendations remain appropriate as site conditions and hazard assessment methodologies may change over time.

Bushfires are an intrinsic part of Australia's environment, are often unpredictable, and have potentially extremely serious consequences. All Queenslanders should be familiar with the official Bushfire Warnings system and have a completed Bushfire Survival Plan. Print ready guides for preparing a Bushfire Survival Plan and to assist in the interpretation of the official Bushfire Warnings system are available for download from the Rural Fire Service Queensland website:

https://ruralfire.qld.gov.au/bushfires/
https://www.ruralfire.qld.gov.au/BushFire_Safety/Pages/Create-your-bushfire-survival-plan.aspx

There are three formal Bushfire Warning levels:

Advice

Monitor conditions and review your bushfire survival plan.

Watch and act

Conditions are changing. Start taking action and follow your bushfire survival plan.

Emergency Warnings

You are in danger. Act on your bushfire survival plan now.