Preliminary Vegetation Management Plan

Chalumbin Wind Farm

Prepared for:
Chalumbin Wind Farm Pty Ltd

October 2022

Document Information

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REVIEWED BY	Nikki O'Donnell – Principal Consultant – Biodiversity and Impact Assessment

Quality Information

REVISION	DATE	DETAILS	AUTHORISATION	
			Name/Position	Signature
0	10-12-21	Issued for use	Chris Cantwell Partner & Principal Consultant	
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Contents

Figures

Tables

1.0 Introduction

1.1 Background

Chalumbin Wind Farm Pty Ltd (CWF), a subsidiary of Ark Energy Projects Pty Ltd (Ark Energy), proposes to develop the Chalumbin Wind Farm Project (the Project) at a location approximately 15 km south-west of Ravenshoe in Far North Queensland within the Tablelands Regional Council Local Government Area (LGA), see **Figure 1.1**. The Project area (which encompasses the land parcels within which infrastructure is proposed) is a total of 31,225 ha plus adjoining road reserves. The Project footprint to construct and operate the Project (i.e. maximum area of disturbance) is a much smaller area within these land parcels, being a total of 1,071.1 ha (3.4 % of the Project area).

1.2 Purpose

The purpose of this Preliminary Vegetation Management Plan (VMP) is to ensure appropriate guidelines and methods are in place to manage potential impacts to vegetation associated with Project development and operation activities. This VMP describes the activities to manage any vegetation clearing required as part of Project construction, to maintain retained vegetation, and to restore vegetation and habitat in temporarily disturbed areas.

This VMP has also been prepared to comply with Performance Outcome PO5 under State Code 23: Wind Farm Development. Specifically, the objectives of this VMP are to:

- Assess potential impacts to native vegetation communities and threatened flora species identified in the Ecological Assessment Report (EAR) for the Project; and
- Identify appropriate actions for avoidance, mitigation and management of potential impacts to native vegetation and threatened flora species, and to maintain these ecological values in the Project area.

1.3 Project Description

1.3.1 Project Components

The Project is proposed to consist of up to 94 wind turbines, linking access tracks and associated infrastructure including a new Powerlink connection substation and wind farm collector substations, permanent meteorological monitoring masts (met masts), medium and high-voltage underground and overhead powerlines, temporary construction compound, laydown and stockpile areas, and temporary and permanent site offices for asset management and operation and maintenance facilities. The full description of the Project is provided in section 3.0 of the Planning Report to support the Development Application for the Project.

1.3.2 Project Development Stages

The Project has three development stages, and activities associated with each stage are summarised in the following sections.

1.3.2.1 Construction

Construction is expected to commence in mid-2023, subject to approvals and commercial considerations. The construction phase is expected to last for a period of approximately 24-18 months, with approximately 250 to 350 staff employed during the peak construction period.

1.3.2.2 Operations

The operational life of the wind farm is expected to be 30 years. Approximately 15 to 30 full-time jobs will be generated during operation, typically 10 to 20 technicians along with a Project Manager, administration, and other support roles. This will include environmental roles on an as-needed basis to assist in operational monitoring.

1.3.2.3 Decommissioning

Infrastructure may be repowered with new equipment for a further 30-year operating life, or decommissioned, with the site rehabilitated to facilitate continuation of the current land use (agriculture) or alternative land use. If decommissioned, most above-ground infrastructure apart from roads (which are left to benefit the landholders) will be removed (e.g., all turbines, transmission lines, etc). The land will then be rehabilitated in line with development permit conditions and specific landowner agreements. Some infrastructure may remain in-situ depending on landowner preferences.

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Project Footprint

Figure 1.1

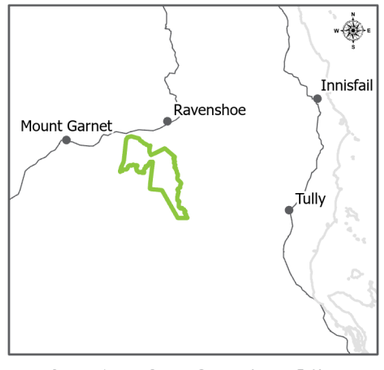
- Project Area Boundary
- Turbine
- Met-mast
- Facilities

Clearance Envelope

- Stage 1
- Stage 2
- Lot Boundary
- Easement

Date: 16/10/2022 Author: TOD

Project: EPU-004 Reviewed: NOD



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2.0 Relevant Legislation

2.1 Commonwealth Legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act is the Australian Government's central piece of environmental legislation that provides a legal framework to manage proposed actions that will or are likely to have an impact on Matters of National Environmental Significance (MNES) that includes nationally and internationally important flora, fauna, ecological communities and heritage places. Known MNES occur within the Project area including threatened flora, fauna and migratory species. A referral to the Department of Agriculture, Water and the Environment (DAWE) (EPBC 2021/8983) was submitted on 23 July 2021. On 10 August 2021 DAWE determined that the Project is a controlled action and will be assessed by Public Environment Report.

2.2 State Legislation

2.2.1 Planning Act 2016

Under the *Planning Act 2016,* wind farm development is assessable development (a material change of use for a wind farm). In accordance with Part 21, Division 2, Table 1 of the *Planning Regulation 2017*, the Project requires assessment and decision by the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP), represented by the State Assessment and Referral Agency (SARA), as assessment manager. The Project will be assessed against State Code 23: Wind farm development (State Code 23).

The purpose of State Code 23 is to protect individuals, communities and the environment from adverse impacts resulting from the construction, operation and decommissioning of wind farm development. Table 23.2.1 of State Code 23 lists the relevant performance outcomes and acceptable outcomes (as applicable) with which the Project must demonstrate compliance. Offsets must be provided where there is an unavoidable residual impact on Matters of State Environmental Significance (MSES). Offsets must be provided in accordance with the *Environmental Offsets Act 2014*.

The Project (in an earlier 94 wind turbine arrangement) received a Development Permit under the *Planning Act 2016* from the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) on 30 June 2022.

2.2.2 Vegetation Management Act 1999

Under the *Vegetation Management Act 1999,* Regional Ecosystems (REs) are assigned three statuses as follows:

- Endangered RE;
- Of Concern RE; or
- Least Concern RE.

The defining features of the statuses are provided in Division 7A of the Act. Sattler and Williams (1999) define RE as a vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil. For the purposes of regulating clearing activities associated with the Project, both the VM Act Status and Biodiversity Status (BD Status) of a RE is provided.

The purpose of the *Vegetation Management Act 1999* (VM Act) is to regulate the clearing of vegetation and to manage environmental impacts caused by clearing. The Project involves operational works, that is clearing Category B regulated vegetation, which is otherwise prohibited if not for a relevant purpose (*Planning Regulation 2017*). Under the *Planning Act 2016* clearing of Category B regulated vegetation is Operational Works (OPW) and requires a development permit. A relevant purpose determination is required to support the lodgement of the OPW development permit; this was obtained by the proponent prior to submission of the Project's development application. The Project's development permit includes conditions associated with clearing of regulated vegetation under the VM Act.

2.2.3 Nature Conservation Act 1992

The purpose of the *Nature Conservation Act 1992* is to conserve flora and fauna and their habitats, by gazettal of protected areas including nature refuges; prescribing the threat status of wildlife; and placing restrictions on the taking or harm to native wildlife without a valid permit. Field and desktop assessments in the EAR identified listed wildlife and associated habitat and likelihood of occurrence within the Project area, and habitat mapping was developed for these species.

2.2.3.1 Protected Plants Trigger Mapping

Under the *Nature Conservation Act 1992* (NC Act), plants listed as either Endangered, Vulnerable or Near Threatened (EVNT) are protected from illegal removal from the wild and illegal trade. If a proposed area to be cleared contains EVNT and there is no relevant exemption and is shown as 'high risk' on the protected plants flora survey trigger map (DES 2019), a flora survey of the clearing impact area and 100 m buffer is required prior to any clearing activities. If EVNT species are confirmed present in the clearing area or 100 m buffer, a clearing permit under the NC Act is required prior to clearing activities.

The clearing permit authorises clearing of land rather than the clearing of species present. Clearing that complies with the permit will not be subject to any further survey or approval requirements once clearing begins. Re-clearing or routine maintenance may be undertaken for up to 10 years from the first clearing, however, where a significant residual impact to EVNT is likely to occur an offset may be required. Where EVNT are not impacted (clearing avoids species) or detected in the clearing impact area, a clearing permit is not required but an exempt clearing notification must be submitted to the Department of Environment and Science (DES) within 1 year following the survey and at least 1 week prior to commencing clearing.

There are some areas of high-risk trigger mapping within the Project footprint, therefore targeted surveys are required and will be undertaken in accordance with the *Flora Guidelines – Protected Plants* (DES 2020). Where clearing cannot be avoided a clearing permit will be required. These surveys and associated permitting/notification processes will be undertaken closer to the time of construction to accord with the timeframe requirements of the NC Act.

2.2.4 Biosecurity Act 2014

The *Biosecurity Act 2014* provides a legislative framework to manage pest flora and fauna, diseases and environmental contaminants, to address the impacts they have on the economy, environment, agriculture, tourism and society. The Act prohibits or restricts the introduction and spread of declared plant and animal pests within Queensland. Weeds and animal pests potentially pose threats to flora and fauna, and agricultural uses within the Project area.

The presence of weeds in the Project area and their proposed control are addressed in this VMP.

3.0 Existing Environment and Ecological Values

Vegetation community surveys were undertaken across the Project area in September 2020. Preliminary flora survey sites were identified based on the results of the desktop assessment, using high-quality satellite imagery, RE mapping (remnant and non-remnant vegetation) and the proposed Project footprint at the time. The purpose of these surveys was to assess the location, extent and condition of vegetation communities across the Project area according to the Queensland RE framework and criteria for threatened ecological communities (TECs) listed under the EPBC Act, where applicable, and to identify preferred habitat types for threatened flora species. Subsequent to the field surveys, vegetation mapping was undertaken based on the results of the vegetation community surveys and interpretation of high-resolution orthophotos.

In addition, a number of targeted protected plants surveys have been carried out at discrete locations within the Project area within high-risk trigger areas. All high-risk trigger mapping within the Project area relates to threatened flora species associated with the habitat type "rocky pavement shrub complex" which has been mapped along ridgelines in both properties. These ridgelines were therefore the focus of the protected plants surveys, which were undertaken in September 2020, March 2021 and June 2021.

A summary of the flora survey methods and results can be found in the EAR (Attexo 2021a) and key findings are described in the following sections.

3.1 Regional Ecosystems and Vegetation Communities

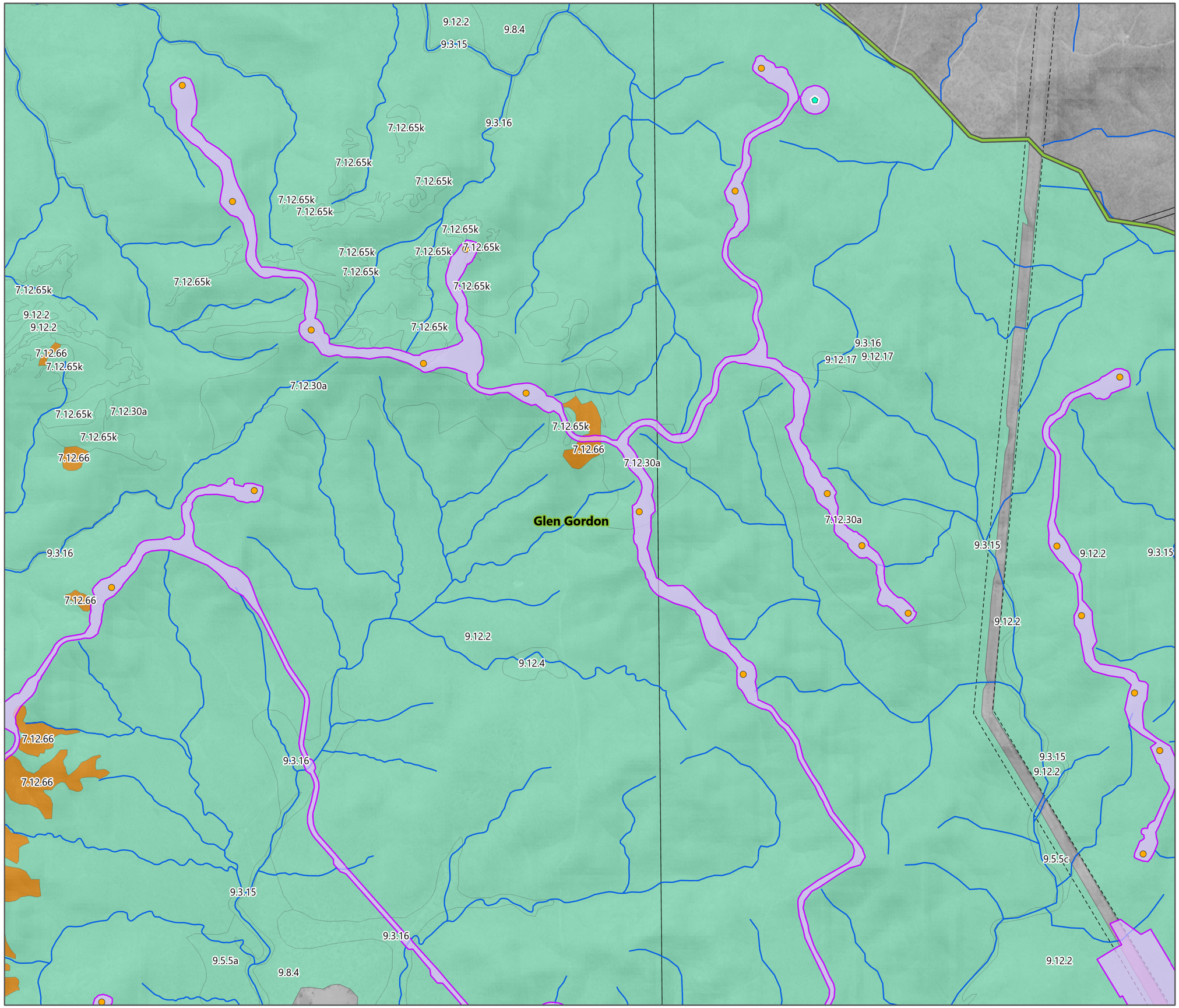
Quaternary surveys were undertaken to ground-truth RE mapping in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland v.5.1* (Nelder et al. 2020). Field surveys confirmed the occurrence of 25 REs within the Project footprint; these are described below in **Table 3.1** and shown in **Figure 3-1**. The Project area is largely remnant vegetation with approximately 4 % categorised as non-remnant. Four small patches of RE 7.3.8a were mapped within the southern part of the Project area based on DoR mapping, potentially corresponding to the TEC broad-leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland. Field surveys confirmed that two of these patches correspond with RE 7.3.8a; however, neither met the diagnostic characteristics of the TEC. Specifically, both patches of RE 7.3.8a had *Eucalyptus lockyeri* as the dominant canopy layer, rather than *Melaleuca viridiflora*. One of these patches of RE 7.3.8a is intersected by a proposed met mast.

Table 3.1 Ground-truthed Regional Ecosystems in the Project footprint

RE	Description	Status (VM Act)
7.3.8a	*Melaleuca viridiflora* open forest to open woodland. Includes areas of natural invasion onto former grasslands. Alluvial plains	Least concern
7.3.16	*Eucalyptus platyphylla* woodland to open forest on alluvial plains. Gently sloping to flat, moderately to poorly drained alluvial lowlands, foot slopes and piedmont fans.	Least concern
7.3.26	*Casuarina cunninghamiana* woodland to open forest on alluvium fringing streams.	Of concern
7.3.43	*Eucalyptus tereticornis* open forest to woodland on uplands on well-drained alluvium	Of concern
7.3.43a	*Eucalyptus tereticornis* open forest, tall open forest and woodland including communities ranging from those dominated by *E. tereticornis* to mixtures of that species with *Corymbia intermedia, E. drepanophylla, Lophostemon suaveolens* and *Allocasuarina torulosa*. Uplands on alluvium.	Of concern

RE	Description	Status (VM Act)
7.8.7	*Eucalyptus tereticornis* (forest red gum) open forest, and associated grasslands. Uplands and highlands on basaltic krasnozem and prairie soils, of the moist rainfall zone.	Of concern
7.8.10	*Eucalyptus tereticornis*, *E. drepanophylla* (or *E. granitica*), *E. portuensis*, *Corymbia intermedia* woodland to open forest, or *E. moluccana* woodland to open forest, of uplands and highlands on basalt.	Of concern
7.8.18	*Corymbia intermedia* (pink bloodwood) and/or *Lophostemon suaveolens* (swamp mahogany) +/- *Allocasuarina torulosa* (forest sheoak) open forest to woodland. Basalt.	Of concern
7.8.19	*Corymbia clarksoniana* open forest to woodland on basalt.	Endangered
7.12.27a	*Eucalyptus reducta* medium open forest and woodland. Uplands and highlands on shallow granitic and rhyolitic soils, of the moist rainfall zone.	Least concern
7.12.27c	*Eucalyptus resinifera* and *Syncarpia glomulifera* open woodland. Uplands and highlands on shallow granitic and rhyolitic soils, of the moist rainfall zone.	Least concern
7.12.29a	*Corymbia intermedia*, *Eucalyptus tereticornis*, *E. drepanophylla* open forest to low open forest and woodland with *Allocasuarina torulosa*, *A. littoralis*, *Lophostemon suaveolens*, *Acacia cincinnata*, *A. flavescens*, *Banksia aquilonia* and *Xanthorrhoea johnsonii*. Uplands, on granite and rhyolite.	Least concern
7.12.30a	*Corymbia citriodora*, *Eucalyptus portuensis*, *C. intermedia*, *Syncarpia glomulifera* woodland to low woodland to open forest with *Callitris intratropica*, *Acacia calyculata* and *Xanthorrhoea johnsonii*. Uplands and highlands, of the moist and dry rainfall zones.	Least concern
7.12.34	*Eucalyptus portuensis* and/or *E. drepanophylla* +/- *C. intermedia* +/- *C. citriodora*, +/- *E. granitica* open woodland to open forest on uplands on granite	Least concern
7.12.52	*Eucalyptus resinifera*, *Corymbia intermedia*, *Allocasuarina littoralis*, *Syncarpia glomulifera*, *E. drepanophylla* +/- *E. reducta* woodland on granite and rhyolite in the dry to moist rainfall zone	Of concern
7.12.57	Shrubland and low woodland mosaic with *Syncarpia glomulifera*, *Corymbia abergiana*, *Eucalyptus portuensis*, *Allocasuarina littoralis* and *Xanthorrhoea johnsonii* on uplands and highlands on granite	Of concern
7.12.57a	Shrubland and low woodland mosaic with *Syncarpia glomulifera*, *Corymbia abergiana*, *Eucalyptus portuensis*, *Allocasuarina littoralis* and *Xanthorrhoea johnsonii.* Uplands and highlands on granite and rhyolite, of the moist and dry rainfall zones.	Of concern
7.12.65	Rock pavement or areas of skeletal soil on granite and rhyolite of dry western or southern areas +/- shrublands to closed forests of *Acacia* spp. and/or *Lophostemon suaveolens* and/or *Allocasuarina littoralis* and/or *Eucalyptus lockyeri* subsp. *exuta*.	Least concern
7.12.65k	Granite and rhyolite rock outcrop, of dry western areas, associated with shrublands to closed forests of *Acacia* spp. and/or *Lophostemon* spp. and/or *Allocasuarina* spp. In the Mount Emerald area, shrubs may include *Acacia umbellata, Melaleuca borealis, Homoranthus porteri, Leptospermum neglectum, Melaleuca recurva, Melaleuca uxorum, Grevillea glossadenia, Corymbia abergiana, Eucalyptus lockyeri, Sannantha angusta, Pseudanthus ligulatus* subsp. *ligulatus*, *Acacia aulacocarpa*, *Leptospermum amboinense*, *Xanthorrhoea johnsonii* and *Jacksonia thesioides*. Ground-cover species may include *Borya septentrionalis*, *Lepidosperma laterale, Eriachne* spp., *Cleistochloa subjuncea*, *Boronia occidentalis*, *Cheilanthes* spp., *Coronidium newcastlianum*, *Schizachyrium* spp., *Tripogon loliiformis*, *Gonocarpus acanthocarpus* and *Eragrostis* spp. Dry western areas. Granite and rhyolite.	Least concern
7.12.66	*Lophostemon confertus* (brush box) low shrubland or low to medium closed forest. Exposed rocky slopes on granite and rhyolite.	Of concern

RE	Description	Status (VM Act)
9.5.5a	Mixed woodland to open forest of *Eucalyptus crebra*, *Corymbia clarksoniana* and *C. citriodora* subsp. *citriodora* +/- *E. portuensis* with a generally open sub-canopy of canopy species +/- *Callitris intratropica* and *Acacia* spp. The open shrub layer often contains juvenile canopy species, *Petalostigma pubescens, Acacia flavescens* and other *Acacia* spp. *Themeda triandra* is the dominant species in a dense grassy ground layer. Occurs on Tertiary plateaus and remnants.	Least concern
9.3.15	Fringing woodland to open forest containing any combination of *Casuarina cunninghamiana*, *Eucalyptus tereticornis* and *E. platyphylla* +/- *Lophostemon suaveolens* +/- *Nauclea orientalis* +/- *Corymbia tessellaris* +/- *C. clarksoniana*. There is often a low sub-canopy layer which can include canopy species and Ficus spp. The open shrub layer contains juvenile canopy species and can include mesic species such as *Euroschinus falcatus*, *Acacia mangium* and *Syzygium sp*. The ground layer is medium to dense grassy and contains *Imperata cylindrica*, *Crotalaria sp*., *Heteropogon contortus*, *Cyperus spp*. and *Paspalum spp*. Occurs on stream banks and channels in areas of higher rainfall in the central east of the bioregion.	Least concern
9.3.16	*Eucalyptus tereticornis* and/or *E. platyphylla* and/or *Corymbia clarksoniana* woodland on alluvial flats, levees and plains.	Least concern
9.12.2	*Eucalyptus portuensis*, *Corymbia citriodora* subsp. *citriodora*, *E. granitica* or *E. crebra*, *C. intermedia* or *C. clarksoniana* mixed woodland on steep hills and ranges on igneous hills close to Wet Tropics boundary.	Least concern
9.12.4	Low open woodland to woodland of *Eucalyptus shirleyi* +/- *Corymbia peltate* +/- *Callitris intratropica*. The mid layer varies from absent to a mid-dense sub-canopy and/or shrub layer and the ground layer is dense and grassy. Occurs predominantly on sandy shallow soils derived from igneous rocks on rolling low hills to hills.	Least concern



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Regional Ecosystems in the Project Area

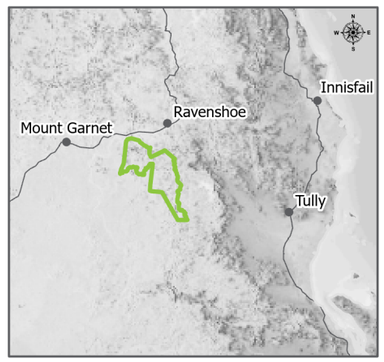
Figure 3.1 Sheet 1 of 8

- Project Area Boundary
- Study Area
- Turbine
- Met-mast

Clearance Envelope
- Stage 1
- Stage 2

Regional Ecosystem Mapping (Attexo 2021)
- Remnant vegetation containing endangered regional ecosystem
- Remnant vegetation containing of concern regional ecosystem
- Remnant vegetation containing least concern regional ecosystem
- Non Remnant
- Watercourse
- WTQ Boundary
- Lot Boundary
- Easement

Date: 17/10/2022 Author: TOD
Project: EPU-004 Reviewed: NOD



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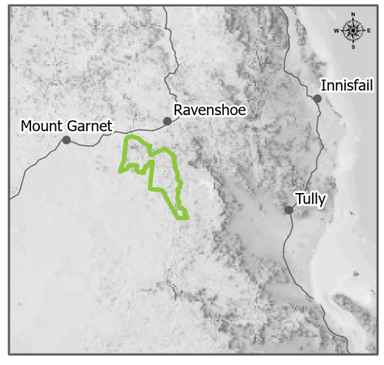

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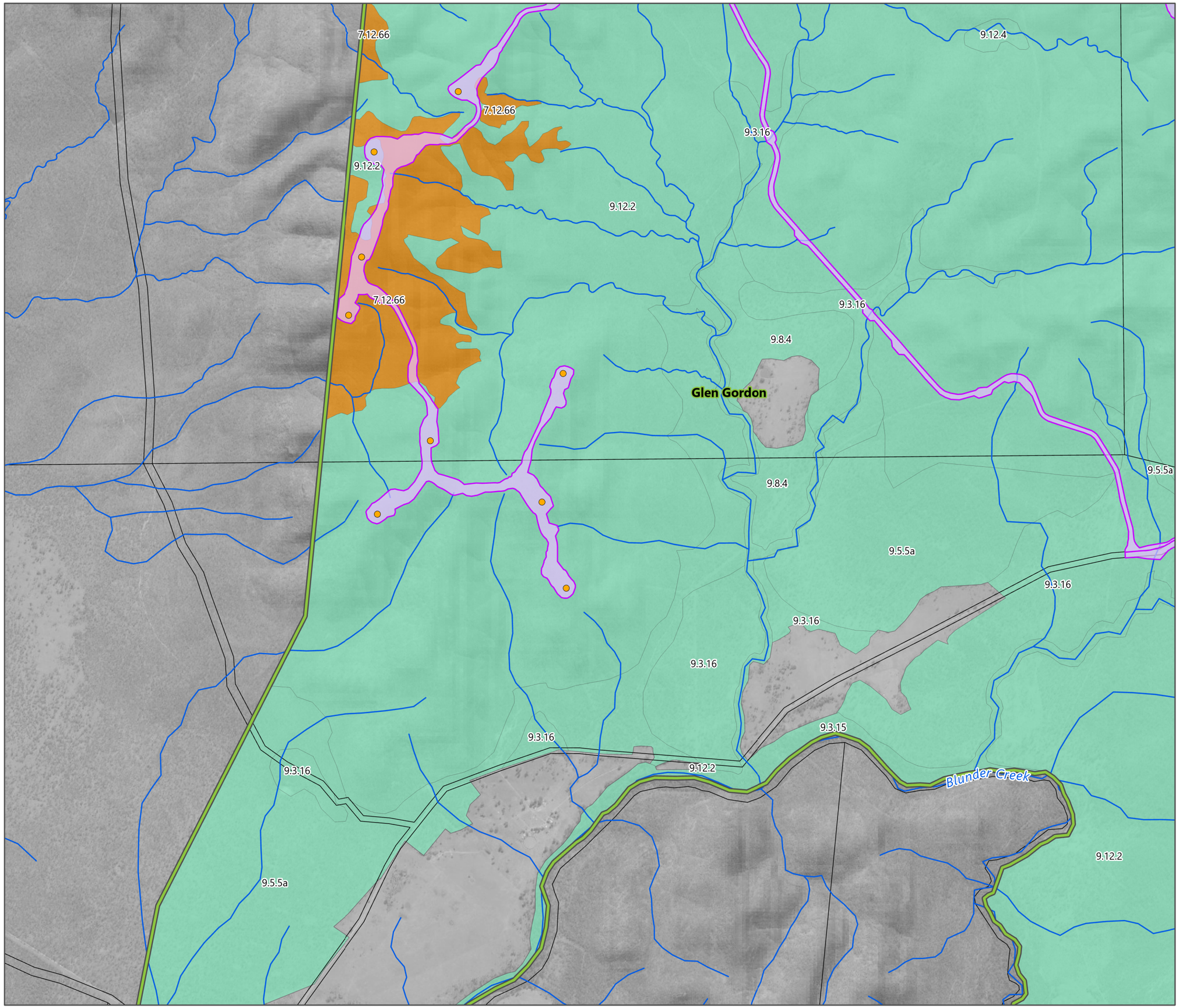

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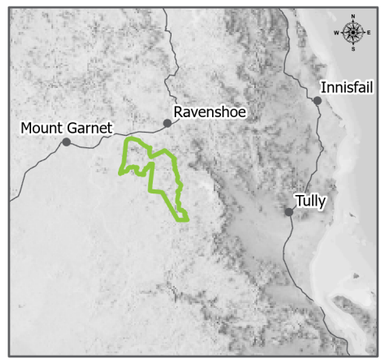

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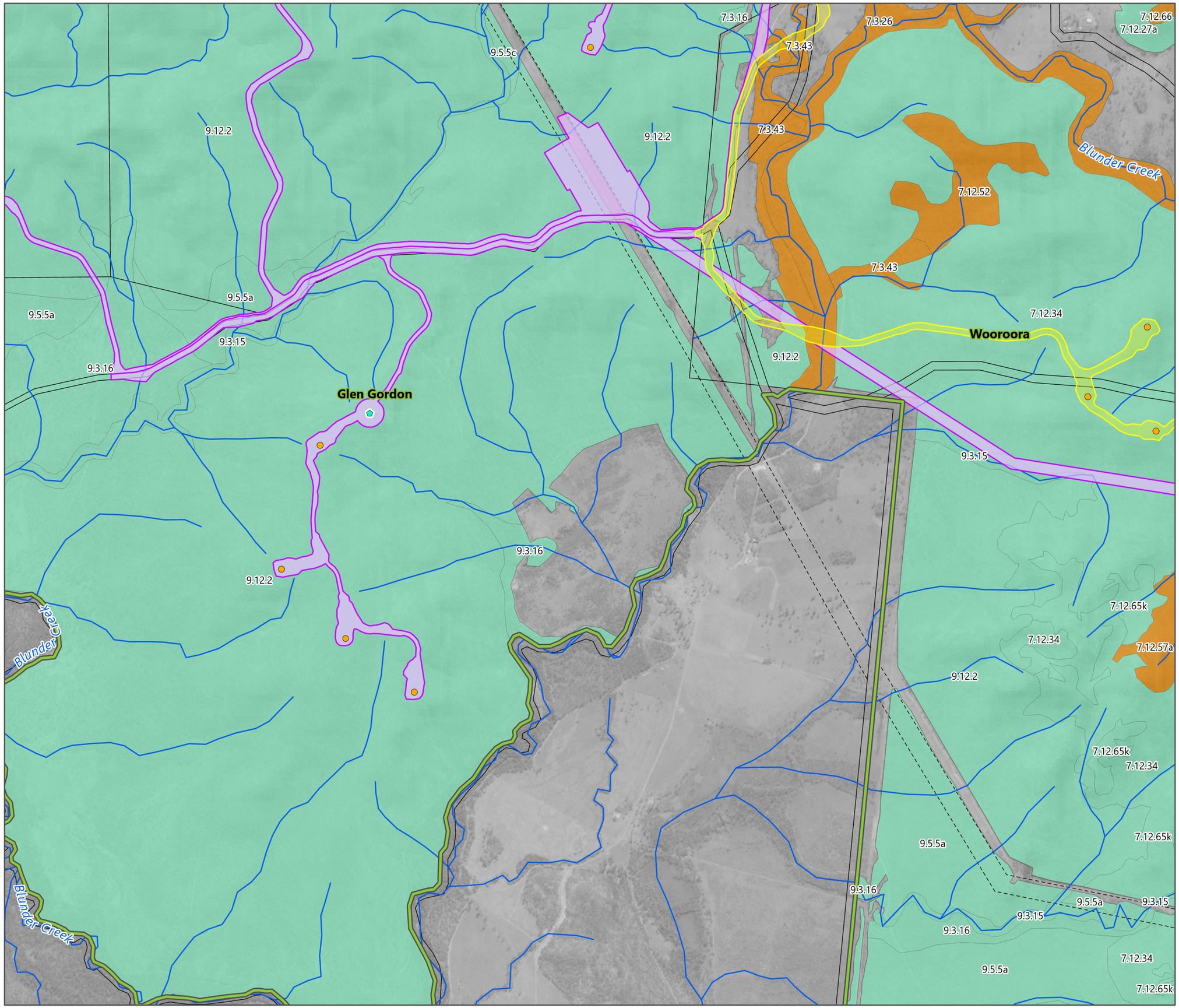

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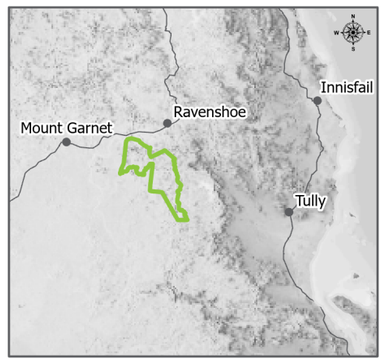

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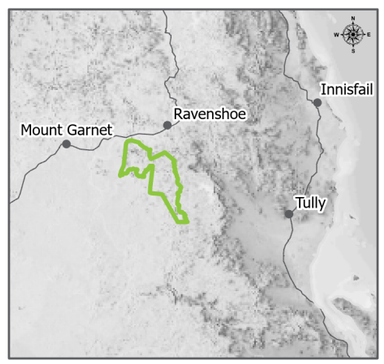

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Chalumbin Wind Farm

Regional Ecosystems in the Project Area

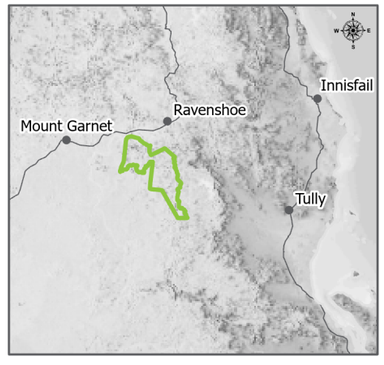
Figure 3.1 Sheet 6 of 8

- Project Area Boundary
- Study Area
- Turbine
- Met-mast

Clearance Envelope
- Stage 1
- Stage 2

Regional Ecosystem Mapping (Attexo 2021)
- Remnant vegetation containing endangered regional ecosystem
- Remnant vegetation containing of concern regional ecosystem
- Remnant vegetation containing least concern regional ecosystem
- Non Remnant
- Watercourse
- WTQ Boundary
- Lot Boundary
- Easement

Date: 17/10/2022 Author: TOD
Project: EPU-004 Reviewed: NOD



0 500 1,000 m

Scale: 1:25,000@A3

Data Source(s):
Digital Cadastral Database - Department of Resources (2022)

Path: C:\Users\Tim ODonnell\Attexo Group\Attexo - Documents\Projects\Epuron\EPU-004 - Chalumbin\GIS\4.3 Cartography\11_PER_Submission\11_PER_VegMP.aprx