

Cleanaway Operations Pty Ltd

Bromelton Energy and Resource Centre

Bushfire Hazard Assessment

Reference: BERC-ARU-BNE-ENBF-RPT-0001

Rev C | 19 December 2025

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 293683-10

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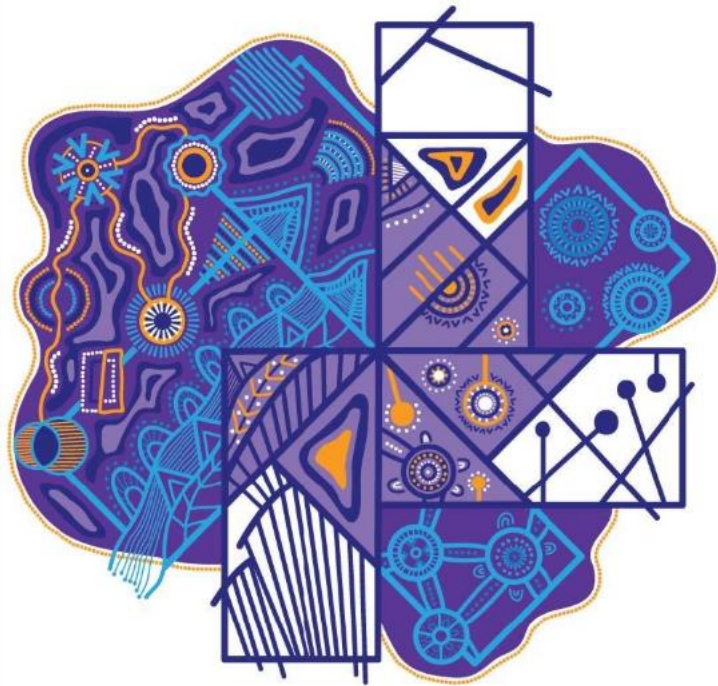
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Acknowledgement of Country



The artwork is 'Shift to shape an even better world' by Gilimbaa Artist Tarni O'Shea

'Shift to shape an even better world' explores a moving mechanism that shows the impact, richness and strength bringing culture, design and people together. The motif was developed by Tarni O'Shea; a proud Aboriginal and South Sea Islander woman who is strongly inspired by the celebration of culture and bringing it to the forefront of the creative process.

Arup acknowledges the Traditional Owners across all lands, waters and skies our firm may reach; we acknowledge their wisdom, resilience, and rich cultural heritage.

We pay our respects to the Elders, past and present, and to all Aboriginal and Torres Strait Islander peoples.

We recognise the ongoing journey of healing and reconciliation, and Arup commits to walking alongside First Nations peoples, to acknowledge their teachings and foster a future of unity and respect.

Abbreviations List

Abbreviation	Definition
AEP	Annual Exceedance Probability
APCr	Air Pollution Control Residue
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BHA	Bushfire Hazard Assessment
BMP	Bushfire Management Plan
BRC	Bushfire Resilient Communities
BERC	Bromelton Energy and Resource Centre
BREF	Best Available Techniques Reference Document
BPA	Bushfire Prone Area
C&I	Commercial and Industrial
DOR	Department of Resources now NRMMRRD
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning
EA	Environmental Authority
EFW	Energy from Waste
FDI	Fire Danger Index
FFDI	Forest Fire Danger Index
FPA	Fire Protection Association
GIS	Geographic Information System
ha	Hectare
IED	Industrial Emissions Directive
IBA	Incinerator Bottom Ash
IMS	Interactive Mapping System
m	Metres
MSW	Municipal Solid Waste
MW	Megawatts
NCC	National Construction Code
NRMMRRD	Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development
PFI	Potential Fireline Intensity

Abbreviation	Definition
PFL	Potential Fuel Load
RE	Regional Ecosystem
SDA	State Development Area
SPP	State Planning Policy
QDC	Queensland Development Code
QFES	Queensland Fire and Emergency Service
VHC	Vegetation Hazard Class

1. Introduction

1.1 Purpose of Assessment

This Bushfire Hazard Assessment has been prepared on behalf of Cleanaway in support of the Bromelton Energy and Resource Centre (BERC) proposal.

The Project is mapped within a designated Bushfire Prone Area under the State Planning Policy mapping which aligns with the mapped areas under the Planning Scheme. The purpose of this assessment is to provide a site-specific assessment of bushfire hazard and to demonstrate the Project's compliance with State Planning Policy, the Bromelton State Development Area (SDA) Development Scheme and the Scenic Rim Regional Council Planning Scheme 2020 (the 'Planning Scheme'), including the Bushfire Hazard Code (the 'Code').

Bushfire can present a number of risks and consequences to infrastructure and people both in the construction and operational phases. The proposed infrastructure is affected by virtue of its location in designated Bushfire Prone Areas and bushfire impact is a key consideration to ensure mitigation and risk are understood to reduce the consequences of any bushfire events.

With acknowledgment that the Project is exempt from the Bushfire Hazard Overlay Code under the Planning Scheme, key aspects of the code have been considered as part of the overall assessment. The Overlay Code are still relevant to the assessment despite the exemption because they provide assessment benchmarks and requirements for assessable development to address a range of considerations including bushfire hazard. This report aims to demonstrate that bushfire has been considered in the design of the Project and that the proposed development complies with the Overlay Code.

The National Construction Code (NCC) does not prescribe specific bushfire performance requirements for Class 5 to 8 and Class 10 buildings, which include offices, warehouses, production facilities, and sheds. Consequently, AS3959:2018 are not recognised as Deemed-to-Satisfy provisions for these building classes. However, consideration of AS3959:2018 remains important in demonstrating alignment with the broader aims and objectives of bushfire planning and it has therefore been considered in relation to the Project. Therefore, the bushfire assessment provides evidence that the Project is in a low-risk bushfire area and satisfies the assessment criteria, with recommendations consistent with relevant legislative requirements, guidelines and AS3959:2018 to reduce the risk to life and property.

1.1.1 Qualifications

The Queensland Fire and Emergency Service (QFES) *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'* (Bushfire Resilient Communities, BRC Technical Guide, 2019) sets out the requirements for suitably qualified people to undertake bushfire hazard assessments, namely:

- Fine-scale assessment of vegetation communities to be undertaken in accordance with the 'Vegetation Hazard Class' assessment method, and by a suitably qualified person with experience in botanical survey methods

- Applicant-initiated assessments and reports must be prepared or peer-reviewed by suitably qualified and experienced people with a degree qualification (AQF Level 8) in environmental science, environmental management (or an equivalent discipline), demonstrated experience in botanical surveys and spatial analysis methods, including use of geographic information systems (GIS, software); demonstrated experience in the assessment of bushfire hazard and risks or technical qualifications in environmental science, environmental management (or and equivalent discipline) and demonstrated relevant industry experience in the assessment of bushfire hazard and risks for a minimum of five years.

The authors of this report are Aaron Felton, Gabi Head-Gray and Chris Fay who meet QFES' criteria as follows:

- Possess knowledge and experience in applying relevant legislation, plans, policies, standards and guidelines relating to bushfire hazard and fire ecology relating to Queensland requirements and Southeast Queensland conditions
- Have knowledge, experience in botanical survey methods and GIS analysis and at least five years' experience in undertaking bushfire hazard assessment and preparing bushfire management plans, including experience in undertaking fine-scale assessment of vegetation communities and application of the QFES Bushfire Hazard Assessment method outlined in the BRC Technical Guide
- Have qualifications and experience in the field of ecology, environmental management, or similar to assess and protect site-based and strategic biodiversity values relating to Southeast Queensland.

1.2 Project overview

Cleanaway Operations Pty Ltd (Cleanaway) is developing an Energy from Waste (EfW) facility in Queensland known as the Bromelton Energy and Resource Centre (referred to as the 'Project' hereinafter).

The Project will be located within the Special Industry Precinct of the Bromelton SDA, west of Beaudesert within the Scenic Rim Regional Council local government area.

The Project has been designed to thermally treat approximately 760,000 tonnes per annum (tpa) of waste feedstock, consisting of residual Municipal Solid Waste (MSW) and residual Commercial and Industrial (C&I) waste. Residual waste is waste that is not technically, environmentally, and economically practical (TEEP) to reuse or recycle, which would otherwise be sent to landfill for disposal. The facility's actual annual throughput will vary depending on the calorific value of the feedstock and plant availability. To account for variability in feedstock energy content, the facility will be designed for a maximum processing capacity of up to 10 percent above the nominal figure (836,000 tpa). The EfW process is summarised in Figure 1.

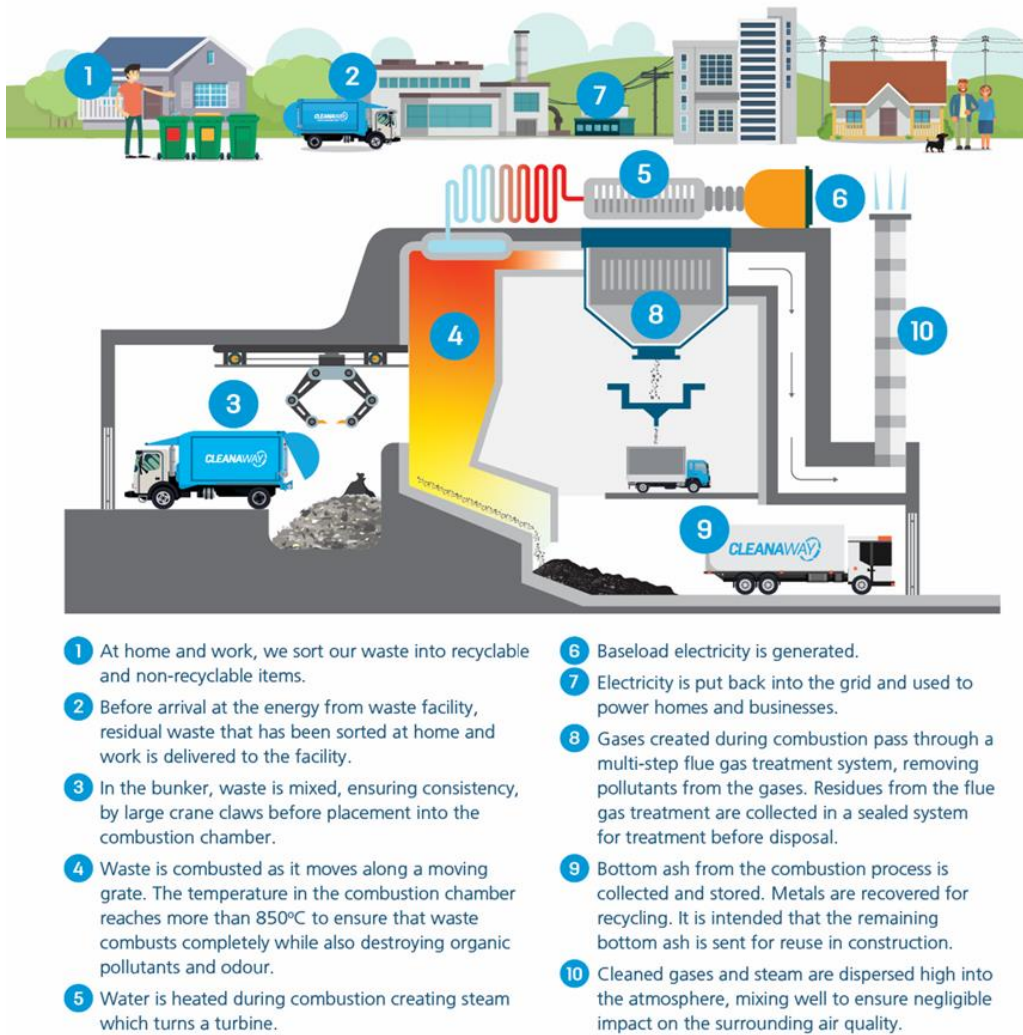


Figure 1: Energy from Waste Process

The key components of the Project are summarised in Table 1-1.

Table 1-1: Key project components

Project Component	Detail
Address	Lot 1 Beaudesert Boonah Road, Bromelton, Queensland, 4285 (Lot 1 on RP45234). Refer Figure 2.
Site Area	63 hectares
Summary of proposed works	The Project includes the construction of a main EfW facility for waste processing, incinerator bottom ash (IBA) maturation and processing facility and an air pollution control residue (APCr) facility. It also includes all onsite infrastructure needed for the EfW facility, such as site utilities, internal roads, weighbridges, parking and hardstand areas, stormwater infrastructure, fencing and landscaping. The Project will include a visitor centre to help educate and inform the community on circular economy principles, the waste hierarchy, including waste avoidance, recycling, resource recovery, the benefits of landfill diversion and the EfW process.

	The intent behind this education is to drive a shift in community awareness and attitudes toward waste management and resource recovery.
Technology Used	The Project will use moving grate combustion technology. This has been used globally for over 100 years and is common in many of the 500 similar operational examples across Europe.
Facility Outputs	Approximately 73.2 MW (577,600 MWh/year, corrected for ambient temperature) exported to the grid as baseload electricity. Potential to supply energy in the form of heat and/or process steam to local industrial users. Residual materials include IBA and APCr. It is intended that the IBA will be mechanically processed onsite to create incinerator bottom ash aggregate (IBAA). During this process, both ferrous and non-ferrous metals will be recovered for recycling and sale. It is intended that the remaining material is repurposed for use as an aggregate in construction. The Project will include a facility to stabilise APCr before removal and disposal at a licensed landfill.
Key infrastructure	• EfW facility including administration and visitor's centre • IBA maturation and processing facility (2 x pads and 2 x sheds) • APCr facility (1 x pad, 1 x shed) • Transformer yard and switchyard • De-coupling area for trucks • Weighbridges • Internal road network and carparking • 2 x combined storm water treatment and detention basin • 1 x lined retention basin • Access from Beaudesert Boonah Road via a signalised intersection with Recycling Street
Hours of Operation	24 hours per day, seven days per week (365 days per year)
Operational Staff	Approximately 60 staff

1.3 Existing conditions

The site encompasses a total area of 633,080m² (63.3ha) (Figure 3). The site is directly adjacent to the interstate railway corridor to the east, and Beaudesert Boonah Road to the north and Quickcell Technology Products Pty and SCT Logistics yard also to the north. The surrounding properties and land uses are rural and farming. These have previously been cleared with only small, standalone patches of native vegetation remaining. The most significant patch sits over 200 m from the north-east boundary of the site.

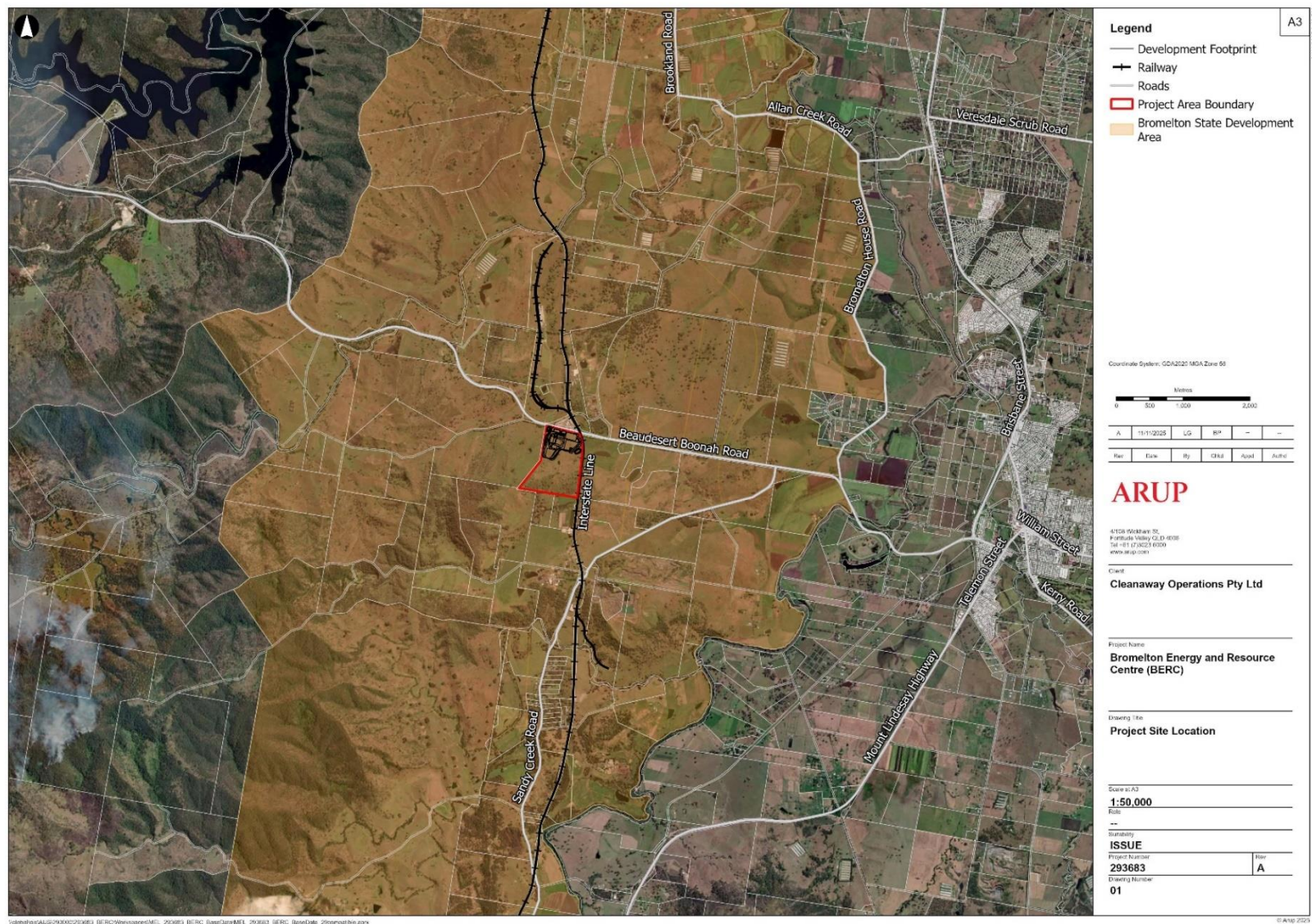


Figure 2: Project site location

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Bromelton Energy and Resource Centre

Bushfire Hazard Assessment



Figure 3: Project development layout

2. Regulatory Context

Bushfire hazards pose risks to individuals, community wellbeing, property, the economy, and the environment. Accordingly, effective bushfire hazard management in Queensland is a critical aspect of land use planning and development decision-making. The applicable regulatory frameworks and instruments to the Project are summarised below and examined further in subsequent sections:

- Bromelton State Development Area Development Scheme (SDA, DILGP, 2017)
- State Planning Policy (DILGP, 2017)
- Scenic Rim Planning Scheme (Planning Scheme, Scenic Rim Regional Council, 2020)
- AS3959:2018 – Construction of Buildings in Bushfire-Prone Areas (Standards Australia, 2018) (AS2959:2018).

2.1 Queensland legislation

2.1.1 Bromelton State Development Area Development Scheme

The Coordinator-General of Queensland declared the SDA in 2017. This was in accordance with the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The SDA comprises 15,600 hectares in the Scenic Rim LGA, six kilometres west of the town of Beaudesert.

The site is located within the Special Industry Precinct of the SDA. This precinct supports various defined advanced industries. However, because the Project establishes a new Special Industry activity, it is legally defined as a Material Change of Use (MCU). This triggers the need to lodge an SDA application, which is then assessed against the relevant parts of the Development Scheme, including the strategic vision, overall objectives, preferred development intent for the precinct, and the SDA-wide assessment criteria, namely:

- Strategic vision for the Bromelton SDA
- Overall objectives for development in the Bromelton SDA
- Preferred development intent for the applicable development precinct
- SDA wide assessment criteria.

For this Project, the relevant SDA-wide assessment criteria relating to ‘Natural Hazards – other’ are:

(1) Development, in accordance with current best practice:

(a) identifies relevant natural hazards that may impact upon the development

(b) appropriately manages risk associated with the identified hazards and

(c) avoids increasing the severity of the natural hazard.

An assessment of the Project against the SDA wide assessment criteria relating to natural hazards is provided in section 5.

2.1.2 State Planning Policy

The Queensland State Planning Policy (SPP) sets out the Government's policies on matters of State interest in land use planning and development (Department of Infrastructure, Local Government and Planning, 2017). The SPP is supported by the following guidance material:

- *SPP State Interest Guidance Material - Natural hazards, risk and resilience - Bushfire* (SPP Guidance, DSDMIP, 2019), which provides further context to the SPP and explains how its policies can be applied for local government when making or amending planning instruments. The SPP Guidance is also intended to assist assessment managers and practitioners in applying the Bushfire Hazard Overlay Code *assessment benchmarks* when State interests have not been integrated into the local planning scheme.
- *BRC Technical Guide 2019*, which provides technical guidance and policy positions of the QFES. It includes procedures for undertaking a Bushfire Hazard Assessment (BHA), calculating asset protection zones and preparing a Bushfire Management Plan (BMP).

The proposed MCU application is located in the Bromelton SDA and is not regulated by the Planning Scheme and therefore the Bushfire Hazard Overlay Code is not a relevant assessment benchmark. Notwithstanding, the mapped bushfire hazard area under the SPP aligns with the Planning Scheme mapping. Therefore, this bushfire assessment has been prepared in line with the SPP guidance to support the application.

The SPP is supported by State-wide mapping of bushfire prone areas (BPA), also referred to as 'bushfire hazard area'. These areas are based on the CSIRO modelling of potential fireline intensity using the method described by Leonard *et al.*, 2014. The BPA mapping identifies areas of *very high* (>40,000 kW/m), *high* (20,000 – 40, 000 kW/m) and *medium* (4,000 – 20,000 kW/m) potential bushfire intensity. The potential impact buffer includes all land within 100 metres of any area with a potential fireline intensity greater than 4,000 kW/m (i.e., medium rating or higher). This mapping triggers assessment against the Bushfire Hazard Overlay Code *assessment benchmarks*.

2.1.3 Bushfire Hazard Overlay Code

The site is identified on the Planning Scheme Schedule 2 Bushfire Hazard Overlay map OM-03.2 (Bushfire hazard) and therefore the Bushfire Hazard Overlay Code applies to the Project.

The Code requires that development addresses the bushfire hazard determined by a site-specific bushfire hazard assessment based on vegetation existing within, adjacent and nearby to the site including any areas subject to revegetation or regrowth.

Although section 2.1.2 states that the Bushfire Hazard Overlay Code is not a relevant assessment benchmark, an analysis has been included for completeness. The site-specific bushfire assessment provided in section 4 has been undertaken in accordance with the BRC Technical Guide.

2.1.4 AS3959:2018 Construction of Buildings in Bushfire Prone Areas

AS3959:2018 is utilised in both the Queensland planning and building systems to determine the level of bushfire attack on buildings in bushfire prone areas and to determine the appropriate construction response to mitigate these effects for specified types of buildings

The standard specifies the requirements for the construction of buildings in bushfire-prone areas to improve their resistance to bushfire attack. AS3959:2018 applies to those areas where a regulated map (i.e., planning scheme overlay map) identifies an area as a bushfire prone area, requiring calculation of the Bushfire Attack Level (BAL) in accordance with a methodology outlined in the about Australian Standard. The detailed requirements relating to construction methods and materials are typically dealt with as part of building design and enabled via private certification in accordance with the Building Code of Australia.

The NCC does not provide for any bushfire specific performance requirements for Class 5 to 8 and Class 10 buildings (which includes offices, warehouses, production facilities, and sheds). Notwithstanding, compliance with AS3959:2018 must be considered when meeting the aims and objectives of bushfire planning.

Section 0 of this report provides an overview of the method used to assess bushfire hazard.

2.1.5 Bushfire Hazard Overlay Code

The site is identified on the Planning Scheme Schedule 2 Bushfire Hazard Overlay map OM-03.2 (Bushfire Hazard) and therefore the Bushfire Hazard Overlay Code applies.

The Code requires that development addresses the bushfire hazard determined by a site-specific assessment based on vegetation existing within, adjacent and nearby including any areas subject to revegetation or regrowth.

Although section 2.1.2 of this report states that the Bushfire Hazard Overlay Code is not a relevant assessment benchmark, an analysis has been included for completeness. The site-specific bushfire hazard assessment provided in section 4 has been undertaken in accordance with the BRC Technical Guide.

2.2 Commonwealth legislation and standards

2.2.1 AS3959:2018 Construction of Buildings in Bushfire Prone Areas

AS3959:2018 is utilised in both the Queensland planning system and building system to determine the level of bushfire attack on buildings in bushfire prone areas and to determine the appropriate construction response to mitigate these effects for specified types of buildings

The standard specifies the requirements for the construction of buildings in bushfire-prone areas to improve their resistance to bushfire attack. AS3959:2018 applies to those areas where a regulated map (i.e., planning scheme overlay map) identifies an area as a bushfire prone area (or similar), requiring calculation BAL in accordance with a methodology outlined in the standard. The detailed requirements relating to construction methods and materials are typically dealt with as part of building design and enabled via private certification in accordance with the Building Code of Australia.

The NCC does not provide for any bushfire specific performance requirements for Class 5 to 8 and Class 10 buildings (which includes offices, warehouses, production facilities, and sheds). Notwithstanding, compliance with AS3959:2018 must be considered when meeting the aims and objectives of bushfire planning.

Section 0 of this report provides an overview of the method used to assess bushfire hazard.

3. Methodology

A site-specific BHA has been undertaken in accordance with the methodology outlined in the BRC technical document (QFES, 2019). The underlying method consists of three stages:

1. An assessment to verify the reliability of existing BPA mapping over the site and surrounding land surrounding (the 'assessment area')
2. A hazard assessment involving field investigations to ground-truth the accuracy of the BPA mapping onsite. The assessment area included the development area (i.e., the site) and all land within 150 m. The following was undertaken during the field investigation:
 - a. Verify the occurrence, extent, composition and structure of vegetation communities currently existing within and surrounding the site to determine a Vegetation Hazard Class (VHC)
 - b. Measure effective fire slope and site slope
 - c. Assess adjacent bushland, existing fire breaks/trails and access roads.
3. Determine the required width of the Asset Protection Zone (APZ) using the results of the site-specific assessment. The APZ was sufficient to achieve the necessary radiant heat flux levels, calculated with either the SPP Bushfire APZ width calculator or Method 2 of AS3959:2018.

Where the precision and/or accuracy of BPA mapping or map input datasets are insufficient (e.g. where there has been changes in land use and vegetation cover within the assessment area since the mapping/datasets were prepared), the process enables applicants to create a local-scale BPA map based on the results of the site investigation and to apply modified input variables that reflect changes that have occurred over time.

Accordingly, given [name the change in land use] a local-scale BPA map was prepared as part of the hazard assessment as described further in section 4 of this report. The BHA process adapts the method used to generate the State-wide BPA mapping, described in Leonard *et. al.* (2014) with further refinement to allow for the downgrade and/or filtering of small patches and narrow corridors where needed in accordance with contemporary mapping rules outlined in the BRC technical guide and Leonard and Opie (2017).

Where effective fuel loads have been reduced based on patch size and isolation in accordance with the filtering rules outlined in Section 4.2.6 of the BRC Technical Guide, reduced effective fuel loads can be used as inputs into a method two BAL assessment. This has been applied to the assessment methodology of the hazard assessment as per section 4.2.5.1.

The assessment has been based on vegetation existing within, adjacent and nearby to the site including any areas subject to revegetation or regrowth, which have been assessed as if these areas have reached their mature state.

4. Bushfire Hazard Assessment

4.1 Bushfire Hazard Mapping

The site is within a designated BPA area., as show below in an excerpt from the SPP Assessment Benchmark BPA mapping published on the SPP Interactive Mapping System (IMS). The mapping shows the site to contain areas of *high* and *very high* potential bushfire intensity mainly in the southern portion. The land outside the site to the north-east and south also triggers assessment against the Bushfire Hazard Code assessment benchmarks as it is mapped as either holding a *medium*, *high*, or *very high* potential bushfire intensity and *potential impact buffer*.

The Bushfire Hazard Overlay Map OM-03.2 contained in Schedule 2 of the Planning Scheme is consistent with the SPP mapping shown in

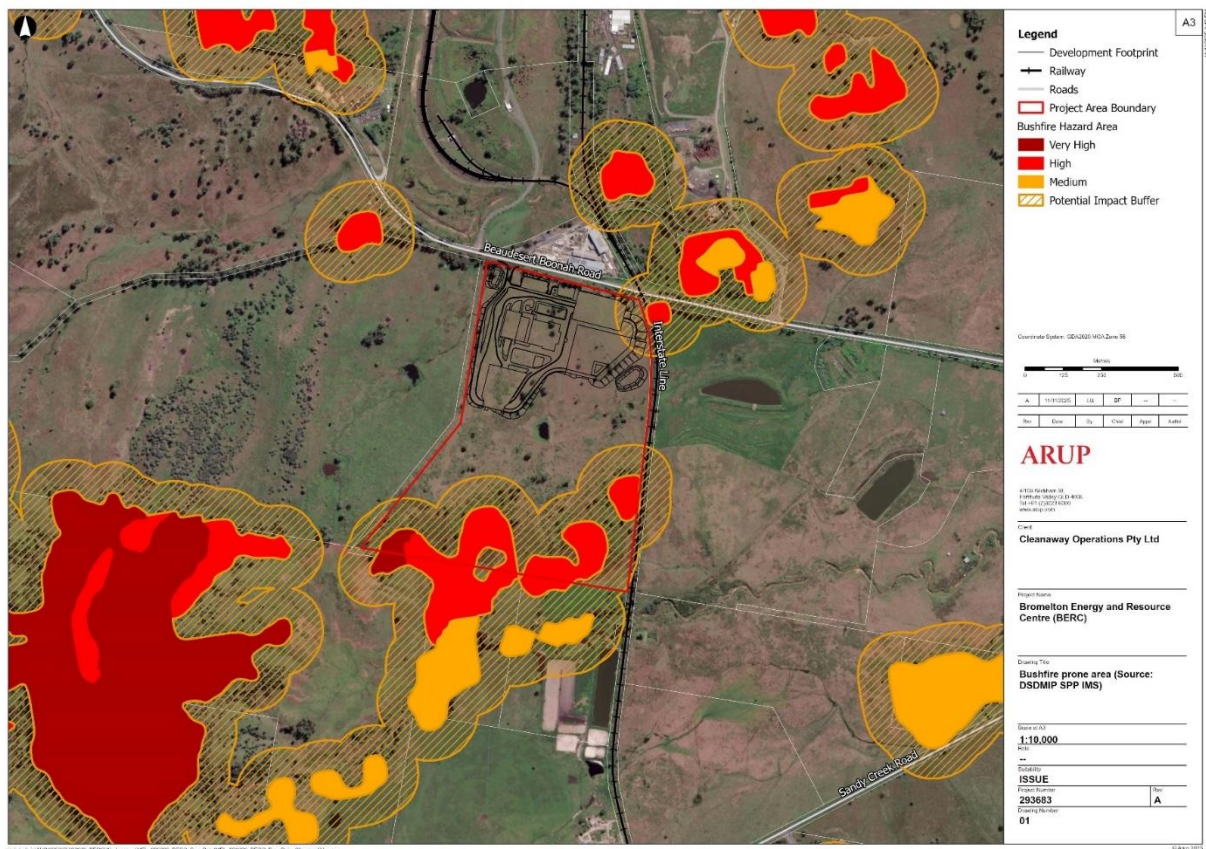


Figure 4: Bushfire prone area (Source: DSDMIP SPP IMS), where the site holds a *high* to *very high* potential bushfire intensity and *potential impact buffer*.

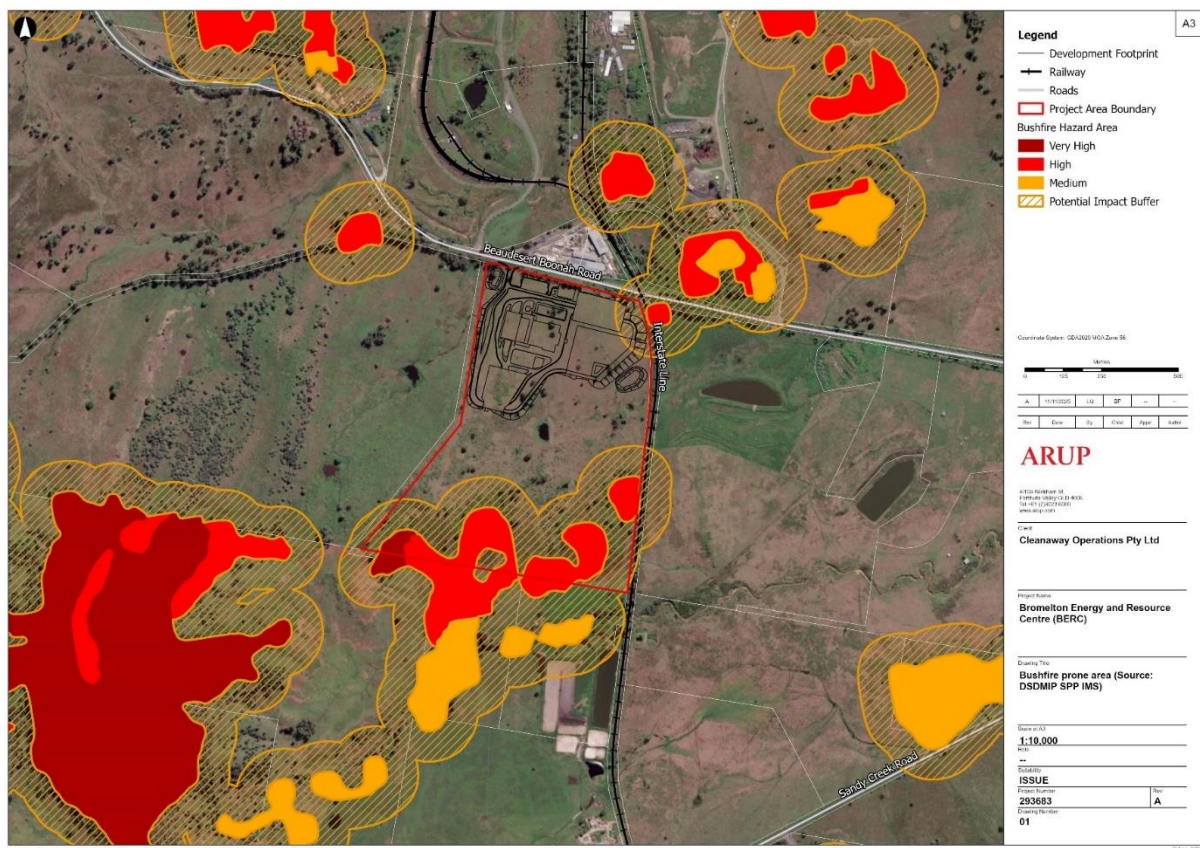


Figure 4: Bushfire prone area (Source: DSDMIP SPP IMS)

4.2 Hazard Assessment

BALs are used to quantify the levels of attack (radiant heat exposures/flux) that built structures may experience during a fire event. The BAL is defined as *'a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire'* (Standards Australia, 2018).

AS3959:2018 adopts six BAL categories based on the level of radiant heat flux to which buildings may be exposed to during a bushfire event. This level of heat flux generally relates to the type of vegetation, effective slope and how far a building is from hazardous vegetation. BALs apply to buildings and any attached or adjacent structure within 6m of the building.

The following steps have been undertaken to assess spatial factors that contribute to potential bushfire intensity for the site and surrounding land:

Step 1: Identification of Fire Danger Index (FDI)

- Identification of all Forest Fire Danger Index (FFDI) values estimated at a 1:20 year (five percent) Annual Exceedance Probability (AEP) using the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from the Queensland Government data portal.

Step 2: Identification of Vegetation Hazard Classes

- Assessment of vegetation communities to identify the relevant VHCs using a combination of remnant and pre-clearing regional ecosystem maps, high-resolution aerial imagery and a ground-truthed assessment of vegetation present within the site and within the required 150 m assessment area.

Step 3: Slope assessment

- Identification of site slope and effective slope, and determination of whether proposed buildings are upslope or downslope of hazardous vegetation using Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from the Queensland Government data portal and 1 m/5 m LiDAR-derived contour data.

Step 4: Remodelling of bushfire hazard and calculation of potential fireline intensity

- Where a change to the distribution, extent and/or classification of VHCs within the assessment area is proposed, remodelling of bushfire hazard to determine how the changes to VHCs and associated fuel loads affect potential fireline intensity. Potential fireline intensity is to be calculated in accordance with the method outlined in Leonard *et al.* (2014).

VHCs and associated potential fuel loads are in accordance with Leonard *et al.* (2014), as provided in the BRC Technical Guide and SPP Bushfire APZ width calculator published by QFES.

Relevant spatial datasets published by the QFES were accessed via the Queensland Spatial Catalogue (QSpatial) and the Catalyst Fire Management System (QFES, 2020).

4.2.1 Step 1 – Identification of Fire Danger Index (FDI)

South-east Queensland has a subtropical climate with warm humid summers and mild winters and is subject to influence from monsoonal climate systems and easterly troughs. Seasonality is not pronounced; however, the ‘wet’ season generally occurs during the December to April period. The fire danger season usually occurs from spring to mid-summer (August/September to December) with the greatest danger after a dry winter and/or spring, and when deep, low-pressure systems near Tasmania bring strong, hot and dry westerly winds to the coastal districts (Bureau of Meteorology, 2021). Severe bushfire weather is characterised by days with high temperatures over 35 degrees, low relative humidity, and winds from the north to north-west.

The Fire Forest Danger Index (FFDI) provides an index of fire weather severity. The relevant FFDI for the site was derived from the Fire Weather Severity raster provided as part of the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset.

AS3959:2018 allows for the use of data sets provided by the relevant authority having jurisdiction for the site, namely QFES. QFES datasets are published via The Catalyst Fire Management System (Catalyst, 2020). The relevant Fire Danger Index (FDI) value for the site is 57.

4.2.2 Step 2 – Identification of Vegetation Hazard Classes and Potential Fuel Loads

The different types 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 and can then be susceptible to very destructive bushfires. Alternatively, vegetation communities may expose fuels to drying and therefore be frequently available for burning. Frequent bushfires can result in the development of bushfire-tolerant grassy woodlands or grasslands and presents less destructive bushfire behaviour.

VHCs provided within the Bushfire Prone Area – Vegetation hazard class – South East Queensland spatial dataset were reviewed for the site and surrounding land (Figure 5). The following VHCs are mapped within the required 150 m assessment area:

- 13.1 – Dry to moist eucalypt open forest on undulating metamorphics and granite
- 16.2 – Eucalyptus dominated woodland on drainage lines and alluvial plains
- 38.5 – Discontinuous irrigated cropping and horticulture
- 40.4 – Low grass or tree cover in rural areas
- 41.4 - Low grass or tree cover in built up areas
- 42.6 – Nil to very low vegetation cover.

The reliability of State-mapped VHCs was assessed through:

- Review of the vegetation management remnant and pre-clearing regional ecosystem (RE) mapping published by the Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (NRMMRRD, formerly the Department of Resources, DoR).
- A ground-truthed assessment of existing vegetation present on site and in the surrounding 150 m of the site boundaries undertaken by suitably qualified senior ecologist Colin Vaughan on 13 April 2023.

The desktop assessment using the NRMMRRD's remnant RE mapping shows that the majority of the site is mapped as a 'Category X area', non-remnant vegetation. There is however a small patch mapped as 'Category C', high-value regrowth, located along the southern boundary of the site. This patch is identified as containing 'of concern' high-value regrowth of RE 12.9 -10.3 – *Eucalyptus moluccana* open forest on sedimentary rocks (Appendix 1).

The site assessment determined that vegetation within the 150 m assessment area of the site boundary consists of a mosaic of native vegetation with varying levels of degradation, cleared farming and horticulture land, and areas consisting of commercial yards and the train line. The site has been predominantly cleared, with some small patches of retained native vegetation, mainly in the southern portion and along the northern boundary roadside of Beaudesert Boonah Road. Vegetation adjacent to and within proximity of the development consists of two site-verified vegetation communities.

1. Vegetation Community 1 – Cleared Farmland Vegetation

The Project site predominantly consists of Vegetation Community 1 comprising open paddock dominated by ground covering invasive grass and weed species with individual *Eucalyptus moluccana* (grey box) scattered throughout, or in small aggregations with a canopy cover not exceeding 10 percent.

Other native trees present in low densities include *Ficus obliqua* (small leaved fig), *Corymbia citriodora* (lemon scented gum), *Eucalyptus siderophloia* (grey ironbark), and *Corymbia tessellaris* (Moreton Bay ash). A single *Ficus watkinsiana* (strangler fig) was also observed. This community is mapped as Category X non-remnant, with these small individual trees and patches of trees which resembles (RE) 12.9-10.3, corresponding to VHC 13.1 (dry to moist open forest on undulating metamorphics and granite). However, due to the highly impacted and degraded nature of the area from clearing and farming practices, with a lack

of midstory and canopy layer, this community does not conform to a forest, or woodland and is better represented as an exotic grassland community.

The VHC mapping of the site also supports this classification although it does show small sections of VHC 13.1, associated with the aforementioned small patches of remaining trees. However, there is neither the densities nor the understorey to support the VHC or a bushfire front. Therefore, in accordance with the ‘Bushfire Resilient Communities – Technical reference guide 2019’ this community is non-bushfire prone vegetation community, and classifies as VHC 40.4 (continuous low grass and tree cover). It is a *low-risk* vegetation community and ‘*non-bushfire prone vegetation*’, not capable of producing a fire front or requiring BAL calculations.

2. Vegetation Community 2 – Degraded Eucalyptus Woodland

Vegetation Community 2 is located within the southern portion of the site, along a mapped waterway in Lots 1 on RP 43189 and 2 on RP68584, located in the north-east corner of the site. The community is associated with the rail line corridor and retained vegetation in Lot 101 on SP223082, and along the roadside verge to the west of the site. This vegetation community consists of some remaining trees similar to the tree species composition identified in the *Vegetation Community 1*. It has no real shrub layer/midstory, and a highly degraded ground cover layer consisting of invasive grass species. As mentioned above, this is mapped as Category X non-remnant.

Due to the degraded nature of these small patches of this vegetation community, with a canopy cover of between 20 to 40 percent, and lack of understory and groundcover layers, it represents a degraded woodland community rather than a forest. For the purpose of this assessment, Vegetation Community 2 corresponds to VHC 13.2 (Dry to moist woodland on undulating metamorphics and granite).

Given that the largest patch of native vegetation capable of supporting a bushfire sits over 200 m away from the site in Lot 3 on SP155840, it is not within the 150 m assessment area. In addition, the smaller patches of isolated vegetation considered for this assessment to the east, west and northeast are all either less than 0.5 ha or have a width less than 50 m wide. Therefore, in accordance with the ‘Bushfire Resilient Communities – Technical reference guide 2019’, this can be excluded from assessment as there is not enough hazardous vegetation to support a fully developed flame front or generate a fireline intensity of 4,000 kW/h or greater. This means the vegetation could never provide high bushfire hazard exposure to a built asset. With low density canopy species, lack of a midstory and a highly degraded groundcover layer of invasive weeds, the vegetation community would once again not be capable of supporting a fully developed flame front.

The high-value regrowth vegetation to the south of the site could potentially support a flame front; however, once again, it has a highly degraded community with poor midstory and highly degraded groundcover layer, supported by a regrowth canopy. Given that it sits outside the property boundary, over 670 m away from the nearest proposed building and with no hazardous vegetation between it and the closest structure, it will not be considered for this assessment. Consequently, in accordance with the ‘Bushfire Resilient Communities – Technical reference guide 2019’, *there is no vegetation within the assessment area that is capable of supporting a fully developed flame front or generate a fireline intensity of 4,000 kW/h or more that can provide medium or higher exposure to a built asset.*

Figure 6 depicts the location of ground-truthed VHCs within the 150 m assessment area.



Picture 1: Vegetation Community 1 – site vegetation of cleared paddock with invasive grasses and sparse retained eucalypts



Picture 2: High-Value regrowth vegetation off the southern boundary



Picture 3: Roadside verge retained vegetation to the west of site

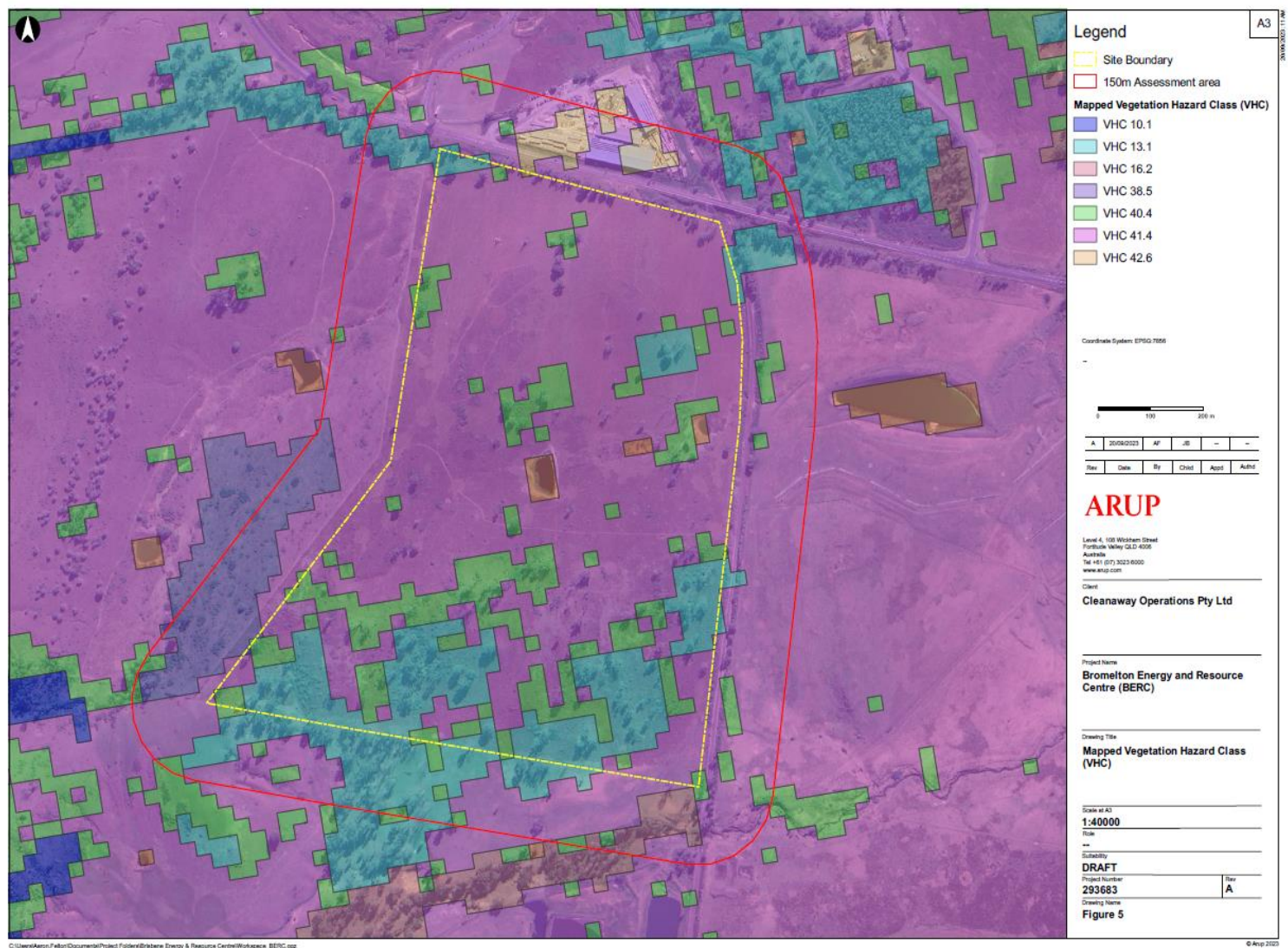


Figure 5: Mapped VHC's within and surrounding the site

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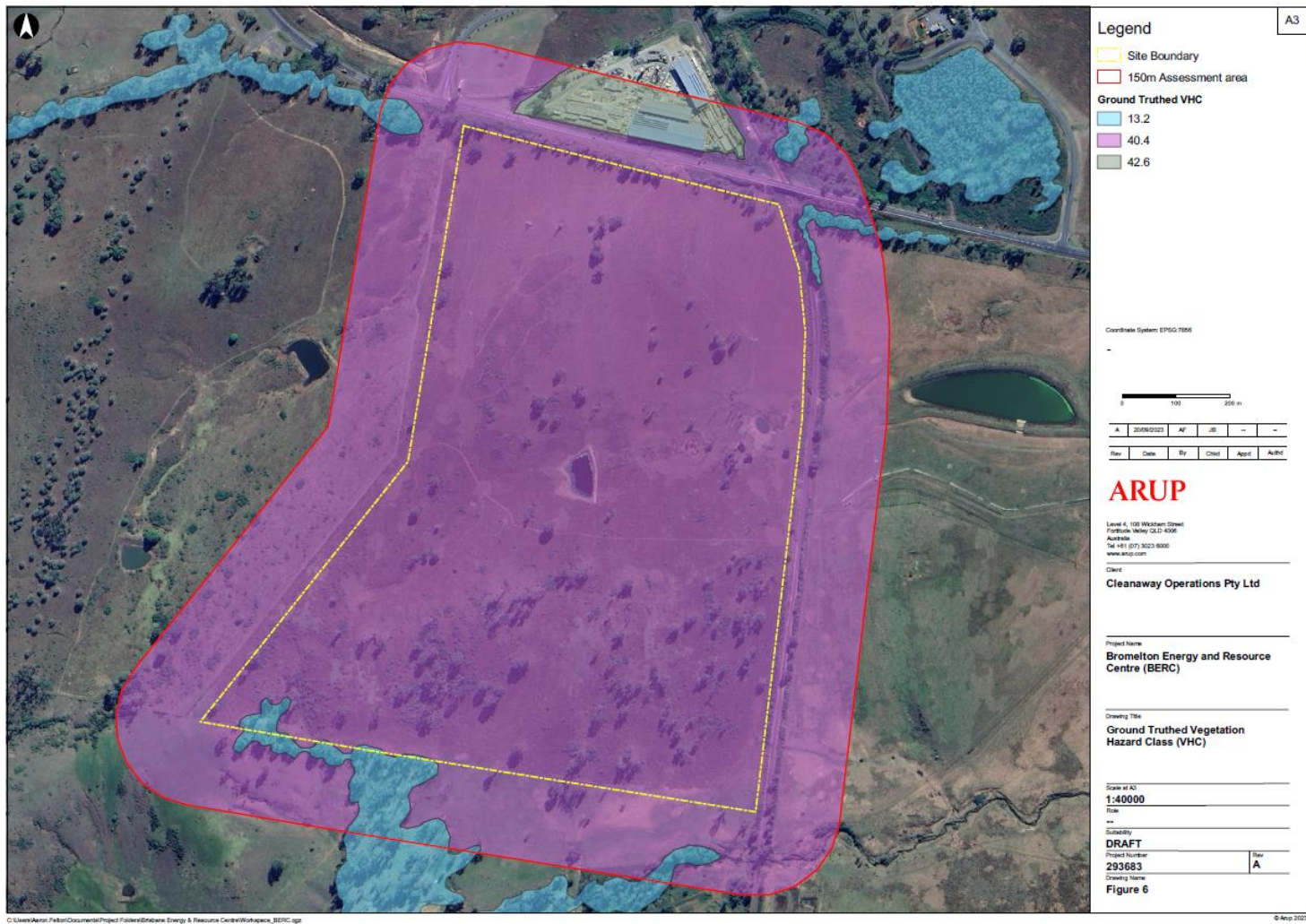


Figure 6: Ground-truthed VHC's within and surrounding the site

4.2.3 Potential fuel loads

Fuel loads have been allocated for each VHC to represent the long-unburnt condition that would be typically exhibited 10 years after a fire. In accordance with the values provided in Figure 14 of the BRC Technical Guide (QFES, 2019a), the potential fuel load values for ground-truthed VHCs within and surrounding the site are as provided in Table 4-1.

Table 4-1: Potential fuel loads for classified vegetation within 150m assessment area

VHC		Total potential surface fuel load (t/ha)	Total overall potential fuel load (t/ha)	Prone type ¹		Fuel continuity ²	
13.2	Dry to moist eucalypt woodlands on undulating metamorphics and granite	12.8	14.4	1	Bushfire prone vegetation	2	Discontinuous
40.4	Low grass or tree cover in rural areas	0.5	4.0	2	Non-bushfire prone – Grassland fire	1	Continuous

4.2.4 Step 3 – Assessment of the Effective Slope

Two slope input parameters are required for the estimation of fire behaviour and separation. Site slope refers to the ground gradient between the Project site boundary and the edge of hazardous vegetation. Effective slope refers to the gradient of the land beneath hazardous vegetation. It is the more important parameter as it has a direct influence on the potential rate of fire spread, fuel consumption and thus, potential fireline intensity. For each vegetation hazard class, the effective slope is determined by assessing the gradient beneath classified vegetation (in degrees) which most influences bushfire behaviour and the relative position of land supporting hazardous vegetation in relation to the development (i.e. upslope or downslope). Where there is more than one slope beneath classified vegetation, each slope is individually assessed, and the worst-case scenario adopted.

The topography of the site and surrounding land is undulating with variable slopes due to dissection by gullies, a train line, and watercourses. Slope measurements have been calculated using LiDAR-derived one to five millimetre contours published by the DoR and verified by site measurement (Figure 7).

The Project site sits on top of a slight hill. The current topography of the site is classified as slightly inclined (<5 percent slope) with the slope calculations of the site as follows:

- Site slope from the east – **5.4 degrees downhill** (direction of biggest bushfire risk)
- Site slope from the west – 2.8 degrees downhill

¹ Prone type taken from the VHC_Data sheet of the SPP Bushfire APZ Calculator.

² Fuel continuity type taken from Figure 14 of the QFES BRC Technical Guide.

- Site slope from the north – 3.1 degrees downhill
- Site slope from the south – 3.8 degrees downhill.

Effective slope is the slope beneath classified vegetation which most influences the bushfire attack. The classified vegetation most likely to impact the Project sits off the north-eastern corner of the site. With the topography of the site being classified as slightly inclined (<5 percent slope) the effective slope was calculated as approximately **2.8 degrees downhill**. Average slope was measured using spatial contour data (1 m Lidar-derived data published by DoR) and the Maximum Landscape Slope raster dataset published as part of the Bushfire hazard area – Bushfire Prone Area – Inputs dataset published by QFES.

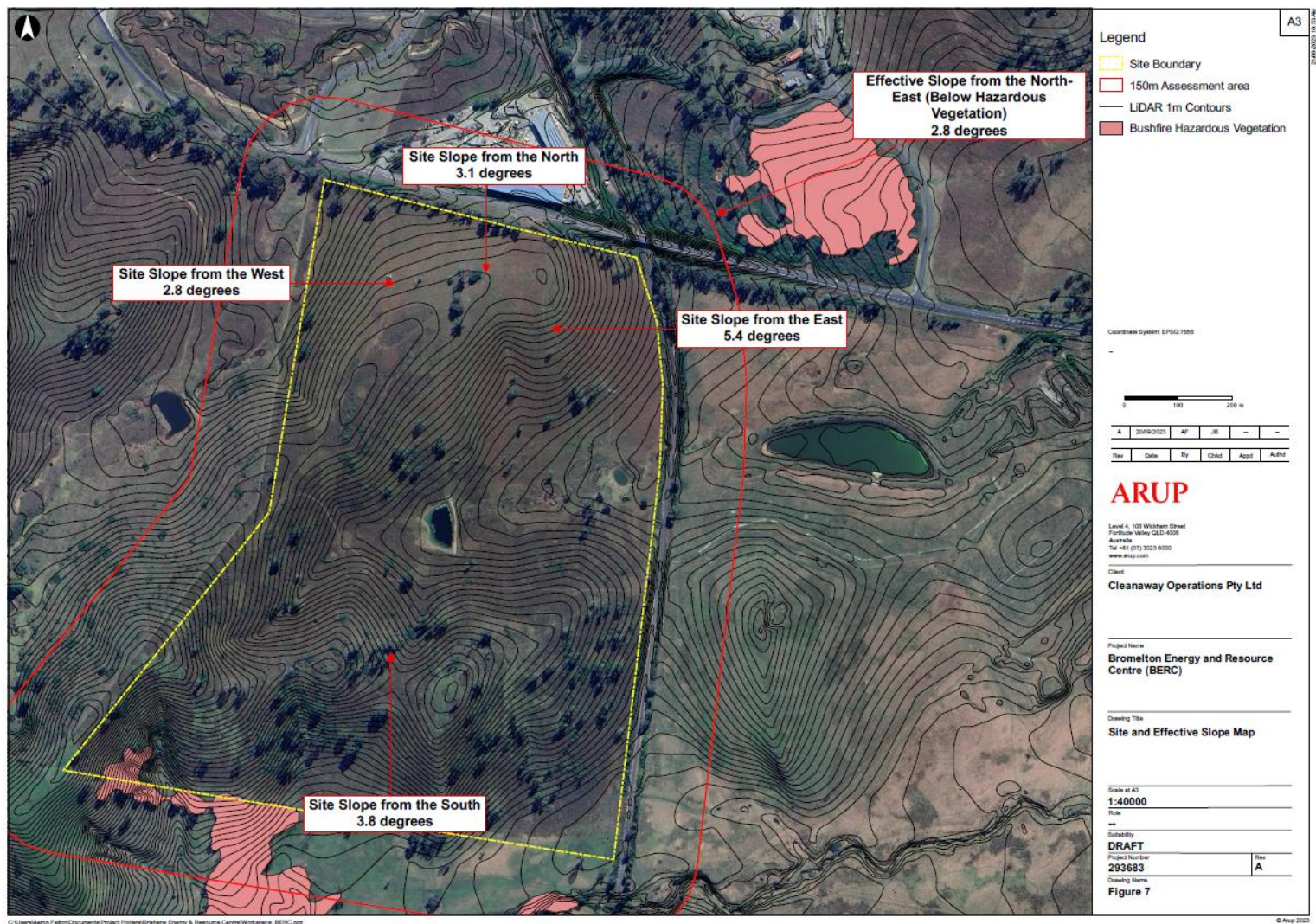


Figure 7: Site and Effective slope map

4.2.5 Step 4 - Remodelling of bushfire hazard and calculation of Potential Fireline Intensity

Given that site-specific assessment determined that VHCs provided within the BPA – VHC – South East Queensland spatial dataset do not entirely reflect the ground-truthed VHCs, remodelling has been undertaken to determine how the changes to VHCs and associated fuel loads affect potential fireline intensity. Potential fireline intensity has been calculated in accordance with the method outlined in Leonard *et. al.* (2014).

Potential fireline intensity (PFI) is a standard measure of the rate at which an advancing fire would consume fuel energy per unit time per unit length of the fire front. This metric combines potential fuel load (PFL), maximum landscape slope (slope) and fire weather severity (FFDI) to provide a potential fireline intensity metric. The PFI is represented as the following equation:

$$PFI = 0.62 PFL^2 \times FFDI \exp (0.069 \times \text{slope})$$

Where: PFI = Potential fireline intensity (kW/m), PFL = Potential fuel load (tonnes / ha), FFDI = Potential severe fire weather (FFDI) and Slope = Max slope (degrees – we will use 1 for this site rather than 0)

Table 4-2 shows the potential fireline intensity ranges (in kilowatts per metre) and the corresponding potential bushfire hazard classes.

Table 4-2: Potential fireline intensity ranges and bushfire hazard classes

Potential Fireline Intensity (kW/m)	Potential Bushfire Hazard Class
40,000+ kW/m	Very high
20,000 – 40,000 kW/m	High
4,000–20,000 kW/m	Medium
0 – 4,000 kW/m	Low/Not bushfire prone

Removal of Smaller Vegetation Patches

Section 4.2.6 of the QFES BRC technical guide provides a series of mapping rules ('patch and corridor filtering') for modifying the potential fireline intensity of bushfire-prone areas to reflect the likelihood of lower potential fireline intensities in smaller vegetation patches and narrow vegetated corridors. These rules are applied as follows:

1. Remove patches of continuous fuel <1ha in area that are surrounded by either no fuel or non-continuous fuel and are further than 100 m from any other continuous fuel greater than 2ha
2. Downgrade the effective fuel load of small patches of continuous fuel measuring (a) 1 to 2ha – downgrade by 66 percent and (b) 2 to 3 ha – downgrade by 50 percent if the patch is surrounded by either non-continuous fuel or a low-hazard vegetation or land-use type and if the patch is further than 100 m from any other continuous fuel vegetation patch greater than 2 ha
3. Remove narrow corridors and area of continuous fuel that are less than 50 m in width.

As noted under Step 1, continuous and non-continuous-fuel patches (classified as VHC 13.2) are located to the east, west and north-east of the site, including the patch outside of the 150 m assessment area. The following patch and corridor filtering has been applied.

- These patches to the direct east and north-east associated with the rail corridor and Lot 10 on SP223082. This has a total patch area of 0.45 ha (average ~15 to 20 m wide) and 0.47 ha (average ~

30 to 35 m wide) respectively. These patches are surrounded by either no fuel or discontinuous fuel types (i.e. VHCs 39.2, 41.1, 42.6) and is an area of continuous fuel that are less than 50 m in width or is located more than 100 m from other patches of continuous fuel greater than 2 ha in area.

- The patch to the west associated with the road verge is a thin continuous patch that is greater than 0.5 ha in area and an average of ~ 25 to 30 m wide. This patch is surrounded by either no fuel or discontinuous fuel types (i.e. VHCs 39.2, 41.1, 42.6) is narrow corridor of continuous vegetation less than 50 m wide and is located more than 100 m from other patches of continuous fuel greater than 2 ha in area.

These sub-hectare patches have been removed using Step 1 and 3 above as they are not likely to ignite due to their disconnection from fuels that can carry a running fire front, and if ignited, a fire front arising from these patches is likely to be narrow and significantly less intense. The potential fireline intensity arising from these patches is deemed to be equivalent to a less than 4,000 kW/m fireline intensity and accordingly, are considered to be low hazard for the purpose of land use planning and development assessment.

The potential fireline intensity was calculated for bushfire-prone vegetation within 150 m of the site using the inputs from Steps 1 to 3. However, as previously noted, all hazardous vegetation within the assessment area is not large enough to support a fully formed fire front and has therefore been removed from the assessment. The actual hazardous vegetation that sit outside of the 150 m assessment area and has been included despite being too far away to impact the development. In accordance with Section 7.6 of the BRC Technical Guide, fireline intensity, radiant heat flux and BAL is not required to be calculated for non-bushfire prone (i.e. VHCs with a prone type of 2) or low hazard VHCs (i.e. VHCs with a prone type of 3), therefore VHCs 39.3 and 41.2 have been excluded from calculation of potential fireline intensity.

Remodelled potential fireline intensity for bushfire-prone vegetation to the east and north-east of the site is provided in Table 4-3.

Table 4-3: Potential fireline intensity for classified VHCs within 150m assessment area

Location of classified vegetation in relation to development area	VHC	Status	Effective slope – average slope beneath bushfire-prone vegetation in relation to development (degrees)		Fire weather severity (FFDI)	Potential fireline intensity (PFI)	Potential bushfire hazard class	Remodelled bushfire hazard class
NE	13.2	Non-remnant	2.8	Downslope	57	7,902 kW/m	Medium	Low

The results of the potential fireline intensity calculation for bushfire-prone vegetation that sits outside of the assessment area show that vegetation to the north-east of the site (VHC 13.2) has a potential bushfire hazard class of ‘medium’. All other vegetation within 150 m of the development site is not classified as bushfire-prone and therefore, calculation of radiant heat flux/BAL is not applicable.

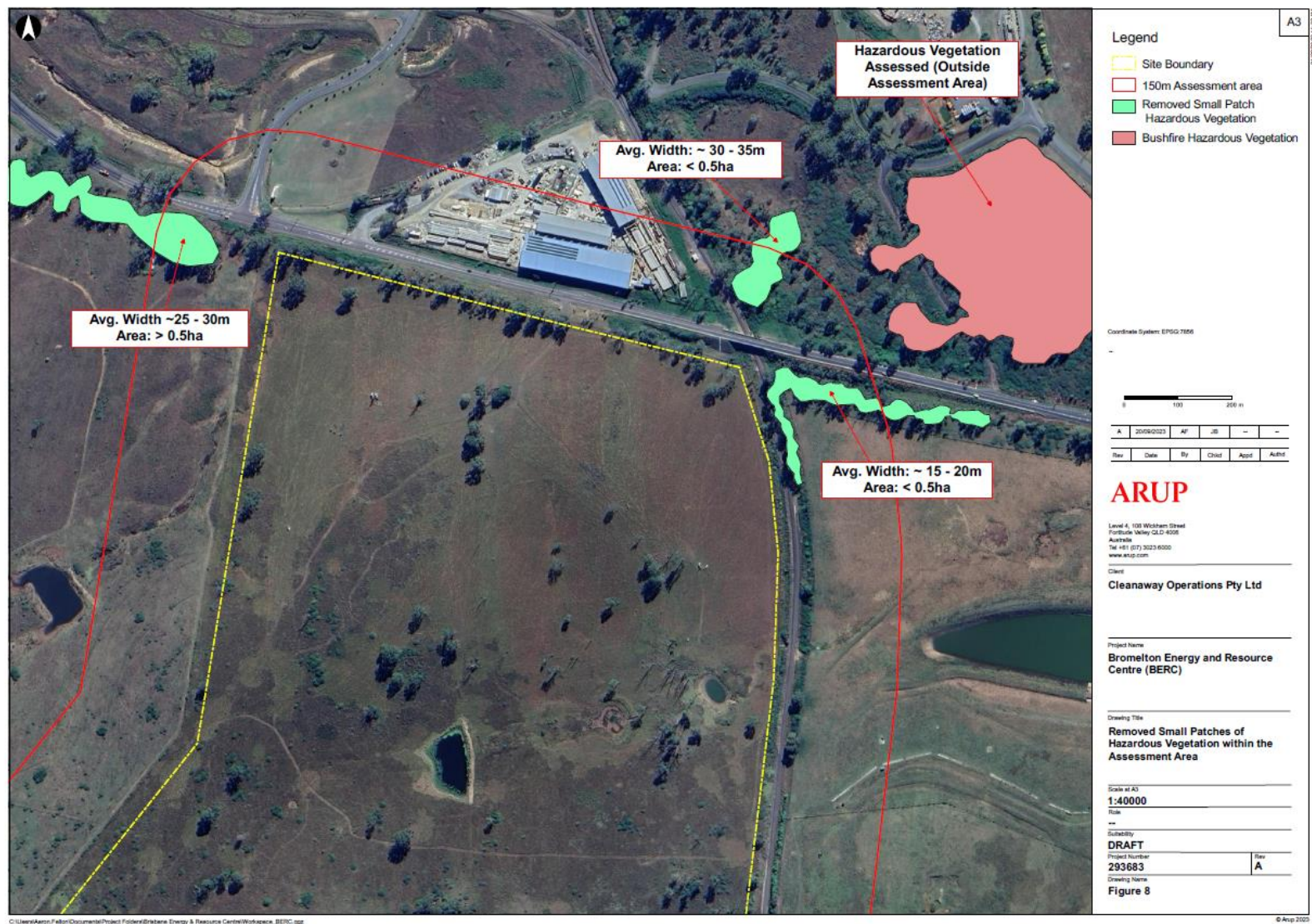


Figure 8: Hazardous Vegetation within the Assessment Area

4.2.6 Step 5 - Determination of Bushfire Attack Level

The BALs for classified vegetation has been calculated using the Flamesol Method 2 Minimum Distance calculator published by Fire Protection Association (FPA) Australia (FPA Australia, 2017). The results from the Flamesol calculator are provided in Table 4-4 and the Flamesol output is provided in Appendix 2.

Table 4-4: Determination of BAL minimum separation distances.

Bushfire Attack Level (BAL)	BAL- Flame Zone (FZ)	BAL-40	BAL-29	BAL-19	BAL-12.5
Vegetation to the North East – VHC 13.2	0 – 6.9m	6.9m – 9.5m	9.5m – 14.2m	14.2m – 21m	21m – 100m

With separation distances of about 200 m to the north-east and 670 m to the south from unmanaged classified vegetation, the site falls outside any BAL separation zones (Figure 8). Since the classified vegetation is too sparse for a fully developed fire-front and excluded from the assessment, the location is rated BAL-LOW. Therefore, bushfire construction requirements, including setbacks under AS3959:2018, are not needed due to insufficient risk.

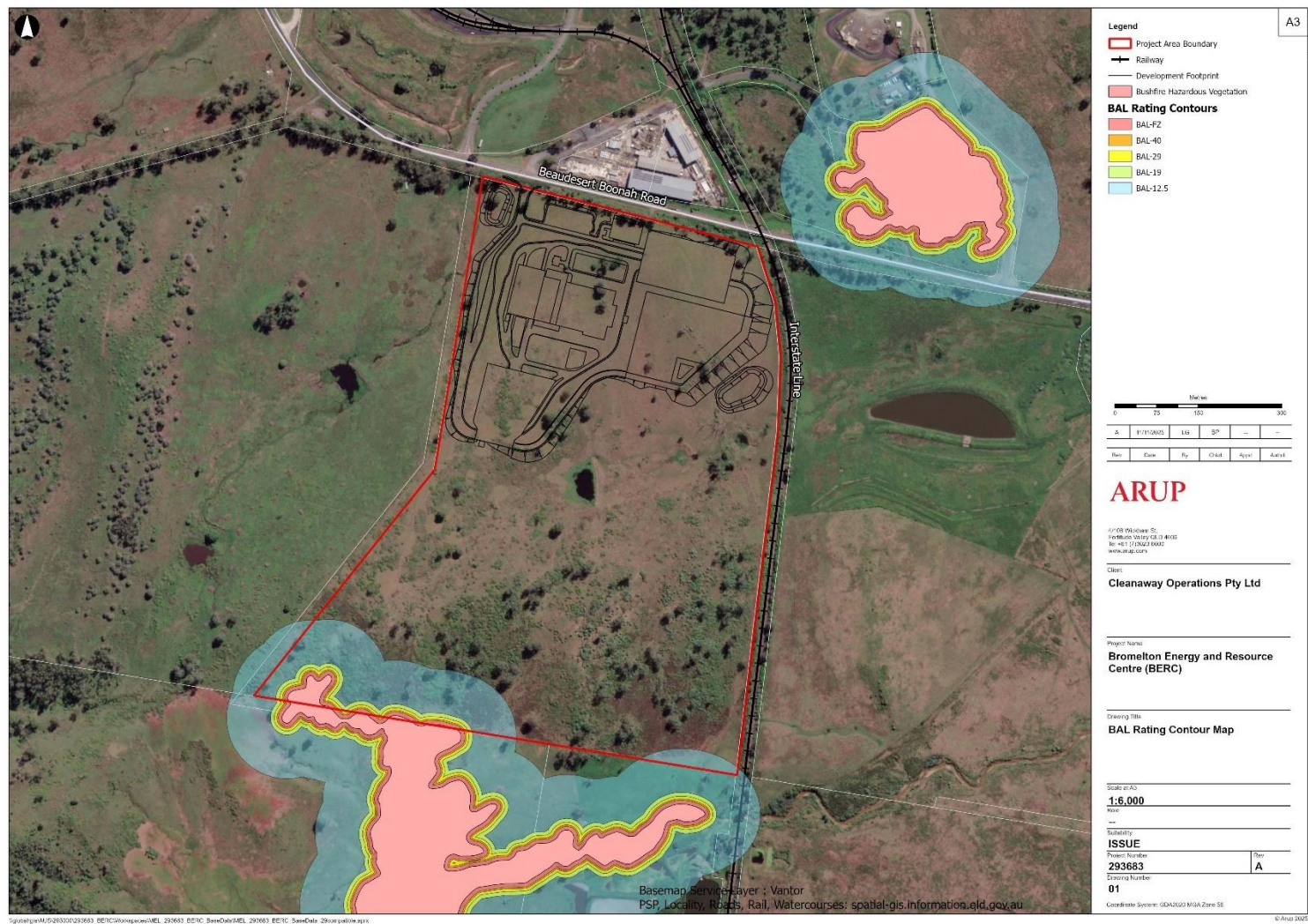


Figure 9: BAL Rating contour map

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5. Regulatory Assessment

5.1 Bushfire Hazard Overlay Code

Clause 8.2.3 of the Planning Scheme includes a Bushfire Hazard Overlay Code and mapping which designates bushfire prone areas pursuant to Section 7 of the *Building Regulation 2006*. Clause 8.2.3.2 of the Planning Scheme notes that the purpose of the Bushfire hazard overlay code will be achieved through the following overall outcomes:

- a. *Development that potentially increases the exposure of people and property to natural hazards:*
 - i. *avoids areas of bushfire risk; or*
 - ii. *where areas of bushfire risk cannot be practicably avoided, development is designed, located and managed to ensure the risk to the safety of people and the damage to property is mitigated to an acceptable or tolerable level before, during and after a natural hazard event;*
- b. *Development in areas at risk from bushfire hazard is compatible with the nature of the hazard;*
- c. *Development is designed and operated in accordance with any Bushfire Management Plan prepared for the site;*
- d. *Development avoids involving the establishment or intensification of vulnerable uses and community infrastructure within or near areas that are subject to bushfire hazard;*
- e. *Development does not result in a material increase in the extent or severity of bushfire hazard;*
- f. *Bushfire risk mitigation treatments are accommodated in a manner that avoids or minimises impacts on the natural environment and ecological processes, and conserves biodiversity values;*
- g. *Development involving the manufacture or storage of hazardous materials does not increase the risk to public safety or the environment in a bushfire event;*
- h. *Development contributes to, and does not unduly burden, effective and efficient disaster management response and recovery capabilities; and*
- i. *Development is located on landforms which can limit the intensity of a bushfire and that have other protective functions or community values.*

Compliance with the outcomes of the Bushfire Hazard Overlay Code have been assessed utilising expert judgement and included in Table 5-1.

Table 5-1: Assessment against the Scenic Rim Planning scheme 2020 Bushfire Hazard Overlay Code

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
For assessable development				
All Development				
PO1	Development is located where it is not at risk from bushfire hazard. <i>Note: A site specific assessment prepared by a suitably qualified person in accordance with Planning Scheme Policy 4 - Bushfire Management Plans will be required to determine compliance with PO1.</i>	AO1	A site specific assessment determines that bushfire hazard is unlikely on any part of the site affected by the development.	In accordance with this Bushfire Hazard Assessment, the Project has been determined to be located where it is not at risk from a bushfire hazard. It was determined to sit outside of the potential impacts of any continuous bushfire prone vegetation of a patch size of greater than 1 ha or wider than 50 m, capable of supporting a fully developed flame front or generate a fireline intensity of 4,000 kW/h or more that can provide medium to high exposure to a built asset. Therefore, no further assessment against the Planning scheme Bushfire Overlay Code is required
The following Outcomes (PO2 - PO22) must be addressed only where it is determined through AO1 above that the site is at risk from Bushfire Hazard and a Bushfire Management Plan is required				
PO2	Development complies with a site specific Bushfire Management Plan (BMP), prepared by a suitably qualified person in accordance with Planning Scheme Policy 4 - Bushfire Management Plans . The BMP demonstrates: 1. That the safety of people and property in a bushfire event can be managed and risks mitigated; and 2. How the specific outcomes of this Code can be achieved.	AO2	No acceptable outcome is prescribed.	Not Applicable – Assessment determined site is not at risk from bushfire.

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
PO3	Development does not increase the number of people living, congregating or working on land in a bushfire hazard area, unless a Bushfire Management Plan (BMP), prepared by a suitably qualified person in accordance with Planning Scheme Policy 4 - Bushfire Management Plans , demonstrates that the safety of people and property in a bushfire event can be managed and risks mitigated.	AO3.1	Development does not increase the number of people living, congregating or working on land in a bushfire hazard area.	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>
		AO3.2	Development involving a vulnerable use is not established in a bushfire hazard area	
PO4	Emergency services and uses providing community support services: 1. Are able to function effectively and safely during and immediately after a bushfire hazard event; and 2. Can demonstrate, by a Bushfire Management Plan prepared by a suitably qualified person in accordance with Planning Scheme Policy 4 - Bushfire Management Plans , that the safety of people and buildings in a bushfire event can be managed and lives protected during a bushfire event.	AO4	Emergency services and uses providing community support services: 1. Are not located in a bushfire hazard area; and 2. Ensures the development footprint, including internal driveways between buildings and from buildings to the roadway, does not traverse a bushfire hazard area.	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>
PO5	Development does not cause: 1. An adverse risk to people, property and the environment due to the impact of bushfire on hazardous materials; and 2. Excess danger or difficulty for emergency services to provide an emergency response or evacuation.		Development involving the storage, handling or manufacture of hazardous materials is not located within a bushfire hazard area.	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>
PO6	Landscaping and fuel sources within the bushfire prone area between hazardous vegetation and building envelopes does not increase the potential for bushfire hazard.	AO6	Landscaping treatments and fuel sources within a bushfire prone area, and any hazardous vegetation and building envelopes are designed and managed to achieve: 1. A potential available fuel load which is less than five tonnes/hectare in aggregate; and	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
			2. A fuel structure which is discontinuous. <i>Note - A landscape maintenance plan may be required to identify the long-term management arrangements to be implemented to achieve the above Acceptable Outcome.</i>	
PO7	Development is designed to minimise vegetation clearing and avoid or minimise impacts on the natural environment and ecological processes.	AO7.1	Development is located in an area that does not require the removal of native vegetation.	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>
PO8	Development outside reticulated water supply areas include a dedicated static supply that is available solely for firefighting purposes and can be accessed by firefighting appliances.		A water tank is provided within 10 metres of each building (other than a class 10 building) which: - Is either below ground level or of non-flammable construction; - Has a take-off connection at a level that allows the following dedicated, static water supply to be left available for access by fire fighters: 10,000 litres for residential buildings; - For industrial, commercial and other buildings, a volume specified in AS 2304–2011; - Includes shielding of tanks and pumps in accordance with AS2304–2011; - Includes a hardstand area (concrete or construction standard gravel) allowing medium rigid vehicle (15 tonne fire appliance) access within 6 metre of the tank; - Is provided with rural fire brigade tank fittings if serviced by a rural fire brigade (i.e. 50 mm ball valve and male camlock coupling and, if underground, an access hole of 200mm (minimum) to accommodate suction lines); and - Is clearly identified by directional signage at the street frontage.	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
PO9	Where development is undertaken in an urban area or is for urban purposes a constructed perimeter road with reticulated water supply is established between the lot or building envelope and is readily accessible at all times for urban fire fighting vehicles. The access to the perimeter road is available for both fire-fighting and maintenance works for hazard reduction purposes. <i>Note - For a material change of use perimeter roads are unlikely to be required where a development site involves less than 2.5ha and alternative access is available.</i>	AO9.1	Lot boundaries or building envelopes are separated from hazardous vegetation by a public road which: - Has a two-lane sealed carriageway clear of hazardous vegetation; - Contains a reticulated water supply; - Is connected to public roads at both ends and at intervals of no more than 500 m; - Accommodates geometry, turning radii and vertical clearance in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines and the Department of Transport and Main Roads' Planning and Design Manual; and - Allows and does not impede access for fire-fighting and maintenance for fire-fighting purposes.	Not Applicable – Assessment determined site is not at risk from bushfire.
		AO9.2	Where a reticulated water supply is available, fire hydrants are designed, sited and installed in accordance with AS2419.1-2009 Fire Hydrant Installations - System Design, Installation and Commissioning, and connected to a reticulated water supply, unless otherwise specified by the relevant water entity.	
PO10	Where development is undertaken for non-urban purposes either a constructed perimeter road or a formed, all weather fire trail is established between the development (including lots or building envelopes) and the hazardous vegetation and is readily accessible at all times for the type of fire-fighting vehicles servicing the area. The access to the perimeter road or fire trail is available for both firefighting and maintenance works or hazard reduction activities. <i>Note - For a material change of use fire trails are unlikely to be required where a development site</i>	AO10	Lot boundaries or building envelopes are separated from hazardous vegetation by a public road (as per AO19.1), or a fire trail which has: - A reserve or easement width of at least 20 metres - A minimum trafficable (cleared and formed) width of four metres and no less than 4.8 metres vertical clearance, with three metres each side cleared of all flammable vegetation greater than 10 centimetres in height - No cut or fill embankments or retaining walls adjacent to the four metres wide trafficable path - The trail must be capable of accommodating a 10-tonne vehicle	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
	<i>involves less than 2.5ha and alternative access is available</i>		5. The balance 10 metre width of the easement has managed vegetation to remove major surface hazards 6. Turning areas and vertical clearances for firefighting appliances in accordance with Queensland Fire and Emergency Services' Fire hydrant and vehicle access guidelines 7. A maximum gradient of 12.5 per cent 8. A cross-fall of no greater than 10 degrees 9. Drainage and erosion control devices in accordance with the standards prescribed in a planning scheme policy 10. Vehicular access at each end, which is connected to the public road network at intervals of no more than 500 metres 11. Designated fire-trail signage 12. If used, has gates locked with a system authorised by Queensland Fire and Emergency Services; and 13. If a fire trail, has an access easement that is granted in favour of council and Queensland Fire and Emergency Services; and 14. Allows and does not impede access for firefighting and maintenance for firefighting purposes.	
PO11	Development is not located on slopes and land forms that expose people or property to an intolerable level of risk to life or property.	AO11.1	Development along ridgelines, saddles and crests where adjacent slopes exceed 14 degrees is avoided.	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>
		AO11.2	Development is located where the effective slope is less than five degree downslope,	

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
PO12	To ensure the protection of peoples' lives and property, an area designated for revegetation or rehabilitation will not create an additional bushfire prone area. <i>Note - If the acceptable outcomes are not met a bushfire hazard assessment in accordance with Planning Scheme Policy 4 - Bushfire Management Plans will need to be conducted to demonstrate areas designated for revegetation or rehabilitation will not create additional bushfire prone areas.</i>	AO12.1	The dimensions and configuration of an area designated for revegetation or rehabilitation ensure the area does not have the ability to become a medium, high or very high bushfire prone area in the future; OR The landscaping treatments are designed to achieve; - Potential available fuel load which is less than five tonnes/hectare in aggregate; and - Fuel structure which is discontinuous.	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>
		AO12.2	A landscape maintenance plan specifies long-term management arrangements necessary to ensure that: - Potential available fuel load is maintained at less than five tonnes/hectare in aggregate; and - Fuel structure remains discontinuous.	
PO13	Where required, recreational parks or open space are located to act as a buffer between bushfire hazard areas and development and do not create additional bushfire hazard areas.	AO13.1	Recreational parks or open space are designed and located between buildings, building envelopes or lot boundaries and adjacent bushfire hazard areas.	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>
		AO13.2	Recreational parks or open space are designed to ensure that: - Potential available fuel load is maintained at less than five tonnes/hectare in aggregate; and - Fuel structure remains discontinuous.	
PO14	Essential infrastructure is designed or located to minimise the creation of ignition sources that would increase the potential risk of bushfires to people and property.	AO14	Major electricity infrastructure, electricity distribution and transmission networks within the bushfire hazard area, are managed in accordance with <i>Electrical Safety Act 2002</i> and Regulation 2013.	<i>Not Applicable – Assessment determined site is not at risk from bushfire.</i>

5.2 SDA criteria (Natural Hazards – other)

This bushfire hazard assessment identifies low bushfire hazard risk for the Project. Table 5-2 provides an assessment against the SDA criteria (Natural Hazard – other), confirming that the Project is consistent with development intent and planning policy of the SDA.

Table 5-2: Assessment against SDA Natural Hazards (other) criteria

Clause 2.5.6 (1)	Response	Reference
(a) Identifies relevant natural hazards that may impact upon the development	This report identified the relevant natural hazards applicable to the site and Project in accordance with AS3959:2018.	See section 4.2.1 to 4.2.5.
(b) Appropriately manages risk associated with the identified hazards and	A separation distance of approximately 200 m and 670 m between the edge of unmanaged classified vegetation to the north-east and the south respectively of the Project, the BAL at this interface is assessed as sitting outside of any BAL rating attack distance. The site is assessed as BAL-LOW. Based on this separation and BAL classification, there is insufficient risk to warrant specific bushfire construction requirements (AS3959:2018).	See section 4.2.6
(c) Avoids increasing the severity of the natural hazard.	The Project is appropriately sited to avoid bushfire risk hazard (i.e. vegetation hazard) and is sufficiently setback from areas identified as presenting bushfire hazard risk. Vegetation on-site would be maintained regularly through appropriate management arrangements so that it remains in a low threat state.	See section 4.2.6.

6. Recommendations

The following bushfire mitigation measures will be adopted for the Project:

- The planting design will incorporate plant species with lower fuel load in consideration of bushfire mitigation and management bushfire mitigation guidelines from the following agencies:
 - Country Fire Authority, 2022, Landscaping for bushfire garden design and plant selection.
 - Australian Institute of Architects, 2021, Environment practice notes, Site planning and design for bushfire.
 - Queensland Reconstruction Authority, 2020, Bushfire Resilient Building Guidance for Queensland Homes
- Perimeter roads will be provided between any ignition sources and unmanaged vegetation (e.g., mechanical equipment, fuel storage).
- Provision will be made for suitable access and water supply, drawing on relevant parts of the QFES guideline 'Fire Hydrant & Vehicle Access Guidelines for Residential, Commercial & Industrial Lots (2025).
- Advice must be sought from a fire safety engineer on any on fire safety structures and dangerous goods storage requirements to inform the layout and other fire safety measures.

7. Conclusion

This report has been prepared to provide a site-specific bushfire hazard assessment and management plan for a Project at Lot 1 Beaudesert - Boonah Road, Bromelton (Lot 1 on RP45234).

The results of the assessment show that the small patches of vegetation associated with the rail corridor, the roadside verge vegetation to the west and the vegetation to the north-east of the site are too small to develop a full fire front and have been removed from the assessment. The larger patches of hazardous vegetation to the northeast and off the southern boundary all pose *low risk* of bushfire impact to the building assets forming part of the Project.

Based on assessment of the proposal against the applicable parts of the SPP and Bushfire Hazard Overlay Code, it is determined that the Project complies with Section 2.6.5 of the SDA Development Scheme. The report identifies bushfire hazard that may potentially impact on development and assesses the risks associated with this hazard. This assessment confirms the proposal *is not subject to bushfire hazard and complies with the relevant assessment benchmarks as well as State Planning Policy 2017, the Bromelton SDA Development Scheme*.

All other vegetation within 150 m of the development site *is not classified as bushfire-prone* and therefore, calculation of radiant heat flux/BAL is not applicable. The development design provides for safe and efficient access and egress via Beaudesert Boonah Road, which allows for efficient access by firefighting and other emergency vehicles and safe and efficient egress for evacuation away from the most likely direction of bushfire attack.

References

1. Queensland Fire and Emergency Services (QFES). (2019). Bushfire Resilient Communities Technical Reference Guide.
2. Department of Infrastructure, Local Government and Planning. (2017). State Planning Policy.
3. Scenic Rim Regional Council. (2020). Scenic Rim Planning Scheme.
4. Standards Australia. (2018). AS3959:2018 Construction of Buildings in Bushfire-Prone Areas.

Appendix 1 Vegetation Management Report



Vegetation management report

For Lot: 1 Plan: RP45234

13/06/2023

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Recent changes

Updated mapping

Updated vegetation mapping was released on 8 September 2022 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, wetland, high-value regrowth and essential habitat mapping.

The Department of Environment and Science have also updated their protected plant and koala protection mapping to align with the Queensland Herbarium scientific updates.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

Property details - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s) and catchment(s);

Vegetation management framework - an explanation of the application of the framework and contact details for the Department of Resources who administer the framework;

Vegetation management framework details for the specified Lot on Plan including:

- the vegetation management categories on the property;
- the vegetation management regional ecosystems on the property;
- vegetation management watercourses or drainage features on the property;
- vegetation management wetlands on the property;
- vegetation management essential habitat on the property;
- whether any area management plans are associated with the property;
- whether the property is coastal or non-coastal; and
- whether the property is mapped as Agricultural Land Class A or B;

Protected plant framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework, including:

- high risk areas on the protected plant flora survey trigger map for the property;

Koala protection framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework; and

Koala protection framework details for the specified Lot on Plan including:

- the koala district the property is located in;
- koala priority areas on the property;
- core and locally refined koala habitat areas on the property;
- whether the lot is located in an identified koala broad-hectare area; and
- koala habitat regional ecosystems on the property for core koala habitat areas.

This information will assist you to determine your options for managing vegetation under:

- the vegetation management framework, which may include:

- exempt clearing work;
- accepted development vegetation clearing code;
- an area management plan;
- a development approval;

- the protected plant framework, which may include:

- the need to undertake a flora survey;
- exempt clearing;
- a protected plant clearing permit;

- the koala protection framework, which may include:

- exempted development;
- a development approval;
- the need to undertake clearing sequentially and in the presence of a koala spotter.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 8 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

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1. Property details

1.1 Tenure and title area

All of the lot, plan, tenure and title area information associated with property Lot: 1 Plan: RP45234, are listed in Table 1.

Table 1: Lot, plan, tenure and title area information for the property

Lot	Plan	Tenure	Property title area (sq metres)
1	RP45234	Freehold	633,080

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

Does this property have a freehold tenure and is in the Wet Tropics of Queensland World Heritage Area?

No, this property is not located in the Wet Tropics of Queensland World Heritage Area.

1.2 Property location

Table 2 provides a summary of the locations for property Lot: 1 Plan: RP45234, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)
Scenic Rim Regional

Bioregion(s)	Subregion(s)
Southeast Queensland	Moreton Basin

Catchment(s)
Logan-Albert

2. Vegetation management framework (administered by the Department of Resources)

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2012, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem prescribed under Schedule 5 of the Vegetation Management Regulation 2012; and
- a mangrove.

2.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify the Department of Resources or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 4.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact the Department of Resources before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/exemptions>.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact the Department of Resources prior to clearing in any of these areas.

2.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/codes>

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify the Department of Resources before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at

<https://apps.dnrm.qld.gov.au/vegetation/>

2.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an Area Management Plan applies to your property for which you can make a new notification, it will be listed in Section 3.6 of this report. Before clearing under one of these AMPs, you must first notify the Department of Resources and then follow the conditions and requirements listed in the AMP.

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/area-management-plans>

2.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/development>

2.5. Contact information for the Department of Resources

For further information on the vegetation management framework:

Phone 135VEG (135 834)

Email vegetation@resources.qld.gov.au

Visit <https://www.resources.qld.gov.au/?contact=vegetation> to submit an online enquiry.

3. Vegetation management framework for Lot: 1 Plan: RP45234

3.1 Vegetation categories

The vegetation categories on your property are shown on the regulated vegetation management map in section 4.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property. Total area: 63.38ha

Vegetation category	Area (ha)
Category C	< 0.1
Category X	63.3

Table 4: Description of vegetation categories

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact the Department of Resources to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact the Department of Resources to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

There is no Property Map of Assessable Vegetation (PMAV) present on this property.

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 4.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/>

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
12.9-10.3	Of concern	C	0.07	Eucalyptus moluccana open forest on sedimentary rocks	Mid-dense
non-rem	None	X	63.31	None	None

Please note:

1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.
2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work;
- accepted development vegetation clearing codes;
- performance outcomes in State Code 16 of the State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 4.2.

3.4 Wetlands

There are no vegetation management wetlands present on this property.

3.5 Essential habitat

Under the VMA, essential habitat for protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA) as critically endangered, endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 4.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map -

- 1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are

comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or
2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
860	Phascolarctos cinereus	koala	E	Open forests and woodlands containing Eucalyptus, Corymbia, Lophostemon or Melaleuca trees having a trunk of a diameter of more than 10cm at 1.3m above the ground. Tree species used for food and habitat varies across the state and can include: Corymbia citriodora, Corymbia henryi, Corymbia intermedia, Eucalyptus acmenoides, Eucalyptus bancroftii, Eucalyptus biturbinata, Eucalyptus blakelyi, Eucalyptus brownii, Eucalyptus camaldulensis, Eucalyptus carnea, Eucalyptus chloroclada, Eucalyptus coolabah, Eucalyptus crebra, Eucalyptus dealbata, Eucalyptus drepanophylla, Eucalyptus dunnii, Eucalyptus eugenioides, Eucalyptus exserta, Eucalyptus fibrosa, Eucalyptus grandis, Eucalyptus helidonica, Eucalyptus latisinensis, Eucalyptus longirostrata, Eucalyptus major, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus microcarpa, Eucalyptus microcorys, Eucalyptus microtheca, Eucalyptus moluccana, Eucalyptus montivaga, Eucalyptus orgadophila, Eucalyptus papuana, Eucalyptus pilularis, Eucalyptus platyphylla, Eucalyptus populnea, Eucalyptus portuensis, Eucalyptus propinqua, Eucalyptus racemosa, Eucalyptus resinifera, Eucalyptus robusta, Eucalyptus saligna, Eucalyptus seeana, Eucalyptus siderophloia, Eucalyptus sideroxylon, Eucalyptus tereticornis, Eucalyptus thozetiana, Eucalyptus tindaliae, Eucalyptus umbra, Lophostemon confertus, Melaleuca leucadendra, Melaleuca quinquenervia.	Sea level to 1000m.	None	Riparian areas, plains and hill/escarpment slopes.

Label	Regional Ecosystem (mandatory unless otherwise specified)
860	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8, 4.3.10, 4.3.11, 4.5.3, 4.5.5, 4.5.6, 4.5.8, 4.5.9, 4.7.1, 4.7.7, 4.7.8, 4.9.6, 4.9.10, 4.9.12, 4.9.17, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.7, 6.3.8, 6.3.9, 6.3.11, 6.3.12, 6.3.17, 6.3.18, 6.3.22, 6.3.24, 6.3.25, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.6, 6.5.7, 6.5.8, 6.5.9, 6.5.10, 6.5.11, 6.5.13, 6.5.14, 6.5.15, 6.5.16, 6.5.17, 6.5.18, 6.5.19, 6.6.2, 6.7.1, 6.7.2, 6.7.5, 6.7.6, 6.7.7, 6.7.9, 6.7.11, 6.7.12, 6.7.13, 6.7.14, 6.7.17, 6.9.3, 7.2.3, 7.2.4, 7.2.7, 7.2.11, 7.3.7, 7.3.8, 7.3.9, 7.3.12, 7.3.13, 7.3.14, 7.3.16, 7.3.19, 7.3.20, 7.3.21, 7.3.25, 7.3.26, 7.3.39, 7.3.40, 7.3.42, 7.3.43, 7.3.44, 7.3.45, 7.3.47, 7.3.48, 7.3.50, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.8.7, 7.8.8, 7.8.10, 7.8.15, 7.8.16, 7.8.17, 7.8.18, 7.8.19, 7.11.5, 7.11.6, 7.11.13, 7.11.14, 7.11.16, 7.11.18, 7.11.19, 7.11.20, 7.11.21, 7.11.31, 7.11.32, 7.11.33, 7.11.34, 7.11.35, 7.11.37, 7.11.41, 7.11.42, 7.11.43, 7.11.44, 7.11.45, 7.11.46, 7.11.47, 7.11.48, 7.11.49, 7.11.50, 7.11.51, 7.12.4, 7.12.5, 7.12.17, 7.12.21, 7.12.22, 7.12.23, 7.12.24, 7.12.25, 7.12.26, 7.12.27, 7.12.28, 7.12.29, 7.12.30, 7.12.33, 7.12.34, 7.12.35, 7.12.51, 7.12.52, 7.12.53, 7.12.54, 7.12.55, 7.12.56, 7.12.57, 7.12.58, 7.12.59, 7.12.60, 7.12.61, 7.12.62, 7.12.63, 7.12.65, 7.12.66, 7.12.69, 8.1.5, 8.2.3, 8.2.6, 8.2.7, 8.2.8, 8.2.11, 8.2.12, 8.2.13, 8.2.14, 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.8, 8.3.10, 8.3.11, 8.3.13, 8.5.1, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.5.7, 8.9.1, 8.10.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.11.10, 8.11.12, 8.12.4, 8.12.5, 8.12.6, 8.12.7, 8.12.8, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 8.12.26, 8.12.27, 8.12.29, 8.12.31, 8.12.32, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.10, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.27, 9.4.1, 9.4.2, 9.5.1, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.15, 9.5.16, 9.5.17, 9.7.1, 9.7.2, 9.7.3, 9.7.4, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.3, 9.8.4, 9.8.5, 9.8.9, 9.8.10, 9.8.11, 9.8.13, 9.10.1, 9.10.3, 9.10.4, 9.10.5, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.12, 9.11.13, 9.11.14, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.21, 9.11.22, 9.11.23, 9.11.24, 9.11.25, 9.11.26, 9.11.28, 9.11.29, 9.11.30, 9.11.31, 9.11.32, 9.12.1, 9.12.2, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.14, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.25, 9.12.26, 9.12.27, 9.12.28, 9.12.29, 9.12.30, 9.12.31, 9.12.32, 9.12.33, 9.12.35, 9.12.36, 9.12.37, 9.12.38, 9.12.39, 9.12.44, 10.3.2, 10.3.3, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.17, 10.3.20, 10.3.27, 10.3.28, 10.4.3, 10.4.9, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.8, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.1, 10.7.2, 10.7.3, 10.7.4, 10.7.5, 10.7.9, 10.7.10, 10.7.11, 10.7.12, 10.9.2, 10.9.3, 10.9.5, 10.10.1, 10.10.3, 10.10.4, 10.10.5, 10.10.7, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.5, 11.3.6, 11.3.7, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.21, 11.3.23, 11.3.25, 11.3.26, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.32, 11.3.33, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.7, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.18, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.3, 11.7.4, 11.7.6, 11.7.7, 11.8.1, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.6, 11.9.7, 11.9.9, 11.9.10, 11.9.11, 11.9.13, 11.9.14, 11.10.1, 11.10.2, 11.10.3, 11.10.4, 11.10.5, 11.10.6, 11.10.7, 11.10.9, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.2, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.12, 11.11.13, 11.11.14, 11.11.15, 11.11.16, 11.11.17, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.13, 11.12.14, 11.12.15, 11.12.16, 11.12.17, 11.12.19, 11.12.20, 12.2.5, 12.2.6, 12.2.7, 12.2.8, 12.2.10, 12.3.2, 12.3.3, 12.3.4, 12.3.5, 12.3.6, 12.3.7, 12.3.9, 12.3.10, 12.3.11, 12.3.14, 12.3.18, 12.3.19, 12.3.20, 12.5.1, 12.5.2, 12.5.3, 12.5.4, 12.5.6, 12.5.7, 12.5.10, 12.5.12, 12.8.1, 12.8.8, 12.8.9, 12.8.11, 12.8.12, 12.8.14, 12.8.16, 12.8.17, 12.8.20, 12.8.24, 12.8.25, 12.9-10.1, 12.9-10.2, 12.9-10.3, 12.9-10.4, 12.9-10.5, 12.9-10.7, 12.9-10.8, 12.9-10.11, 12.9-10.12, 12.9-10.14, 12.9-10.17, 12.9-10.18, 12.9-10.19, 12.9-10.21, 12.9-10.25, 12.9-10.26, 12.9-10.27, 12.9-10.28, 12.9-10.29, 12.11.2, 12.11.3, 12.11.5, 12.11.6, 12.11.7, 12.11.8, 12.11.9, 12.11.14, 12.11.15, 12.11.16, 12.11.17, 12.11.18, 12.11.22, 12.11.23, 12.11.24, 12.11.25, 12.11.26, 12.11.27, 12.11.28, 12.12.2, 12.12.3, 12.12.4, 12.12.5, 12.12.6, 12.12.7, 12.12.8, 12.12.9, 12.12.11, 12.12.12, 12.12.14, 12.12.15, 12.12.23, 12.12.24, 12.12.25, 12.12.28, 13.3.1, 13.3.2, 13.3.3, 13.3.4, 13.3.5, 13.3.7, 13.9.2, 13.11.1, 13.11.2, 13.11.3, 13.11.4, 13.11.5, 13.11.6, 13.11.8, 13.11.9, 13.12.1, 13.12.2, 13.12.3, 13.12.4, 13.12.5, 13.12.6, 13.12.8, 13.12.9, 13.12.10.

3.6 Area Management Plan(s)

Nil

3.7 Coastal or non-coastal

For the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP), this property is regarded as*

Coastal

*See also Map 4.3

3.8 Agricultural Land Class A or B

The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?

Class A (with urban areas masked as per SPP): 62.56ha

No Class B

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See Map 4.4 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 1 Plan: RP45234.

4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:

<https://www.resources.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form>

Regulated vegetation management map

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new [property maps of assessable vegetation \(PMAV\)](#).

Vegetation management supporting map

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

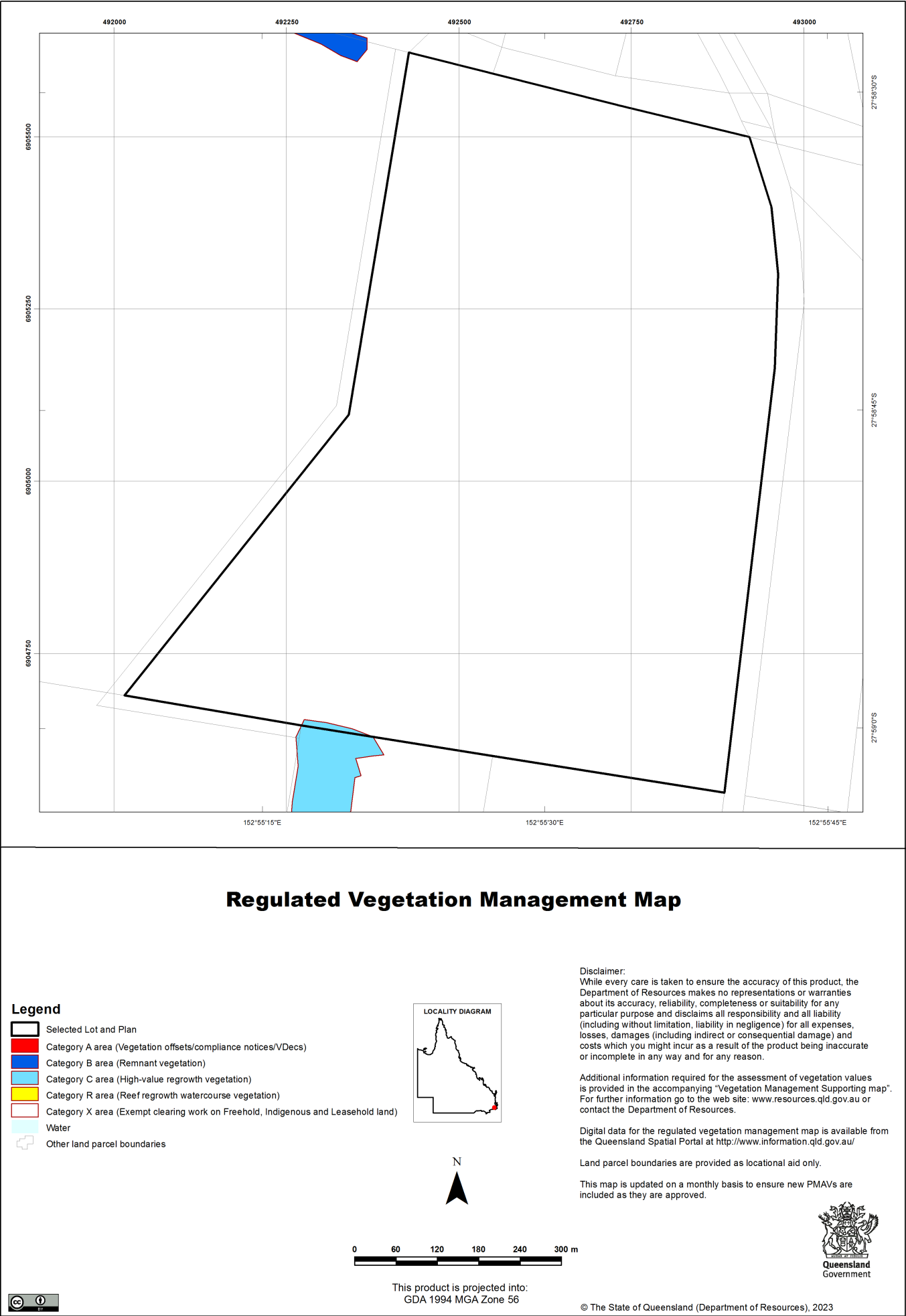
Coastal/non-coastal map

The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP).

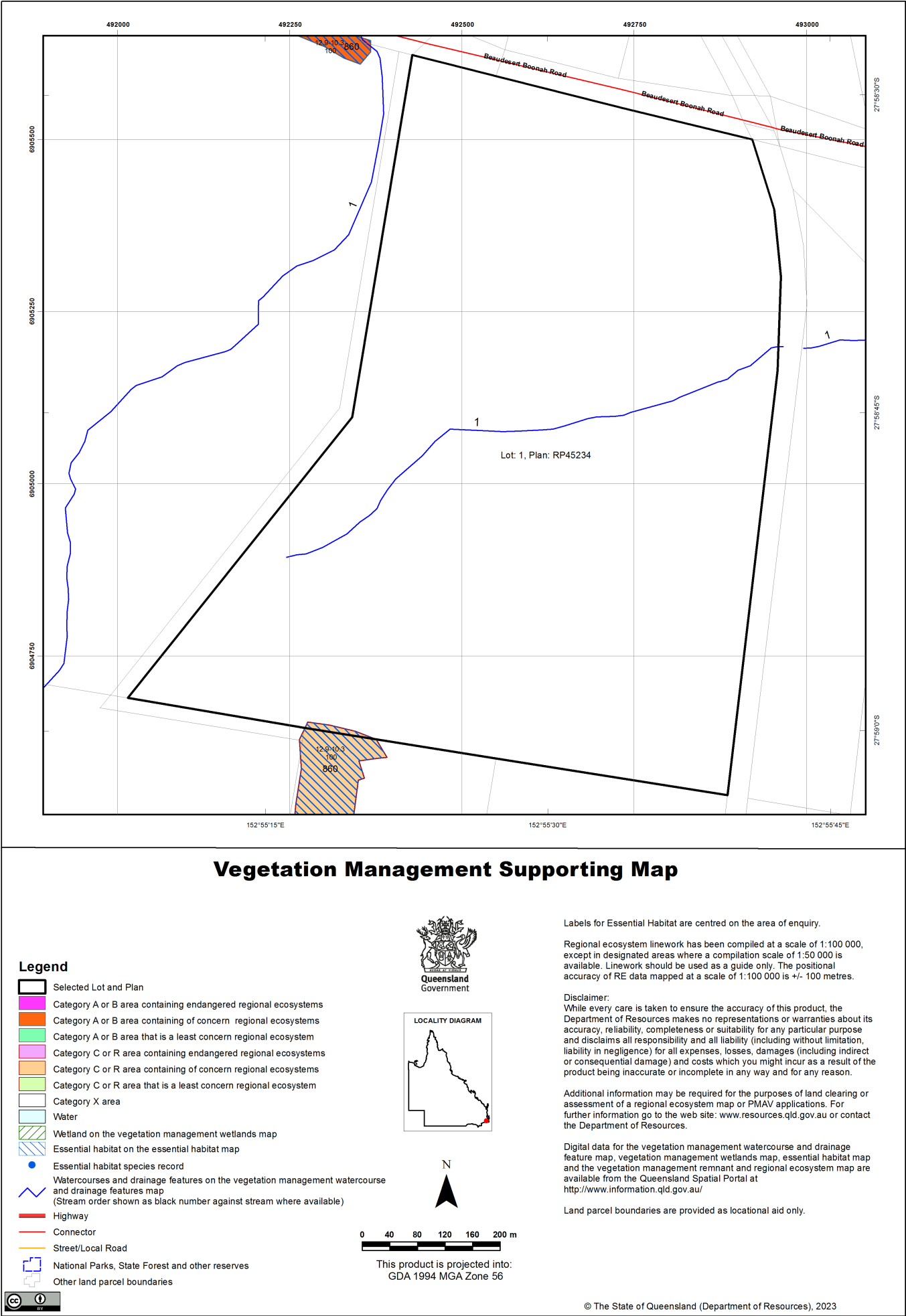
Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture

The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

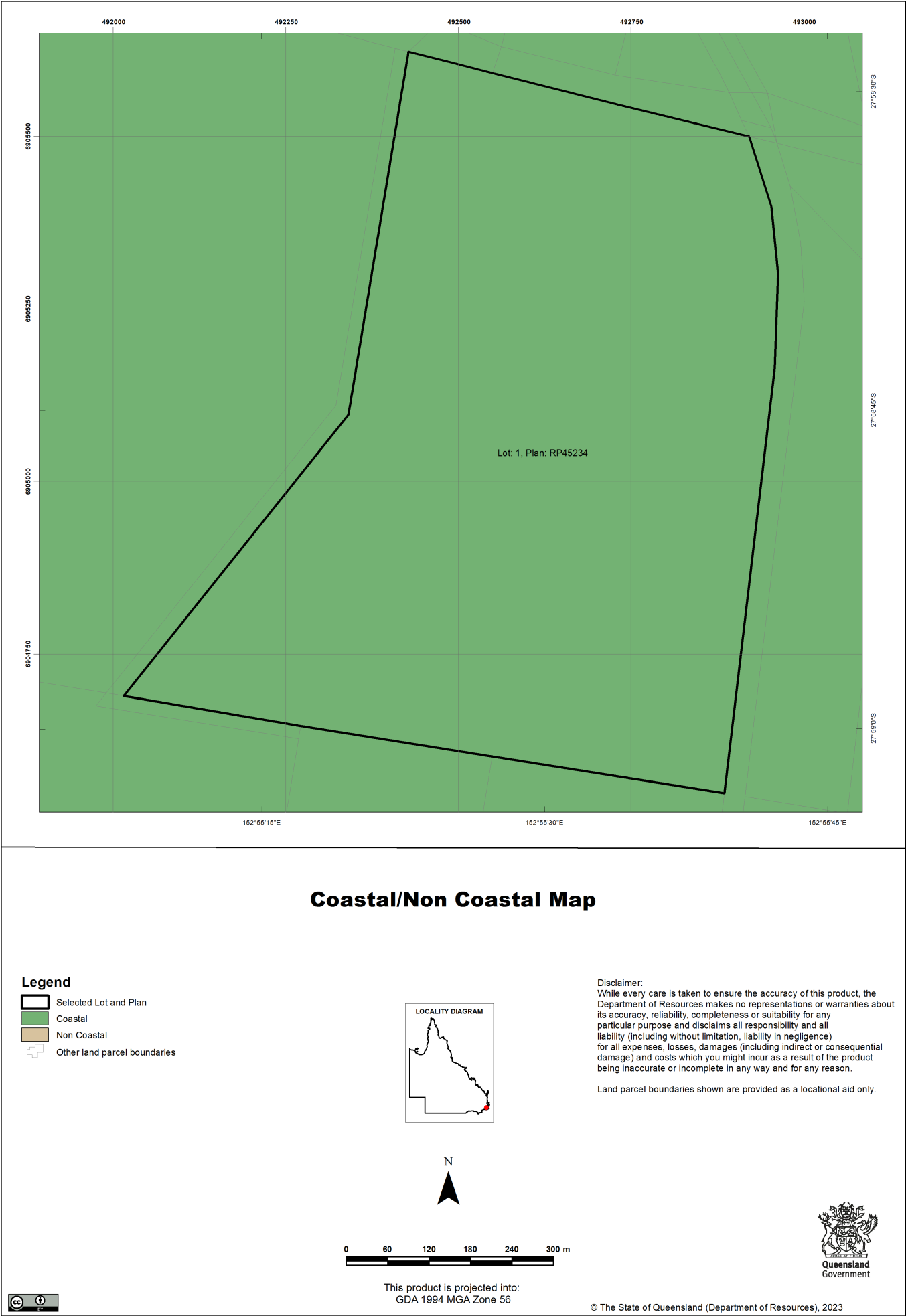
4.1 Regulated vegetation management map



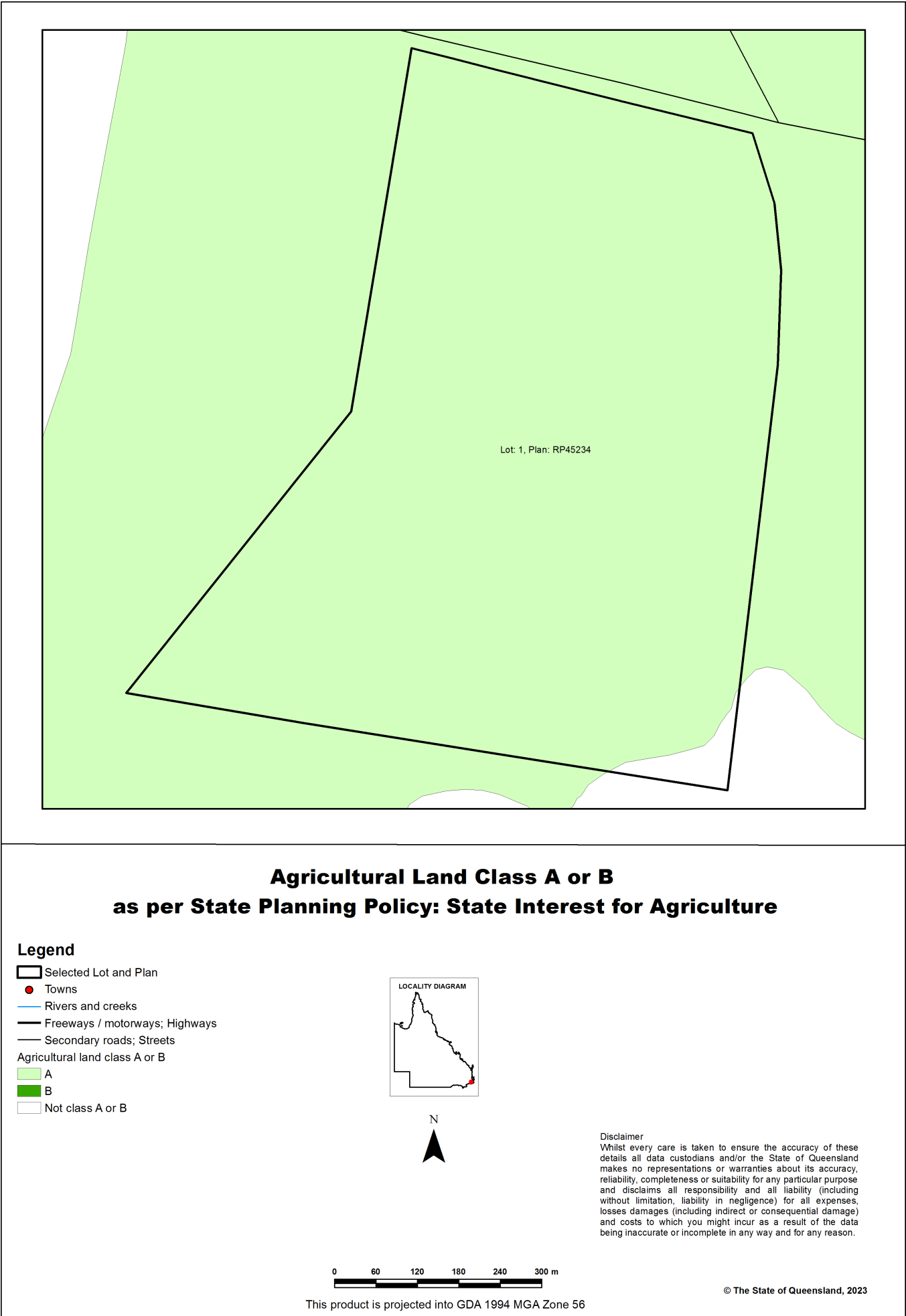
4.2 Vegetation management supporting map



4.3 Coastal/non-coastal map



4.4 Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture



5. Protected plants framework (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the [Nature Conservation Act 1992](#) (NCA). The NCA regulates the clearing of protected plants 'in the wild' (see [Operational policy: When a protected plant in Queensland is considered to be 'in the wild'](#)) that are listed as critically endangered, endangered, vulnerable or near threatened under the Act.

Please note that the protected plant clearing framework applies irrespective of the classification of the vegetation under the *Vegetation Management Act 1999* and any approval or exemptions given under another Act, for example, the *Vegetation Management Act 1999* or *Planning Regulation 2017*.

5.1 Clearing in high risk areas on the flora survey trigger map

The flora survey trigger map identifies high-risk areas for threatened and near threatened plants. These are areas where threatened or near threatened plants are known to exist or are likely to exist based on the habitat present. The flora survey trigger map for this property is provided in section 5.5.

If you are proposing to clear an area shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken by a suitably qualified person in accordance with the [Flora survey guidelines](#). The main objective of a flora survey is to locate any threatened or near threatened plants that may be present in the clearing impact area.

If the flora survey identifies that threatened or near threatened plants are not present within the clearing impact area or clearing within 100m of a threatened or near threatened plant can be avoided, the clearing activity is exempt from a permit. An [exempt clearing notification form](#) must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that threatened or near threatened plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the [clearing permit application form](#).

5.2 Clearing outside high risk areas on the flora survey trigger map

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that threatened or near threatened plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

5.3 Exemptions

Many activities are 'exempt' under the protected plant clearing framework, which means that clearing of native plants that are in the wild can be undertaken for these activities with no need for a flora survey or a protected plant clearing permit. The Information sheet - General exemptions for the take of protected plants provides some of these exemptions.

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) under the *Vegetation Management Act 1999* (i.e. listed in Schedule 21 of the Planning Regulations 2017) while some are different.

5.4 Contact information for DES

For further information on the protected plants framework:

Phone 1300 130 372 (and select option four)

Email palm@des.qld.gov.au

Visit <https://www.qld.gov.au/environment/plants-animals/plants/protected-plants>

5.5 Protected plants flora survey trigger map

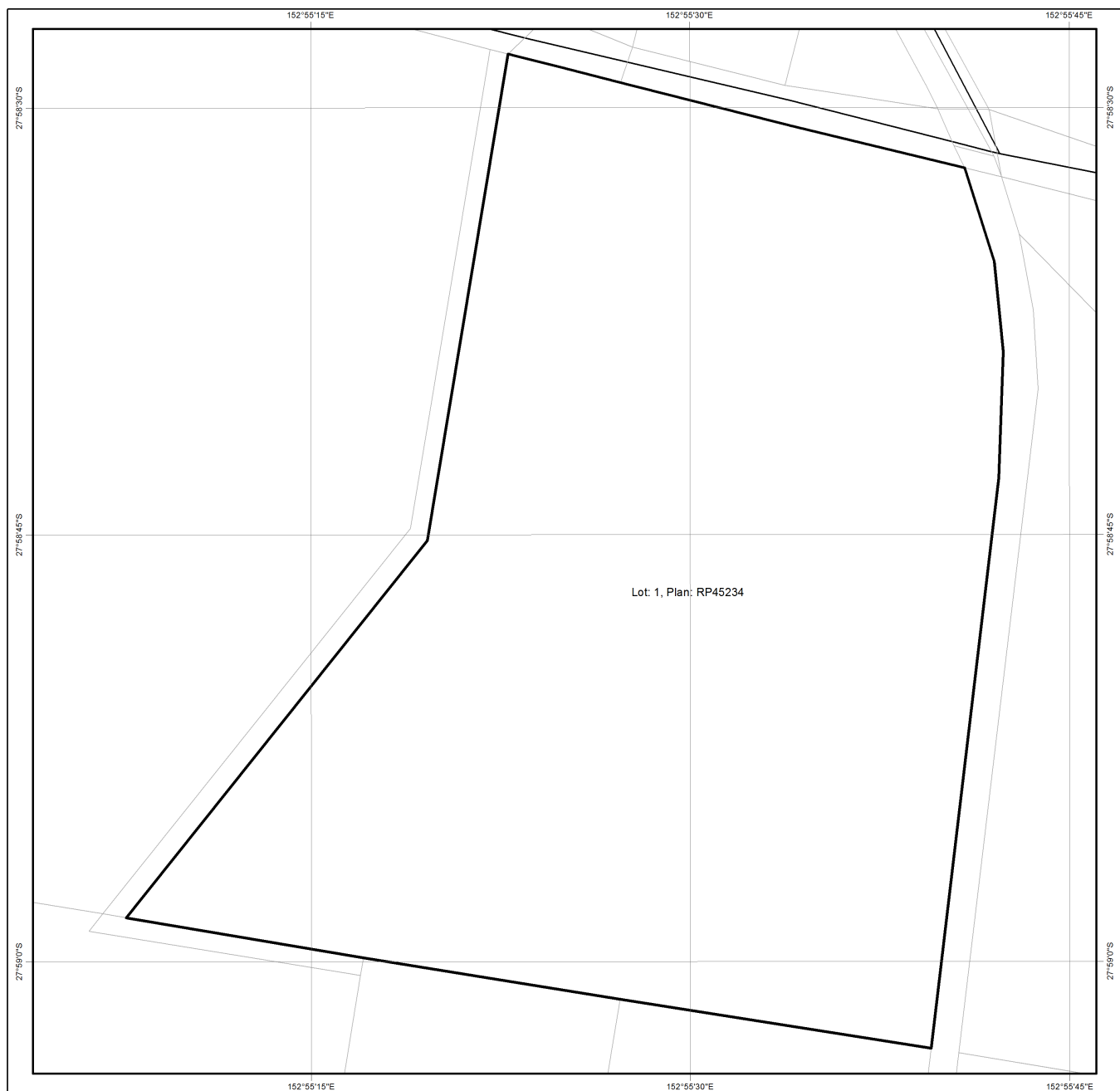
This map included may also be requested individually at: <https://apps.des.qld.gov.au/map-request/flora-survey-trigger/>.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

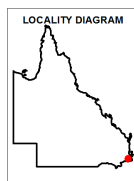
Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the [Queensland Spatial Catalogue](#), the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for more information.



Protected Plants Flora Survey Trigger Map

Legend

-  Selected Lot and Plan
-  High risk area
-  Other land parcel boundaries
-  Freeways / motorways / highways
-  Secondary roads / streets



0 40 80 120 160 200 m

This product is projected into:
GDA 1994 MGA Zone 56

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@des.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

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6. Koala protection framework (administered by the Department of Environment and Science (DES))

The koala (*Phascolarctos cinereus*) is listed in Queensland as endangered by the Queensland Government under *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Queensland Government's koala protection framework is comprised of the *Nature Conservation Act 1992*, the Nature Conservation (Animals) Regulation 2020, the Nature Conservation (Koala) Conservation Plan 2017, the *Planning Act 2016* and the Planning Regulation 2017.

6.1 Koala mapping

6.1.1 Koala districts

The parts of Queensland where koalas are known to occur has been divided into three koala districts - koala district A, koala district B and koala district C. Each koala district is made up of areas with comparable koala populations (e.g. density, extent and significance of threatening processes affecting the population) which require similar management regimes.

Section 7.1 identifies which koala district your property is located in.

6.1.2 Koala habitat areas

Koala habitat areas are areas of vegetation that have been determined to contain koala habitat that is essential for the conservation of a viable koala population in the wild based on the combination of habitat suitability and biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water). In order to protect this important koala habitat, clearing controls have been introduced into the Planning Regulation 2017 for development in koala habitat areas.

Please note that koala habitat areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

There are two different categories of koala habitat area (core koala habitat area and locally refined koala habitat), which have been determined using two different methodologies. These methodologies are described in the document [Spatial modelling in South East Queensland](#).

Section 7.2 shows any koala habitat area that exists on your property.

Under the Nature Conservation (Koala) Conservation Plan 2017, an owner of land (or a person acting on the owner's behalf with written consent) can request to make, amend or revoke a koala habitat area determination if they believe, on reasonable grounds, that the existing determination for all or part of their property is incorrect.

More information on requests to make, amend or revoke a koala habitat area determination can be found in the document [Guideline - Requests to make, amend or revoke a koala habitat area determination](#).

The koala habitat area map will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

Changes to the koala habitat area map which occur between annual updates because of a request to make, amend or revoke a koala habitat area determination can be viewed on the register of approved requests to make, amend or revoke a koala habitat area available at: <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/koalamaps>. The register includes the lot on plan for the change, the date the decision was made and the map issued to the landholder that shows areas determined to be koala habitat areas.

6.1.3 Koala priority areas

Koala priority areas are large, connected areas that have been determined to have the highest likelihood of achieving conservation outcomes for koalas based on the combination of habitat suitability, biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water) and a koala conservation cost benefit analysis.

Conservation efforts will be prioritised in these areas to ensure the conservation of viable koala populations in the wild including a focus on management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring. This includes a prohibition on clearing in koala habitat areas that are in koala priority areas under the Planning Regulation 2017 (subject to some exemptions).

Please note that koala priority areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley,

Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Section 7.2 identifies if your property is in a koala priority area.

6.1.4 Identified koala broad-hectare areas

There are seven identified koala broad-hectare areas in SEQ. These are areas of koala habitat that are located in areas committed to meet development targets in the SEQ Regional Plan to accommodate SEQ's growing population including bring-forward Greenfield sites under the Queensland Housing Affordability Strategy and declared master planned areas under the repealed *Sustainable Planning Act 2009* and the repealed *Integrated Planning Act 1997*.

Specific assessment benchmarks apply to development applications for development proposed in identified koala broad-hectare areas to ensure koala conservation measures are incorporated into the proposed development.

Section 7.2 identifies if your property is in an identified koala broad-hectare area.

6.2 Koala habitat planning controls

On 7 February 2020, the Queensland Government introduced new planning controls to the Planning Regulation 2017 to strengthen the protection of koala habitat in South East Queensland (i.e. koala district A).

More information on these planning controls can be found here:

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

As a high-level summary, the koala habitat planning controls make:

- development that involves interfering with koala habitat (defined below) in an area that is both a koala priority area and a koala habitat area, prohibited development (i.e. development for which a development application cannot be made);
- development that involves interfering with koala habitat (defined below) in an area that is a koala habitat area but is not a koala priority area, assessable development (i.e. development for which development approval is required); and
- development that is for extractive industries where the development involves interfering with koala habitat (defined below) in an area that is both a koala habitat area and a key resource area, assessable development (i.e. development for which development approval is required).

Interfering with koala habitat means:

- 1) Removing, cutting down, ringbarking, pushing over, poisoning or destroying in anyway, including by burning, flooding or draining native vegetation in a koala habitat area; but
- 2) Does not include destroying standing vegetation by stock or lopping a tree.

However, these planning controls do not apply if the development is exempted development as defined in Schedule 24 of the [Planning Regulation 2017](#). More information on exempted development can be found here:

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

There are also assessment benchmarks that apply to development applications for:

- building works, operational works, material change of use or reconfiguration of a lot where:
 - the local government planning scheme makes the development assessable;
 - the premises includes an area that is both a koala priority area and a koala habitat area; and
 - the development does not involve interfering with koala habitat (defined above); and
- development in identified koala broad-hectare areas.

The [Guideline - Assessment Benchmarks in relation to Koala Habitat in South East Queensland assessment benchmarks](#) outlines these assessment benchmarks, the intent of these assessment benchmarks and advice on how proposed development may meet these assessment benchmarks.

6.3 Koala Conservation Plan clearing requirements

Section 10 and 11 of the [Nature Conservation \(Koala\) Conservation Plan 2017](#) prescribes requirements that must be met when clearing koala habitat in koala district A and koala district B.

These clearing requirements are independent to the koala habitat planning controls introduced into the Planning Regulation 2017, which means they must be complied with irrespective of any approvals or exemptions offered under other legislation.

Unlike the clearing controls prescribed in the Planning Regulation 2017 that are to protect koala habitat, the clearing requirements prescribed in the Nature Conservation (Koala) Conservation Plan 2017 are in place to prevent the injury or death of koalas when koala habitat is being cleared.

6.4 Contact information for DES

For further information on the koala protection framework:

Phone 13 QGOV (13 74 68)

Email koala.assessment@des.qld.gov.au

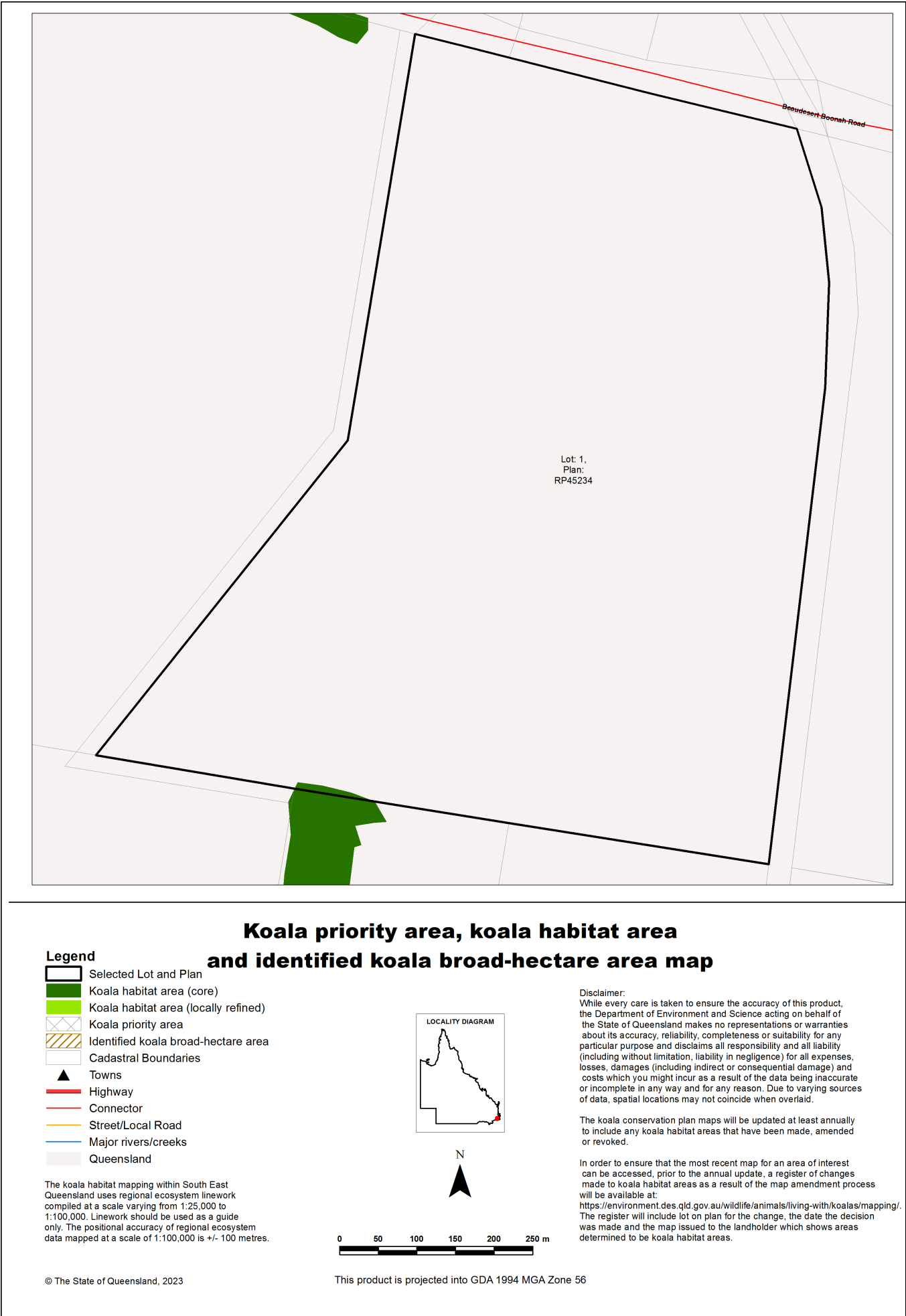
Visit <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping>

7. Koala protection framework details for Lot: 1 Plan: RP45234

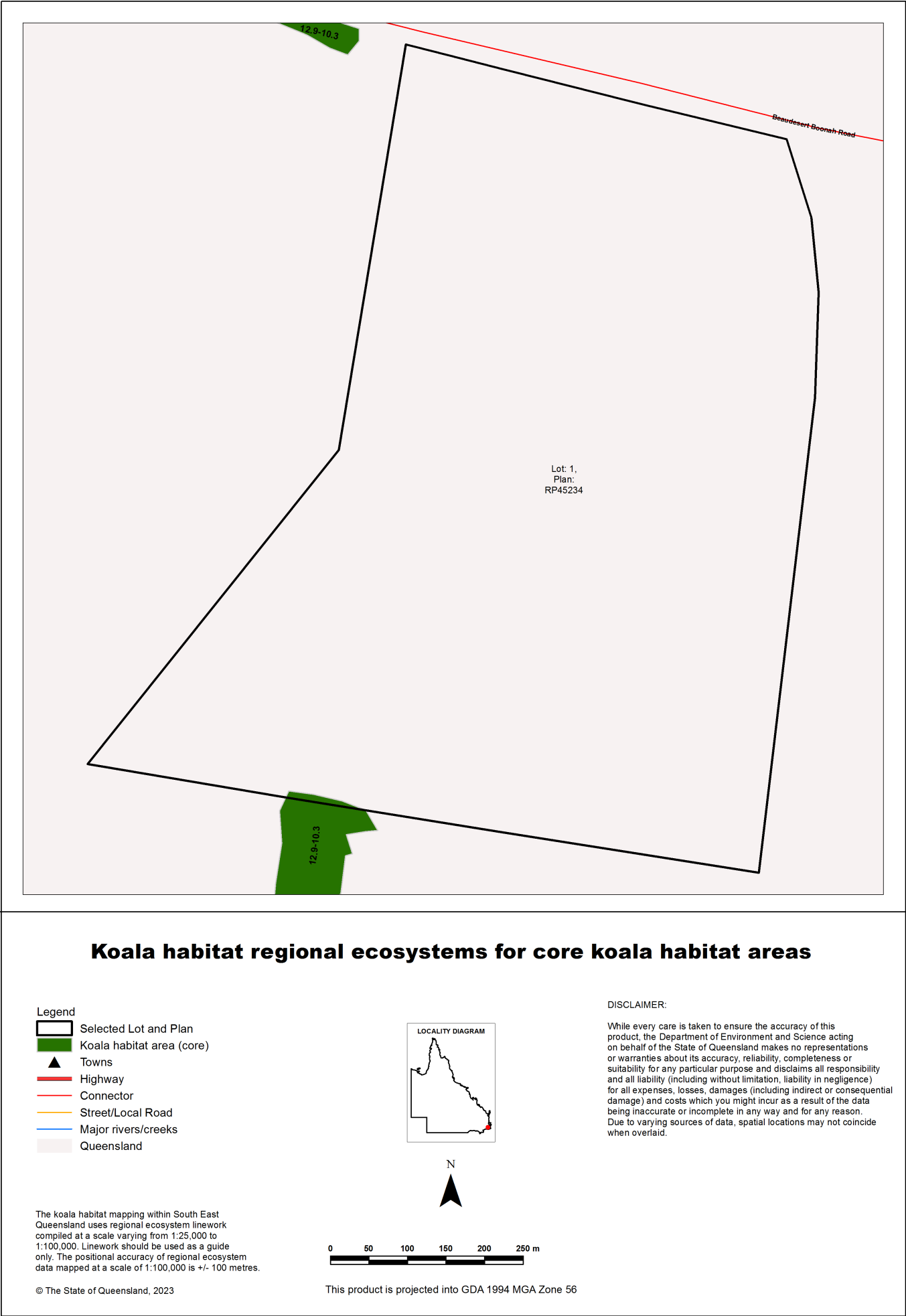
7.1 Koala districts

Koala District A

7.2 Koala priority area, koala habitat area and identified koala broad-hectare area map



7.3 Koala habitat regional ecosystems for core koala habitat areas



8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
• Interference with overland flow • Earthworks, significant disturbance	<i>Water Act 2000</i> <i>Soil Conservation Act 1986</i>	Department of Regional Development, Manufacturing and Water (Queensland Government) Department of Resources (Queensland Government)	Ph: 13 QGOV (13 74 68) www.rdmw.qld.gov.au www.resources.qld.gov.au
• Indigenous Cultural Heritage	<i>Aboriginal Cultural Heritage Act 2003</i> <i>Torres Strait Islander Cultural Heritage Act 2003</i>	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
• Mining and environmentally relevant activities • Infrastructure development (coastal) • Heritage issues	<i>Environmental Protection Act 1994</i> <i>Coastal Protection and Management Act 1995</i> <i>Queensland Heritage Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
• Protected plants and protected areas	<i>Nature Conservation Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 1300 130 372 (option 4) palm@des.qld.gov.au www.des.qld.gov.au
• Koala mapping and regulations	<i>Nature Conservation Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) Koala.assessment@des.qld.gov.au
• Interference with fish passage in a watercourse, mangroves • Forestry activities on State land tenures	<i>Fisheries Act 1994</i> <i>Forestry Act 1959</i>	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
• Matters of National Environmental Significance including listed threatened species and ecological communities	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Department of Agriculture, Water and the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
• Development and planning processes	<i>Planning Act 2016</i> <i>State Development and Public Works Organisation Act 1971</i>	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
• Local government requirements	<i>Local Government Act 2009</i> <i>Planning Act 2016</i>	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office
• Harvesting timber in the Wet Tropics of Qld World Heritage area	<i>Wet Tropics World Heritage Protection and Management Act 1993</i>	Wet Tropics Management Authority	Ph: (07) 4241 0500 www.wettropics.gov.au

Appendix 2 Flamesol Calculations



Calculated September 21, 2023, 11:12 am (MDc v.4.9)

Bromelton Energy and Resource Centre (BERC)

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	57	Rate of spread	1.06 km/h
Vegetation classification	Woodland	Flame length	8.630000000000001 m
Understorey fuel load	12.8 t/ha	Flame angle	57.4 °, 68.40000000000001 °, 77.40000000000001 °, 82.40000000000001 °, 84.40000000000001 ° & 89.40000000000001 °
Total fuel load	14.4 t/ha	Elevation of receiver	2.97 m, 3.1 m, 2.86 m, 2.29 m, 1.88 m & 0 m
Vegetation height	n/a	Fire intensity	7,902 kW/m
Effective slope	2.8 °	Transmissivity	0.884, 0.871, 0.852, 0.829, 0.8159999999999999 & 0.746
Site slope	5.4 °	Viewfactor	0.5897, 0.4334, 0.2926, 0.1975, 0.1603 & 0.044
Flame width	100 m	Minimum distance to < 40 kW/m²	6.9 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	9.5 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	14.2 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	21 m
		Minimum distance to < 10 kW/m²	25.5 m

Rate of Spread - Mearthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005