



4.0 Description of the Environment

This section provides a general description of the environment within the Project area and surrounding landscape, before describing the following MNES in more detail as required by the Guidelines:

- Listed threatened ecological communities (TECs):
 - Mabi forest (complex notophyll vine forest 5b) TEC – critically endangered; and
 - Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland TEC* –endangered.
- Listed threatened species:
 - North Queensland lace (*Aponogeton bullosus*) – endangered;
 - *Homoranthus porteri* – vulnerable;
 - *Prostanthera clotteniana* – critically endangered;
 - *Triplarina nitchaga* – vulnerable;
 - Australian lace-lid (*Litoria dayi*) – vulnerable;
 - Magnificent brood frog (*Pseudophryne covacevichae*) – vulnerable;
 - Mountain mistfrog (*Litoria nyakalensis*) – critically endangered;
 - Masked owl (northern subspecies) (*Tyto novaehollandiae*) – vulnerable;
 - Red goshawk (*Erythroriorchis radiatus*) – vulnerable;
 - Southern cassowary (southern population) (*Casuarius casuarius johnsonii*) – endangered;
 - White-throated needletail (*Hirundapus caudacutus*) – vulnerable, migratory;
 - Ghost bat (*Macroderma gigas*) – vulnerable;
 - Koala (*Phascolarctos cinereus*) – vulnerable⁹;
 - Northern greater glider (*Petauroides minor* syn. *Petauroides minor* in Queensland) – vulnerable;
 - Northern quoll (*Dasyurus hallucatus*) – endangered;
 - Spectacled flying-fox (*Pteropus conspicillatus*) – endangered;
 - Spotted-tailed quoll (North Queensland subspecies) (*Dasyurus maculatus gracilis*) – endangered;
 - Yellow-bellied glider (Wet Tropics subspecies) (*Petaurus australis* Wet Tropics subspecies) – endangered.
- Listed migratory species:

⁹ Note that the koala was declared an endangered species under the EPBC Act on 12 February 2022; however, the PER Guidelines stipulate that any listing events that occur after the controlled action decision (received on 10 August 2021) does not affect the assessment and approval process. Therefore, the koala is assessed under this PER through its former vulnerable listing under the EPBC Act.



- Black-faced monarch (*Monarcha melanopsis*);
 - Fork-tailed swift (*Apus pacificus*);
 - Latham’s snipe (*Gallinago hardwickii*);
 - Rufous fantail (*Rhipidura rufifrons*)*;
 - Satin flycatcher (*Myiagra cyanoleuca*)*; and
 - Spectacled monarch (*Monarcha trivirgatus*)*.
- The WTQ World Heritage Area; and
 - The WTQ National Heritage place.

* Denotes a TEC or species that was not listed in Section 5 of the PER Guidelines but has nonetheless been assessed as part of this PER due to the potential to be impacted by the Project.

4.1 General Description of the Environment

4.1.1 Land Use

4.1.1.1 Historic Land Use

The northern portion of the Project area, including the Wooroora Homestead, the Glen Gordon Homestead and the Kara Outstation, were previously a focus of Jirrbal activity both before European colonisation and in the early pastoral history.

Archaeological evidence shows that the earliest known human occupation near the rainforest areas east of the Project area was 31,000 years ago, with intermittent occupation of these rainforest areas occurring up until approximately 2,500 years ago. From that point through to the first contact with European pastoralists and gold miners (1880s), the Jirrbal people occupied both rainforest and open forest landscapes throughout the broader region. This included the open forest areas of the Project area.

The Wooroora and Glen Gordon Stations were established for pastoral purposes from the late 1800s. From this time through to the 1960s, the stations were expanded through the help of many Jirrbal people living and working on the land (clearing and mustering). It is reported that 95 Jirrbal people were living on Wooroora and working for the pastoralist in the 1890s (Buhrich and Ferrier 2021). It is around the late 1800s when there was also considerable conflict between the European pastoralists and the Jirrbal people.

Much of the land clearing and cattle grazing activity occurred in the northern half of the Project area, in and around the homestead areas and in proximity to Blunder Creek. However, tracks were cut throughout the Project area and grazing activities have extended throughout the Project area over time.

The Powerlink 275 kV Ross to Chalumbin powerline was constructed in two stages between 1989 and 1993. This runs within and along the south-eastern boundary of the Project area from the Chalumbin Substation (which is located within 700 m of the eastern Project area boundary). The Powerlink 275 kV Woree to Chalumbin powerline was constructed within the Project area in 1998 and arcs in a north to south-easterly direction approximately centrally through Glen Gordon and Wooroora Stations.



4.1.1.2 Current Land Use

The Project area is currently used for cattle grazing, with areas ranging from degraded (in the north) to relatively undisturbed (in the south). The north-western portion of the Project (Glen Gordon; Lot 31SP288862) is zoned entirely Rural comprising both Broadhectare and Agricultural Investigation precincts. Land to the north, west and south of the Project is also zoned and used for agricultural purposes. The south-eastern portion of the Project area (Wooroora; Lot 1CWL3298) is zoned for Conservation, with National Parks and Timber Reserve abutting the northern and eastern boundaries (see **Section 4.1.2**).

Wooroora is leasehold land (rolling term lease). At the time of writing, this lease was progressing through the application and approval process for a modification by the Queensland Department of Resources (DoR) to include renewable energy purposes as a permitted lease use. To this end, the proponent is working with the Traditional Owners and Native Title Applicants for the area of the land to agree and register an ILUA which will Consent to the Lease purpose change and to the development and operation of the project on the land.

The northern portion of the Project area features various improvements associated with pastoral activities and is traversed by the Kareeya Powerlink transmission powerline. Notable pastoral infrastructure present within the Project area includes the Wooroora and Glen Gordon Homesteads, and the Kara Outstation. The southernmost portion of the Wooroora property consists primarily of remnant vegetation with limited prior development activity.

The Kennedy Highway runs east-west, approximately 1.2 km north of the Project area (approximately 3.7 km north-west of the Project footprint) whilst the Tully Falls Road is within 5 km of the Wooroora eastern boundary.















4.1.2 Protected Area Estate

The Project area is not located within any Protected Area. Notable Protected Areas located adjacent or within the region include (refer **Figure 4-1**):

- The eastern boundary of the Project area is bordered by national parks and reserves for a total distance of 37.9 km:
 - Tully Falls National Park is part of the WTQWHA and one of wettest areas of Queensland (the Project area has significantly lower average annual rainfall than this National Park). It comprises wet sclerophyll forest, upland rainforest, clear mountain streams and waterfalls. The property supports iconic fauna species such as Lumholtz's tree-kangaroo and southern cassowary.
 - Koombooloomba National Park is also part of the WTQWHA. The western part of the property is in the rain shadow of the Cardwell Range and supports wet sclerophyll forest. In the Wet Tropics this vegetation community is restricted to a narrow, broken strip, 400 km long, bordering the western edge of the rainforest. As well as Lumholtz's tree-kangaroo, this property is known to support the yellow-bellied glider (Wet Tropics subspecies).
 - Koombooloomba South Forest Reserve is part of the WTQWHA and was converted from a timber reserve in 1967. It encompasses a continuous cross-section of wet tropical forest types from high altitude rainforest to open woodlands over a very steep rainfall gradient. This adds to the variety of habitat types and range of flora and fauna species present.
- The northern boundary of the Project area is bordered by Ravenshoe Forest Reserve 1.
- The Bluff State Forest, Ravenshoe State Forest 3 and Millstream Falls National Park are within 9 km of the Project's northern boundary whilst the south-eastern boundary abuts a Queensland special wildlife reserve, Yourka Station, which is managed by Bush Heritage Australia.

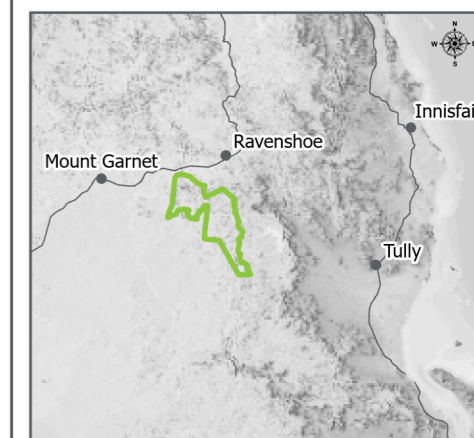
Chalumbin Wind Farm
Protected Area Estate

Figure 4.1

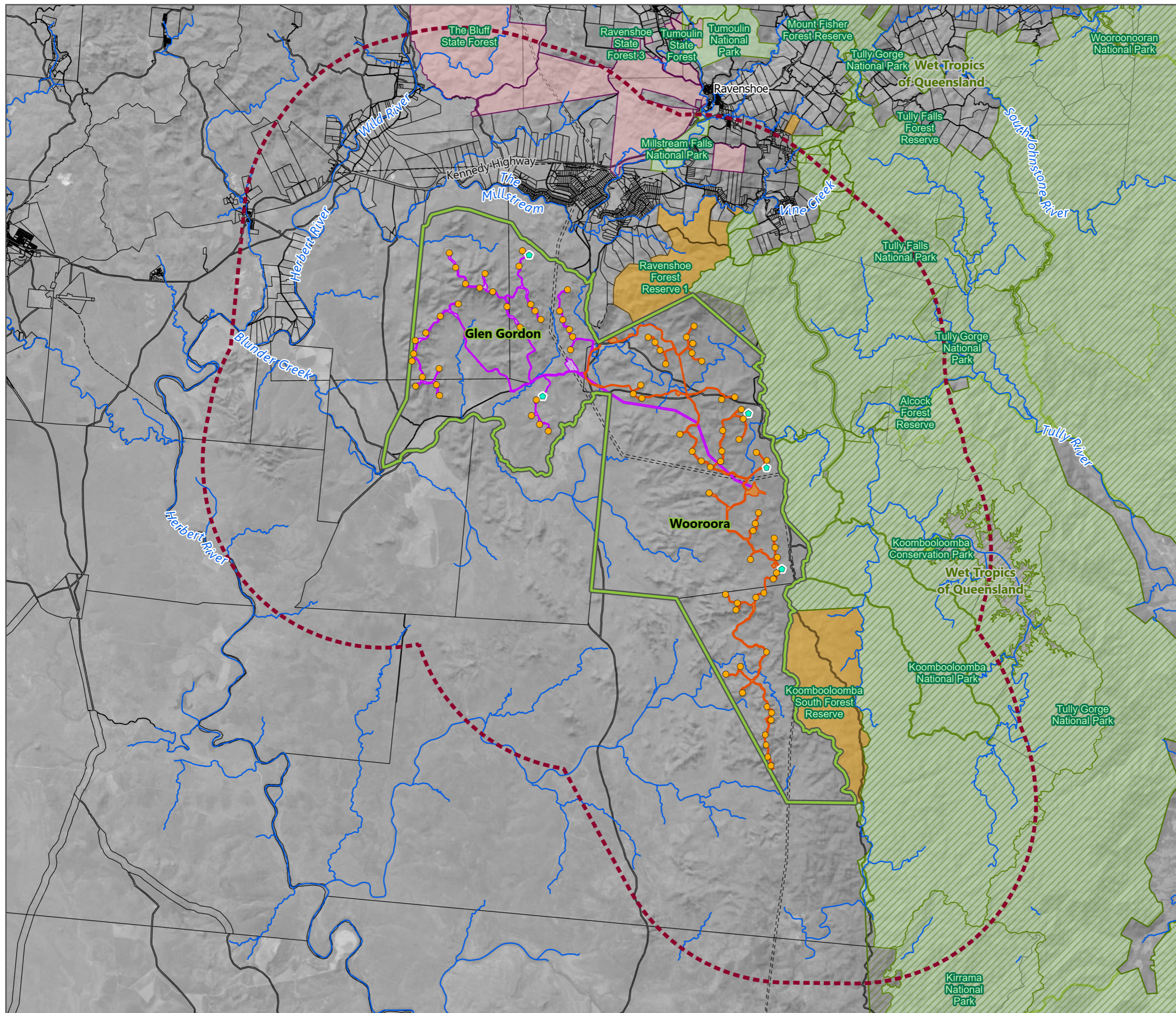
-  Project Area Boundary
-  Study Area
-  Turbine
-  Met-mast
- Clearance Envelope**
-  Stage 1
-  Stage 2
-  Watercourse
-  WTQ Boundary
-  National park
-  Conservation park
-  Forest reserve
-  State forest
-  Lot Boundary
-  Easement

Date: 14/10/2022
Project: EPU-004

Author: TOD
Reviewed: NOD



Scale: 1:200,000@A3
Data Source(s):
Digital Cadastral Database - Department of Resources (2022)
Earthstar Geographics, © State of Queensland (Department of Resources) 2022














4.1.3 Bioregion

The Project area is located along the boundary of two mapped bioregions referred to as the Wet Tropics bioregion (to the east) and the Einasleigh Uplands bioregion (to the west). The eastern and southern parts of the Project area are within the Kirrima-Hinchinbrook sub-bioregion (7.6) and the north-western part is within the Herberton-Wairuna sub-bioregion (9.6) (**Figure 4-2**). The Kaban Green Power Hub (currently under construction) is also located within the Wet Tropics bioregion.

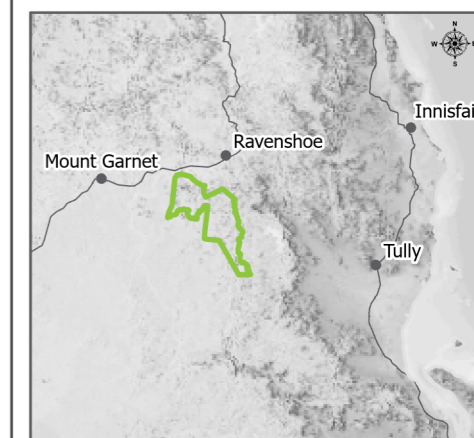
Chalumbin Wind Farm
Bioregion and Sub-Bioregion
Boundary

Figure 4.2

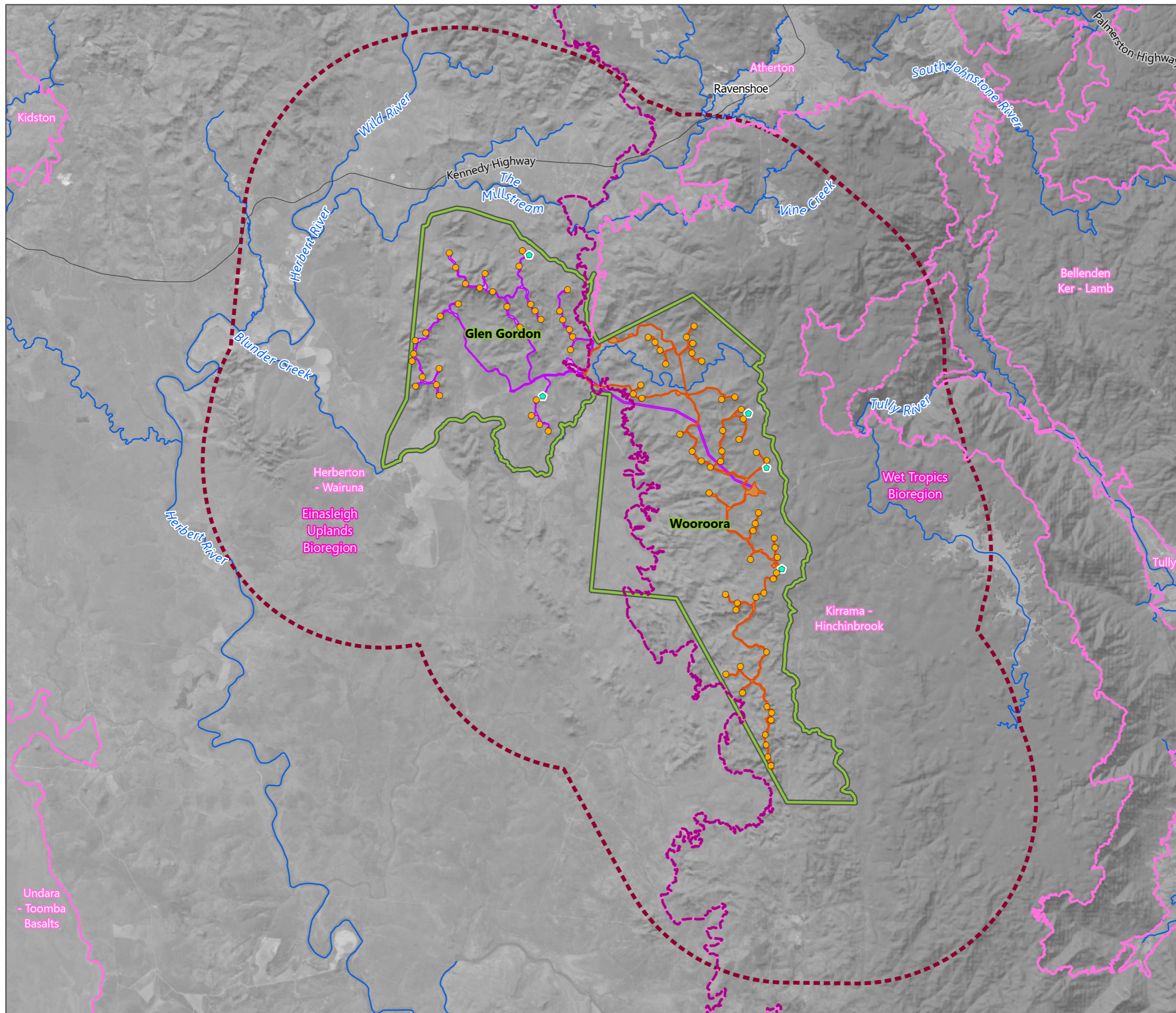
-  Project Area Boundary
-  Study Area
-  Turbine
-  Met-mast
- Clearance Envelope**
-  Stage 1
-  Stage 2
-  Bioregion Boundary
-  Sub-bioregion Boundary
-  Watercourse

Date: 15/10/2022
Project: EPU-004

Author: TOD
Reviewed: NOD



Scale: 1:200,000@A3
Data Source(s):
Digital Cadastral Database - Department of Resources (2022)
Earthstar Geographics, © State of Queensland (Department of Resources) 2022





4.1.4 Vegetation

Vegetation within the Project area is generally of remnant status (given the predominantly steep topography) and is dominated by various woodland and open forest communities. Small patches of discrete rainforest communities are located within the Project area; however, none of these are located within the Project footprint. Extensive areas of rainforest are located to the east of the Project area within the WTQWHA.

In the flatter parts of the Project area, some clearing has occurred for grazing, generally within proximity to the homesteads. The most common vegetation community within the Project area is a woodland community dominated by a mix of *Corymbia citriodora*, *C. intermedia* and *Eucalyptus portuensis* that occurs on the slopes and ridges of hills across both Wooroora and Glen Gordon Stations (**Plate 4-1**). This community corresponds to Regional Ecosystem (RE) 9.12.2 which is listed as Least Concern at the State level and does not form a Threatened Ecological Community at the Commonwealth level.

At the tops of many of the hills, scattered rocky scarps and rocky granite pavements contain shrubland and closed forest communities of *Acacia* spp. And *Lophostemon suaveolens* (**Plate 4-2**). Other communities that occur across these hills include tall open forests and woodlands dominated by *Eucalyptus reducta*, *Eucalyptus resinifera* and *Corymbia intermedia* woodland, and occasional patches of vine thicket.

The most common communities within the low-lying areas of the Project area are mixed woodland of *Eucalyptus crebra*, *Corymbia clarksoniana* and *C. citriodora* (**Plate 4-3**), and *Eucalyptus tereticornis* and *E. platyphylla* woodland occurring on alluvial flats.

Ground truthed REs within the Project area are described in **Table 4-1** and mapped in **Figure 4-3**.

Table 4-1 Ground-truthed REs within the Project area

RE	Description	VM Act Status
7.3.8a	<i>Melaleuca viridiflora</i> open forest to open woodland. Includes areas of natural invasion onto former grasslands. Alluvial plains	Least Concern
7.3.16	<i>Eucalyptus platyphylla</i> woodland to open forest on alluvial plains. Gently sloping to flat, moderately to poorly drained alluvial lowlands, foot slopes and piedmont fans.	Least Concern
7.3.19a	<i>Corymbia intermedia</i> , <i>Eucalyptus tereticornis</i> , <i>E. drepanophylla</i> , <i>Allocasuarina torulosa</i> , <i>A. littoralis</i> , <i>Lophostemon suaveolens</i> woodland with <i>Acacia cincinnata</i> , <i>A. flavescens</i> , <i>Banksia aquilonia</i> and <i>Xanthorrhoea johnsonii</i> . Well-drained alluvium	Of Concern
7.3.19g	<i>Eucalyptus tereticornis</i> , <i>E. drepanophylla</i> , <i>E. portuensis</i> , <i>Corymbia intermedia</i> , <i>C. tessellaris</i> woodland and open forest with <i>Allocasuarina torulosa</i> and <i>Angophora floribunda</i> . Uplands and highlands on alluvium, of the dry rainfall zone	Of Concern
7.3.26	<i>Casuarina cunninghamiana</i> woodland to open forest on alluvium fringing streams.	Of Concern
7.3.26a	<i>Casuarina cunninghamiana</i> , <i>Eucalyptus tereticornis</i> , <i>Lophostemon suaveolens</i> , <i>Melaleuca leucadendra</i> , <i>M. fluviatilis</i> , <i>Buckinghamia celsissima</i> , <i>Mallotus philippensis</i> woodland and forest with an understorey of <i>Melaleuca viminalis</i> and <i>Bursaria tenuifolia</i> . Fringing forests of larger streams. Riverine wetland or fringing riverine wetland	Of Concern
7.3.43	<i>Eucalyptus tereticornis</i> open forest to woodland on uplands on well-drained alluvium	Of Concern
7.3.43a	<i>Eucalyptus tereticornis</i> open forest, tall open forest and woodland including communities ranging from those dominated by <i>E. tereticornis</i> to mixtures of that species with <i>Corymbia intermedia</i> , <i>E. drepanophylla</i> , <i>Lophostemon suaveolens</i> and <i>Allocasuarina torulosa</i> . Uplands on alluvium.	Of Concern



RE	Description	VM Act Status
7.3.45b	<i>Corymbia clarksoniana</i> woodland to open forest. May include small areas of <i>Acacia leptostachya</i> shrubland. Alluvial plains	Least Concern
7.3.48a	<i>Eucalyptus portuensis</i> , <i>E. drepanophylla</i> , <i>Corymbia intermedia</i> , <i>C. citriodora</i> , <i>Lophostemon suaveolens</i> woodland and open forest with <i>Melaleuca viridiflora</i> , <i>Acacia flavescens</i> , and <i>Allocasuarina littoralis</i> . Areas of alluvium on uplands and highlands of the dry rainfall zone	Of Concern
7.8.4a	Complex notophyll vine forests. Highlands on very limited areas, of the cloudy wet rainfall zone	Least Concern
7.8.7	<i>Eucalyptus tereticornis</i> (forest red gum) open forest, and associated grasslands. Uplands and highlands on basaltic krasnozems and prairie soils, of the moist rainfall zone.	Of Concern
7.8.7a	<i>Eucalyptus tereticornis</i> open forest, tall open forest and woodland. May also include <i>Corymbia intermedia</i> , <i>E. drepanophylla</i> , <i>Lophostemon suaveolens</i> and <i>Allocasuarina torulosa</i> . Uplands and highlands on basaltic krasnozems and prairie soils, of the moist rainfall zone	Of Concern
7.8.10	<i>Eucalyptus tereticornis</i> , <i>E. drepanophylla</i> (or <i>E. granitica</i>), <i>E. portuensis</i> , <i>Corymbia intermedia</i> woodland to open forest, or <i>E. moluccana</i> woodland to open forest, of uplands and highlands on basalt.	Of Concern
7.8.10a	<i>Eucalyptus tereticornis</i> , <i>E. drepanophylla</i> , <i>E. portuensis</i> , <i>Corymbia intermedia</i> , <i>C. tessellaris</i> woodland to open forest with <i>Allocasuarina torulosa</i> . Uplands and highlands on basaltic euzozems-krasnozems, of the dry rainfall zone.	Of Concern
7.8.10b	<i>Eucalyptus moluccana</i> woodland to open forest. Uplands and highlands on basalt, of the dry rainfall zone	Of Concern
7.8.15a	<i>Eucalyptus grandis</i> open forest to woodland. Basalt	Of Concern
7.8.16a	<i>Eucalyptus resinifera</i> , <i>Corymbia intermedia</i> , <i>E. cloeziana</i> , <i>Syncarpia glomulifera</i> open forest and woodland with <i>Allocasuarina torulosa</i> . Uplands and highlands on basalt, of the moist rainfall zone	Of Concern
7.8.16c	<i>Lophostemon confertus</i> closed forest. Uplands and highlands on basalt, of the moist rainfall zone	Of Concern
7.8.18	<i>Corymbia intermedia</i> (pink bloodwood) and/or <i>Lophostemon suaveolens</i> (swamp mahogany) +/- <i>Allocasuarina torulosa</i> (forest sheoak) open forest to woodland. Basalt.	Of Concern
7.8.19	<i>Corymbia clarksoniana</i> open forest to woodland on basalt.	Endangered
7.12.7a	Complex notophyll vine forests (with emergent <i>Agathis robusta</i>). Foothills and uplands on granite and rhyolite north of the Herbert River. Moist rainfall zone	Least Concern
7.12.16a	Simple notophyll vine forest on wet and moist uplands, granite and rhyolite. Uplands of the cloudy wet to moist rainfall zones. Granite and rhyolite	Least Concern
7.12.21a	<i>Eucalyptus grandis</i> tall open forest and woodland. Granites and rhyolites	Least Concern
7.12.21b	<i>Eucalyptus grandis</i> tall open forest and woodland with a well-developed vine forest understorey. Granites and rhyolites	Least Concern
7.12.22a	<i>Eucalyptus resinifera</i> , <i>Eucalyptus acmenoides</i> , <i>Corymbia intermedia</i> , <i>Eucalyptus cloeziana</i> , <i>Syncarpia glomulifera</i> tall open forest to tall woodland with <i>Allocasuarina torulosa</i> and <i>Callitris macleayana</i> . Uplands and highlands of the moist rainfall zone	Least Concern
7.12.22d	<i>Syncarpia glomulifera</i> , <i>Eucalyptus resinifera</i> , and <i>Corymbia intermedia</i> open forest to tall open forest, often with <i>Callitris macleayana</i> and <i>Allocasuarina torulosa</i> . Uplands of the wet rainfall zone	Least Concern



RE	Description	VM Act Status
7.12.26a	<i>Syncarpia glomulifera</i> , <i>Allocasuarina torulosa</i> and/or <i>A. littoralis</i> open forest and woodland. Uplands and highlands, often on steep slopes, of the wet rainfall zone. Granite and rhyolite	Least Concern
7.12.27a	<i>Eucalyptus reducta</i> medium open forest and woodland. Uplands and highlands on shallow granitic and rhyolitic soils, of the moist rainfall zone.	Least Concern
7.12.27c	<i>Eucalyptus resinifera</i> and <i>Syncarpia glomulifera</i> open woodland. Uplands and highlands on shallow granitic and rhyolitic soils, of the moist rainfall zone.	Least Concern
7.12.29a	<i>Corymbia intermedia</i> , <i>Eucalyptus tereticornis</i> , <i>E. drepanophylla</i> open forest to low open forest and woodland with <i>Allocasuarina torulosa</i> , <i>A. littoralis</i> , <i>Lophostemon suaveolens</i> , <i>Acacia cincinnata</i> , <i>A. flavescens</i> , <i>Banksia aquilonia</i> and <i>Xanthorrhoea johnsonii</i> . Uplands, on granite and rhyolite.	Least Concern
7.12.30a	<i>Corymbia citriodora</i> , <i>Eucalyptus portuensis</i> , <i>C. intermedia</i> , <i>Syncarpia glomulifera</i> woodland to low woodland to open forest with <i>Callitris intratropica</i> , <i>Acacia calyculata</i> and <i>Xanthorrhoea johnsonii</i> . Uplands and highlands, of the moist and dry rainfall zones.	Least Concern
7.12.30c	<i>Eucalyptus portuensis</i> , <i>Corymbia citriodora</i> , <i>Syncarpia glomulifera</i> woodland and shrubland with a shrubby understorey of <i>Lophostemon confertus</i> and <i>S. glomulifera</i> , and a ground stratum of <i>Xanthorrhoea johnsonii</i> . Rocky slopes on rhyolite and granite	Least Concern
7.12.34	<i>Eucalyptus portuensis</i> and/or <i>E. drepanophylla</i> +/- <i>C. intermedia</i> +/- <i>C. citriodora</i> , +/- <i>E. granitica</i> open woodland to open forest on uplands on granite	Least Concern
7.12.37i	Bare rock pavements associated with <i>Allocasuarina</i> spp. (sheoaks) shrublands and/or sedgelands on seepage areas of wet lowlands, uplands and highlands of the eastern escarpment and central range (excluding high granite areas of Hinchinbrook Island and Bishops Peak). Rock pavements and outcrops. Granite and rhyolite	Of Concern
7.12.52	<i>Eucalyptus resinifera</i> , <i>Corymbia intermedia</i> , <i>Allocasuarina littoralis</i> , <i>Syncarpia glomulifera</i> , <i>E. drepanophylla</i> +/- <i>E. reducta</i> woodland on granite and rhyolite in the dry to moist rainfall zone	Of Concern
7.12.53a	<i>Corymbia clarksoniana</i> woodland to open forest. Lowlands, foothills and uplands on granite and rhyolite, of the dry to moist rainfall zone	Least Concern
7.12.57	Shrubland and low woodland mosaic with <i>Syncarpia glomulifera</i> , <i>Corymbia abergiana</i> , <i>Eucalyptus portuensis</i> , <i>Allocasuarina littoralis</i> and <i>Xanthorrhoea johnsonii</i> on uplands and highlands on granite	Of Concern
7.12.57a	Shrubland and low woodland mosaic with <i>Syncarpia glomulifera</i> , <i>Corymbia abergiana</i> , <i>Eucalyptus portuensis</i> , <i>Allocasuarina littoralis</i> and <i>Xanthorrhoea johnsonii</i> . Uplands and highlands on granite and rhyolite, of the moist and dry rainfall zones.	Of Concern
7.12.58	<i>Eucalyptus reducta</i> +/- <i>E. granitica</i> +/- <i>Corymbia dimorpha</i> +/- <i>C. citriodora</i> woodland to open forest on granite and rhyolite	Of Concern
7.12.60a	<i>Melaleuca viridiflora</i> woodland. Granite and rhyolite. Floodplain (other than floodplain wetlands)	Of Concern
7.12.61a	<i>Eucalyptus tereticornis</i> open forest to tall open forest and woodland. Includes communities ranging from those dominated by <i>E. tereticornis</i> to mixtures of that species with <i>Corymbia intermedia</i> , <i>E. drepanophylla</i> , <i>Lophostemon suaveolens</i> and <i>Allocasuarina torulosa</i> . Foothills and uplands on granite and rhyolite, of the moist and dry rainfall zones	Least 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 <i>Acacia</i> spp. And/or <i>Lophostemon suaveolens</i> and/or <i>Allocasuarina littoralis</i> and/or <i>Eucalyptus lockyeri</i> subsp. <i>Exuta</i> .	Least Concern



RE	Description	VM Act Status
7.12.65a	Rock pavement communities of the dry rainfall zone with <i>Acacia leptostachya</i> , <i>Eucalyptus lockyeri</i> subsp. <i>Exuta</i> , <i>Lophostemon confertus</i> , <i>L. suaveolens</i> , <i>Persoonia falcata</i> , <i>Ficus rubiginosa</i> and <i>Allocasuarina inophloia</i>	Least Concern
7.12.65e	Complex of open to closed shrublands, low to medium woodlands and forests and grasslands of mountain granite and rhyolite rock pavements. Main component: scrub (<i>Allocasuarina littoralis</i> , <i>Syncarpia glomulifera</i> , <i>Lophostemon confertus</i>), shrubland (<i>Banksia aquilonia</i> , <i>Leptospermum</i> sp.) and heath (<i>Xanthorrhoea johnsonii</i> , <i>Gahnia</i> spp., <i>Dicranopteris linearis</i>). Granite and rhyolite rock pavements	Least Concern
7.12.65k	Granite and rhyolite rock outcrop, of dry western areas, associated with shrublands to closed forests of <i>Acacia</i> spp. And/or <i>Lophostemon</i> spp. And/or <i>Allocasuarina</i> spp. In the Mount Emerald area, shrubs may include <i>Acacia 82orter828282</i> , <i>Melaleuca borealis</i> , <i>Homoranthus 82orter</i> , <i>Leptospermum neglectum</i> , <i>Melaleuca 82orter82</i> , <i>Melaleuca uxorum</i> , <i>Grevillea glossadenia</i> , <i>Corymbia abergiana</i> , <i>Eucalyptus lockyeri</i> , <i>Sannantha angusta</i> , <i>Pseudanthus ligulatus</i> subsp. <i>Ligulatus</i> , <i>Acacia aulacocarpa</i> , <i>Leptospermum amboinense</i> , <i>Xanthorrhoea johnsonii</i> and <i>Jacksonia thesioides</i> . Ground-cover species may include <i>Borya septentrionalis</i> , <i>Lepidosperma laterale</i> , <i>Eriachne</i> spp., <i>Cleistochloa subjuncea</i> , <i>Boronia occidentalis</i> , <i>Cheilanthes</i> spp., <i>Coronidium newcastlianum</i> , <i>Schizachyrium</i> spp., <i>Tripogon loliiformis</i> , <i>Gonocarpus acanthocarpus</i> and <i>Eragrostis</i> spp. Dry western areas. Granite and rhyolite.	Least Concern
7.12.66	<i>Lophostemon confertus</i> (brush box) low shrubland or low to medium closed forest. Exposed rocky slopes on granite and rhyolite.	Of Concern
7.12.66b	<i>Lophostemon confertus</i> shrubland. Exposed rocky slopes on granite and rhyolite	Of Concern
7.12.66c	<i>Lophostemon confertus</i> low closed forest to closed forest. Exposed rocky slopes on granite and rhyolite	Of Concern
7.12.66e	Bare rock of exposed rocky slopes on granite and rhyolite, associated with <i>Lophostemon confertus</i> shrublands and closed forests. Exposed rocky slopes on granite and rhyolite	Of Concern
9.3.4	Permanent or seasonal wetlands frequently fringed by narrow bands of trees and shrubs including <i>Eucalyptus</i> spp. On alluvial plains	Of Concern
9.3.15	Fringing woodland to open forest containing any combination of <i>Casuarina cunninghamiana</i> , <i>Eucalyptus tereticornis</i> and <i>E. platyphylla</i> +/- <i>Lophostemon suaveolens</i> +/- <i>Nauclea orientalis</i> +/- <i>Corymbia tessellaris</i> +/- <i>C. clarksoniana</i> . There is often a low sub-canopy layer which can include canopy species and <i>Ficus</i> spp. The open shrub layer contains juvenile canopy species and can include mesic species such as <i>Euroschinus falcatus</i> , <i>Acacia mangium</i> and <i>Syzygium</i> sp. The ground layer is medium to dense grassy and contains <i>Imperata cylindrica</i> , <i>Crotalaria</i> sp., <i>Heteropogon contortus</i> , <i>Cyperus</i> spp. And <i>Paspalum</i> spp. Occurs on stream banks and channels in areas of higher rainfall in the central east of the bioregion.	Least Concern
9.3.16	<i>Eucalyptus tereticornis</i> and/or <i>E. platyphylla</i> and/or <i>Corymbia clarksoniana</i> woodland on alluvial flats, levees and plains.	Least Concern
9.5.5a	Mixed woodland to open forest of <i>Eucalyptus crebra</i> , <i>Corymbia clarksoniana</i> and <i>C. citriodora</i> subsp. <i>Citriodora</i> +/- <i>E. portuensis</i> with a generally open sub-canopy of canopy species +/- <i>Callitris intratropica</i> and <i>Acacia</i> spp. The open shrub layer often contains juvenile canopy species, <i>Petalostigma pubescens</i> , <i>Acacia flavescens</i> and other <i>Acacia</i> spp. <i>Themeda triandra</i> is the dominant species in a dense grassy ground layer. Occurs on Tertiary plateaus and remnants.	Least Concern
9.5.5b	Woodland of <i>Eucalyptus crebra</i> or <i>E. granitica</i> +/- <i>Corymbia clarksoniana</i> +/- <i>C. dallachiana</i> +/- <i>C. erythrophloia</i> with a usually open sub-canopy and shrub layer including juvenile canopy species, <i>Grevillea glauca</i> , <i>G. parallel</i> , <i>Acacia flavescens</i> , <i>Petalostigma pubescens</i> , <i>Melaleuca viridiflora</i> and <i>Denhamia cunninghamii</i> . The grassy ground layer is dominated by <i>Themeda triandra</i> . Occurs on Tertiary plateaus and remnants	Least Concern



RE	Description	VM Act Status
9.5.5c	Woodland to open woodland of <i>Eucalyptus moluccana</i> or <i>E. tereticornis</i> +/- <i>Lophostemon suaveolens</i> +/- <i>Corymbia clarksoniana</i> . The distinct sub-canopy usually contains canopy species +/- <i>Melaleuca viridiflora</i> . Scattered <i>M. viridiflora</i> , <i>Petalostigma pubescens</i> and <i>Acacia</i> spp. May be found in the shrub layer. The dense grassy ground layer is often dominated by <i>Themeda triandra</i> and <i>Chrysopogon fallax</i> . Occurs on Tertiary sandplains	Least Concern
9.5.5d	Low woodland to tall shrubland of <i>Callitris intratropica</i> +/- <i>Melaleuca viridiflora</i> +/- <i>Petalostigma pubescens</i> . A number of <i>Eucalyptus</i> spp. And/or <i>Corymbia</i> spp. Can occur in the dominant layer including <i>Eucalyptus crebra</i> , <i>Corymbia clarksoniana</i> and <i>Corymbia citriodora</i> subsp. <i>Citriodora</i> , or occur as 83orter8383. A dense lower canopy layer can occur and include <i>Callitris intratropica</i> and other canopy species. The lower mid-layer is generally open and usually contains canopy juvenile species +/- <i>Acacia</i> spp. The ground layer is mid-dense grassy and usually dominated by <i>Themeda triandra</i> or <i>Chrysopogon fallax</i> . This description can include <i>Eucalyptus</i> spp. And/or <i>Corymbia</i> spp. Woodlands with a dense understory of <i>Callitris intratropica</i> . Occurs on Tertiary plateaus and remnants	Least Concern
9.5.6a	Woodland to open woodland of <i>Eucalyptus leptophleba</i> +/- <i>Corymbia clarksoniana</i> +/- <i>E. platyphylla</i> +/- <i>C. tessellaris</i> . The mid layer is generally isolated shrubs which may include <i>Petalostigma pubescens</i> , <i>Melaleuca</i> spp. And <i>Acacia</i> spp., <i>Alphitonia pomaderroides</i> and <i>Grevillea glauca</i> . There is a grassy ground layer usually dominated by <i>Heteropogon contortus</i> . Occurs on yellow kandosols and mapped as YEPR (yellow earths on gently undulating plains and plateaus on Tertiary lateritic remnants) by Grundy	Least Concern
9.5.14	<i>Melaleuca viridiflora</i> and/or <i>M. stenostachya</i> low open woodland on erosional plains	Of Concern
9.5.17	<i>Eucalyptus exserta</i> , <i>Corymbia abergiana</i> and <i>Callitris intratropica</i> mixed low woodland on Tertiary remnants	Of Concern
9.8.2a	Woodland to open woodland of <i>Eucalyptus leptophleba</i> +/- <i>Corymbia clarksoniana</i> /- <i>C. dallachiana</i> +/- <i>C. erythrophloia</i> +/- <i>E. cullenii</i> +/- <i>E. platyphylla</i> . There is often an open sub-canopy layer with canopy species. The shrub layer is absent or contains scattered canopy species, <i>Planchonia careya</i> , <i>Melaleuca</i> spp. And/or <i>Grevillea</i> spp. The ground layer is mid-dense and dominated by <i>Heteropogon</i> spp. And <i>Themeda triandra</i> . Occurs on basalt plains and undulating rises of the Tertiary MacLean Basalt group.	Least Concern
9.8.4	<i>Eucalyptus crebra</i> and/or <i>E. tereticornis</i> open woodland on basalt plains	Least Concern
9.11.10	<i>Eucalyptus cloeziana</i> , <i>Corymbia citriodora</i> subsp. <i>Citriodora</i> , <i>E. portuensis</i> and <i>E. cullenii</i> mixed woodland on steep dissected hills on highly metalliferous metamorphic rocks	Least Concern
9.12.2	<i>Eucalyptus portuensis</i> , <i>Corymbia citriodora</i> subsp. <i>Citriodora</i> , <i>E. granitica</i> or <i>E. crebra</i> , <i>C. intermedia</i> or <i>C. clarksoniana</i> 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 <i>Eucalyptus shirleyi</i> +/- <i>Corymbia peltate</i> +/- <i>Callitris intratropica</i> . 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
9.12.4a	Low woodland to occasionally a low open forest of <i>Eucalyptus shirleyi</i> and <i>Corymbia 83orter83</i> +/- <i>E. crebra</i> (sens. Lat.) +/- <i>Corymbia</i> spp. +/- <i>Acacia leptostachya</i> . <i>E. melanophloia</i> can sometimes occur. <i>E. crebra</i> may also occur as an emergent. A sub-canopy containing <i>E. shirleyi</i> , <i>Alphitonia excelsa</i> , <i>Acacia</i> spp. And <i>Persoonia falcata</i> can occur. <i>E. shirleyi</i> can occur as a dense sub-canopy under <i>C. 83orter83</i> . The shrub layer varies from absent to mid-dense with a variable species mix including <i>E. shirleyi</i> , <i>Denhamia cunninghamii</i> , <i>Acacia leptostachya</i> , <i>Petalostigma 83orter83</i> , <i>Persoonia falcata</i> , <i>Alphitonia</i> spp. And <i>Acacia</i> spp. <i>Xanthorrhoea johnsonii</i> can also occur in a lower shrub layer. The dense grassy	Least Concern



RE	Description	VM Act Status
	ground layer is dominated by <i>Heteropogon</i> spp., <i>Schizachyrium fragile</i> and <i>Themeda triandra</i> . Occurs predominantly on sandy shallow soils derived from granitic or rhyolite geologies on rolling low hills to hills	
9.12.30a	Woodland to open forest of <i>Corymbia leichhardtii</i> and <i>Eucalyptus cloeziana</i> +/- <i>E. portuensis</i> +/- <i>C. citriodora</i> subsp. <i>Citriodora</i> +/- <i>E. cullenii</i> +/- <i>Callitris intratropica</i> . Some canopy species can occur as 84orter8484. The sparse to mid-dense shrub layer is dominated by juvenile canopy species, <i>Persoonia falcata</i> , <i>Grevillea glauca</i> and <i>Allocasuarina inophloia</i> and a lower shrub with <i>Jacksonia thesioides</i> and <i>Xanthorrhoea johnsonii</i> can occur. The sparse to mid-dense ground layer is dominated by <i>Themeda triandra</i> . Rocky rhyolite hills to steep hills	Least Concern
9.12.30b	Shrubland of <i>Acacia leptostachya</i> +/- <i>A. 84orter848484</i> +/- <i>Callitris intratropica</i> 84orter8484. There is no mid layer or ground layer. Occurs on shallow soils on rock pavements within 9.12.30a	Least Concern

Chalumbin Wind Farm

Ground-Truthed Regional
Ecosystem Mapping

Figure 4.3

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

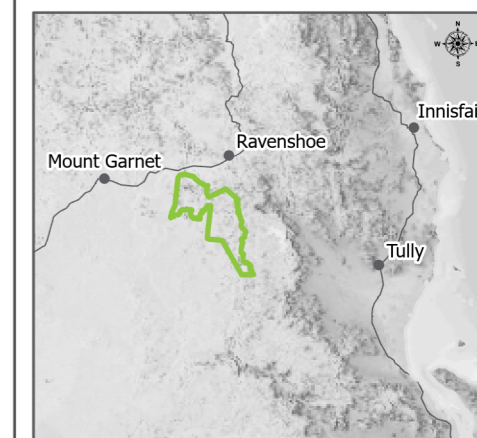
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Date: 15/10/2022

Author: TOD

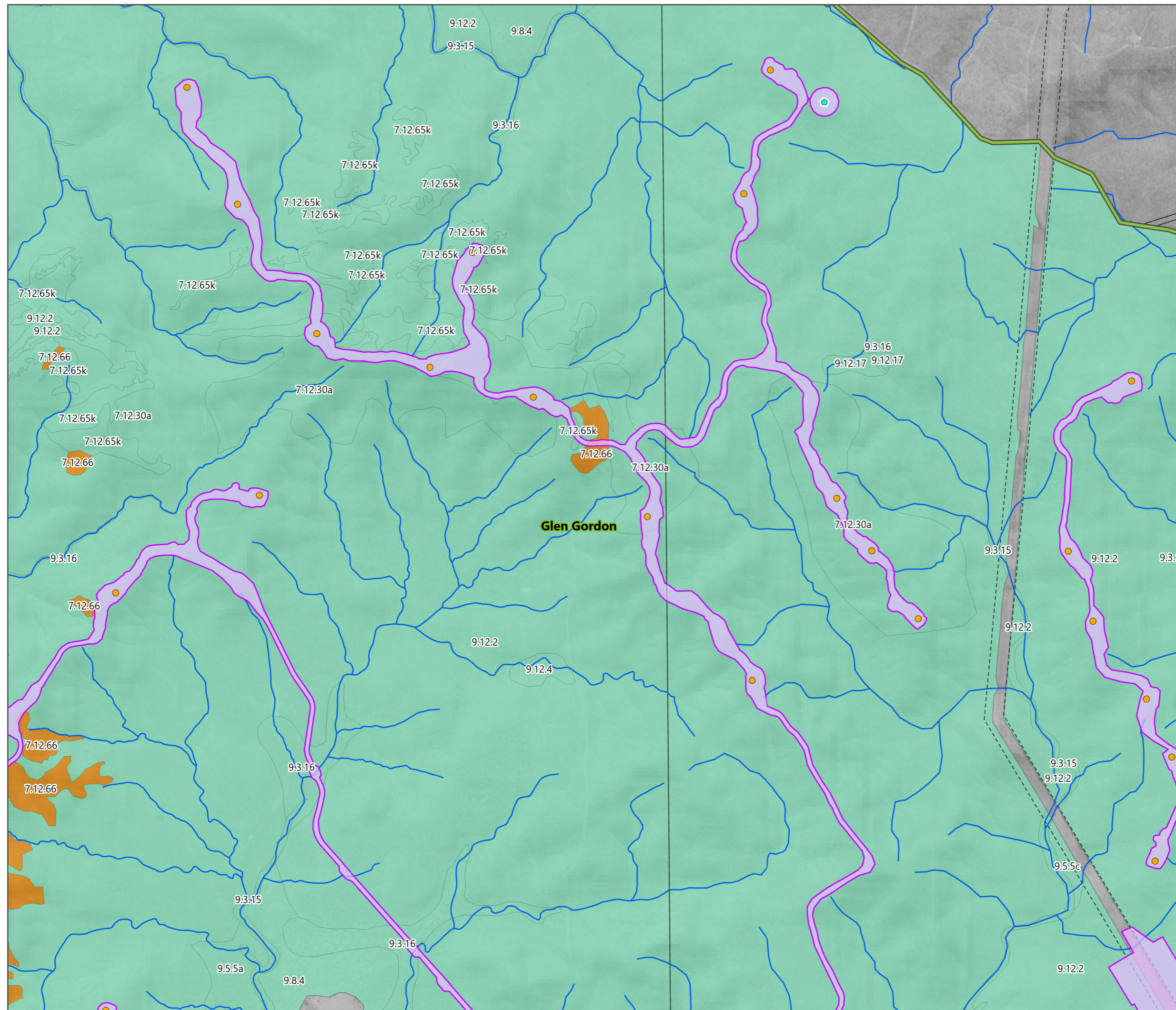
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









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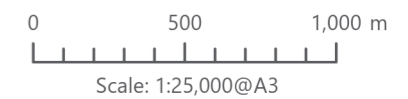
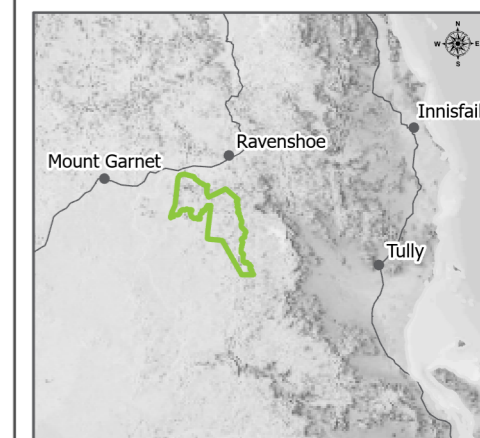
Ground-Truthed Regional Ecosystem Mapping

Figure 4.3 Sheet 2 of 8

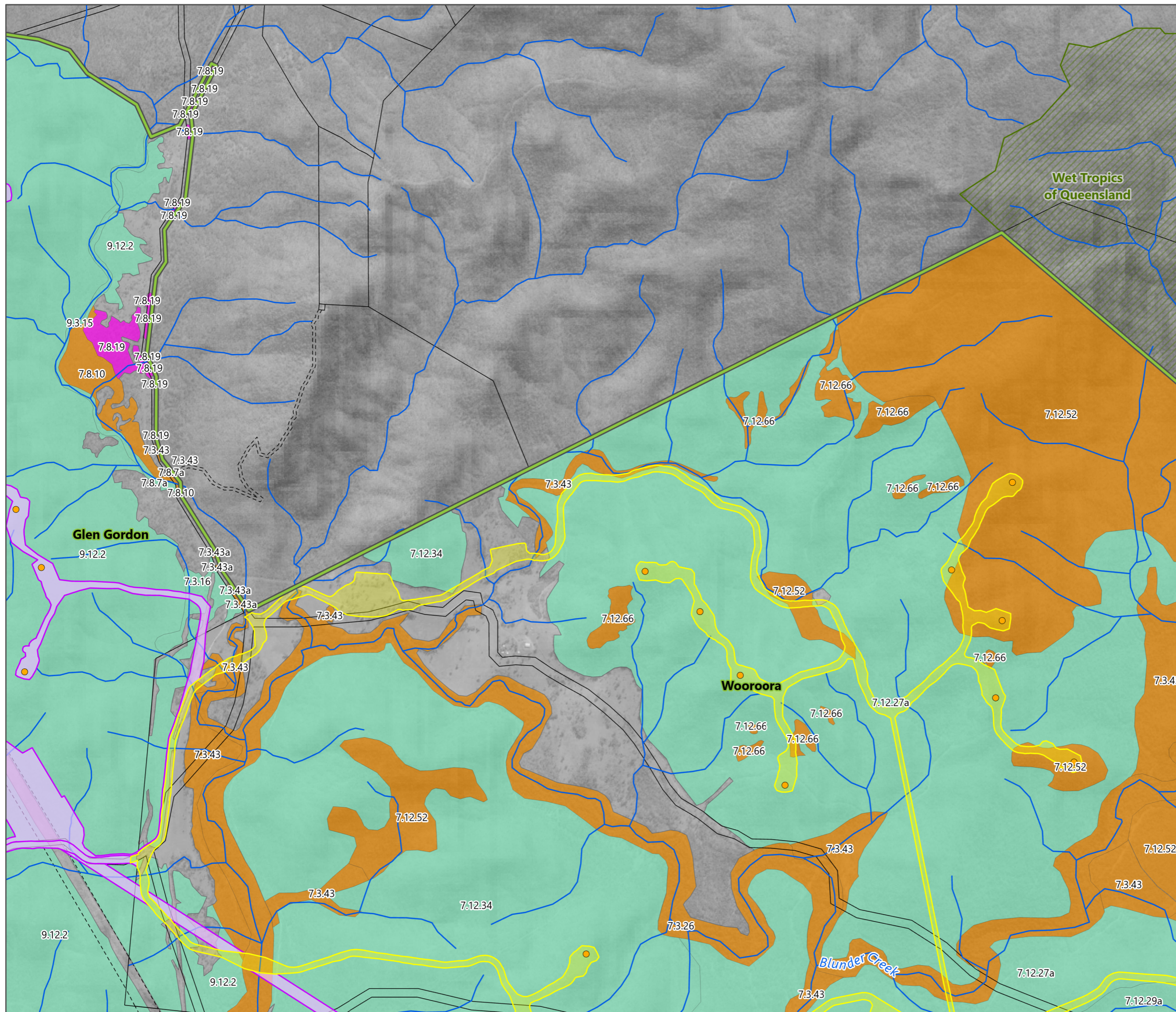
-  Project Area Boundary
-  Study Area
-  Turbine
-  Met-mast
- Clearance Envelope**
-  Stage 1
-  Stage 2
- Regional Ecosystem Mapping (Attexo 2021)**
-  Remnant vegetation containing endangered regional ecosystem
-  Remnant vegetation containing of concern regional ecosystem
-  Remnant vegetation containing least concern regional ecosystem
-  Non Remnant
-  Watercourse
-  WTQ Boundary
-  Lot Boundary
-  Easement

Date: 15/10/2022
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Author: TOD
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Chalumbin Wind Farm

Ground-Truthed Regional
Ecosystem Mapping

Figure 4.3

Sheet 3 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

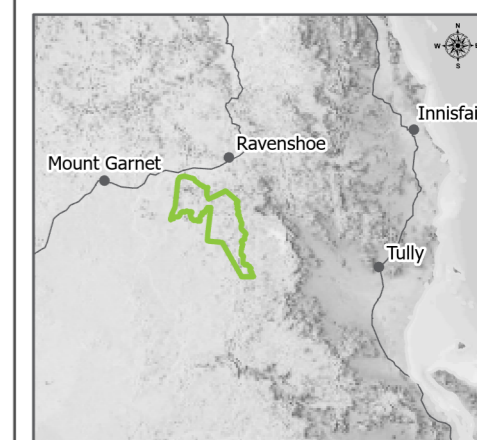
WTQ Boundary

Lot Boundary

Easement

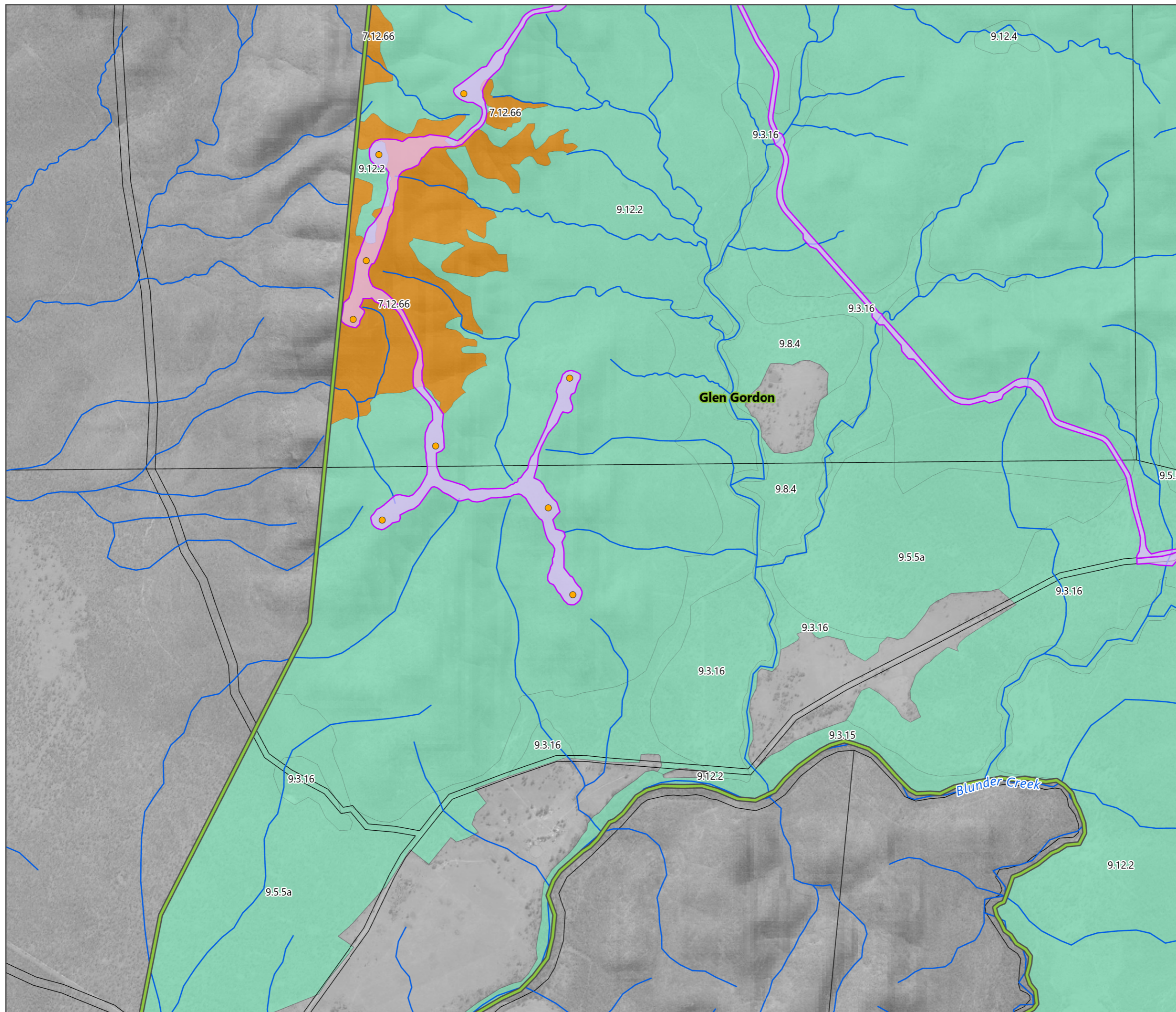
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Project: EPU-004

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









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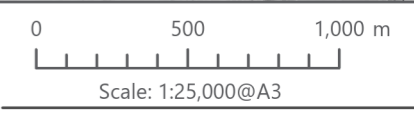
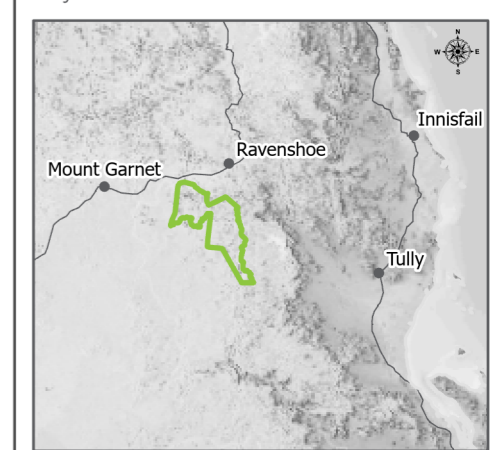
Chalumbin Wind Farm

Ground-Truthed Regional Ecosystem Mapping

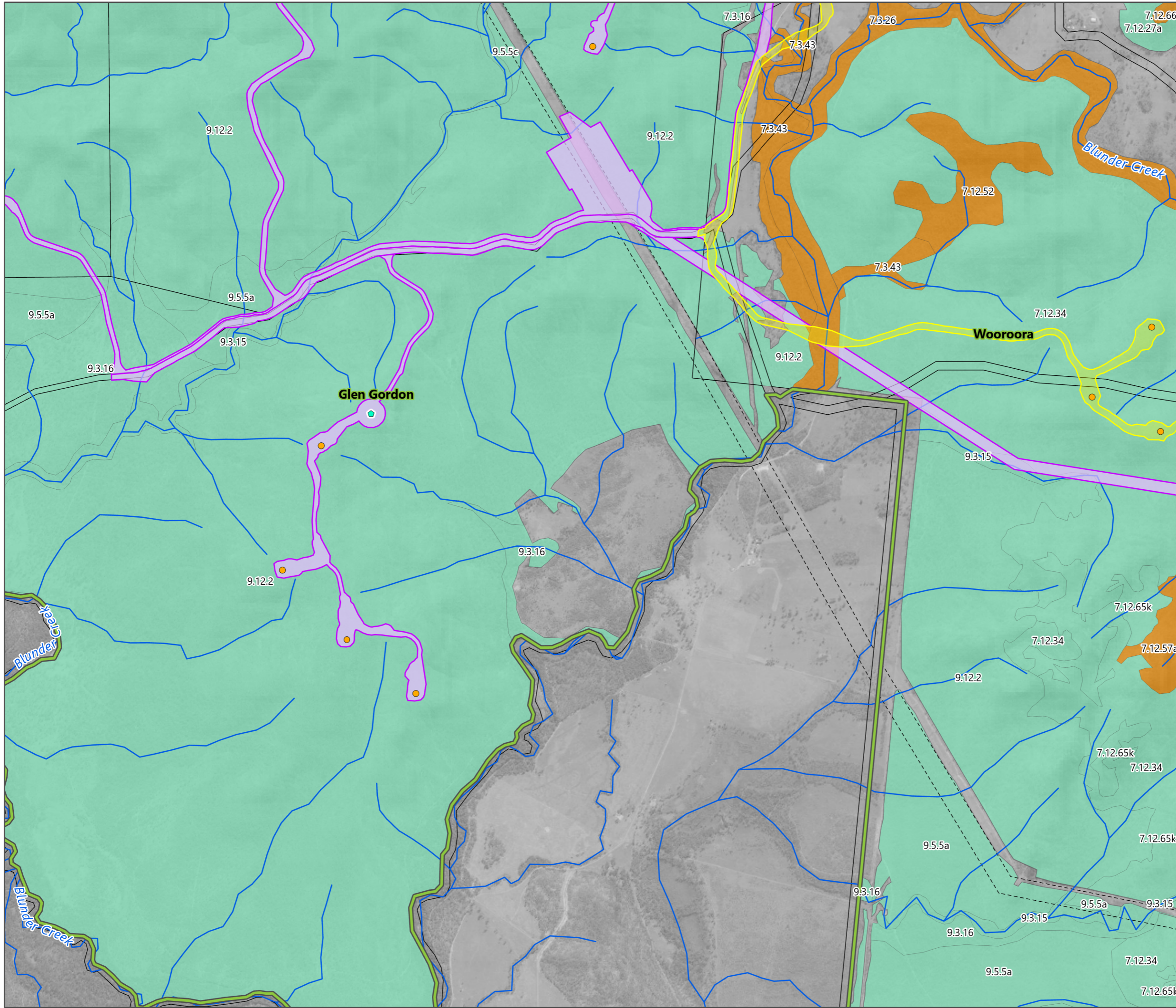
Figure 4.3 Sheet 4 of 8

-  Project Area Boundary
-  Study Area
-  Turbine
-  Met-mast
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-  Stage 1
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-  Easement

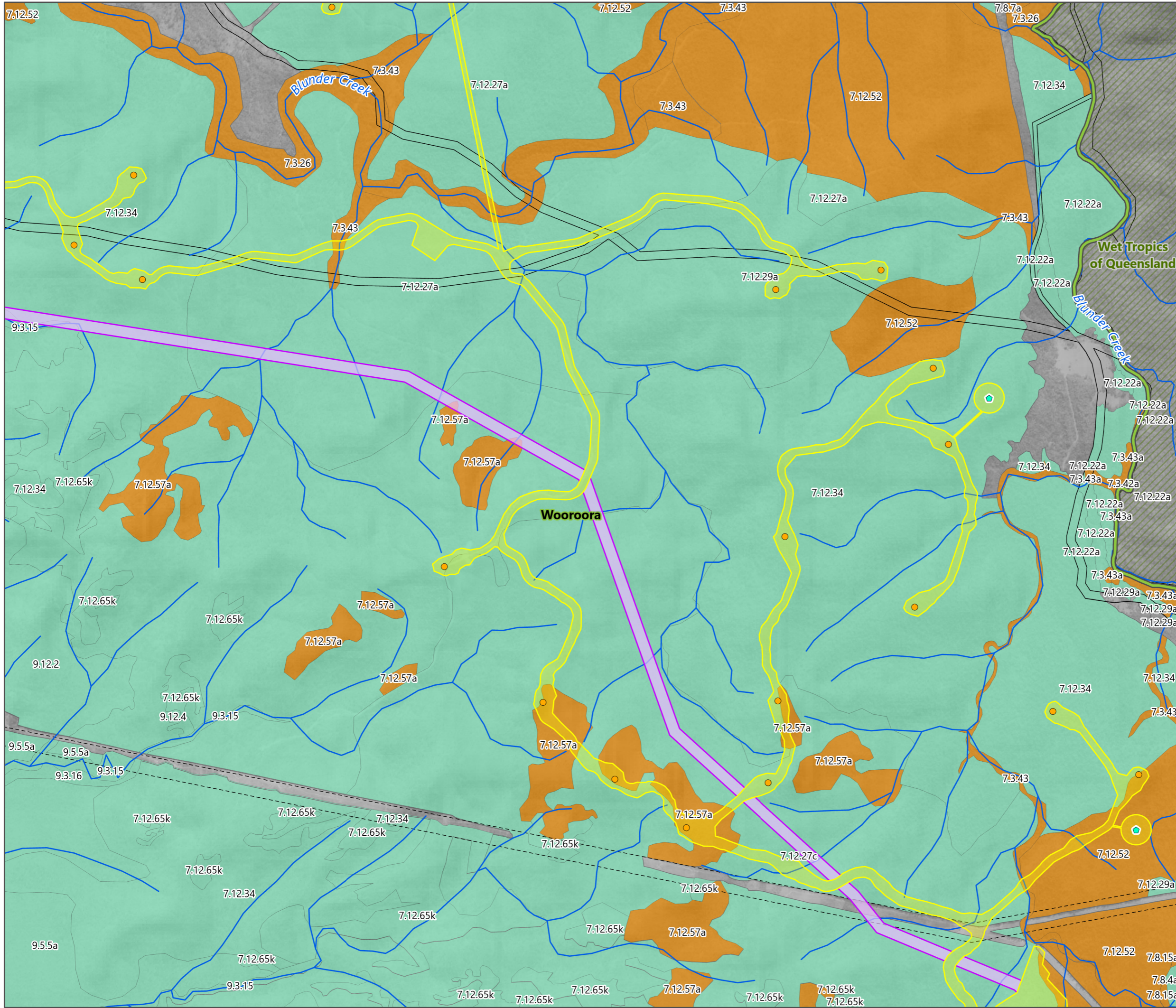
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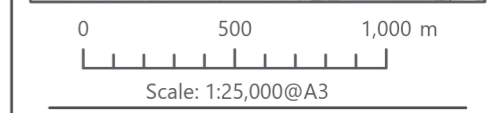
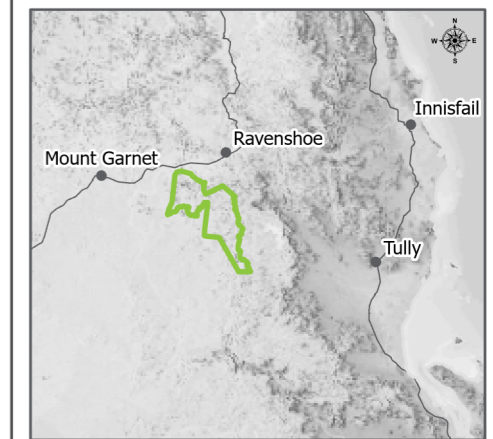


Chalumbin Wind Farm
Ground-Truthed Regional
Ecosystem Mapping

Figure 4.3 Sheet 5 of 8

- Project Area Boundary
- Study Area
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- Clearance Envelope**
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Date: 15/10/2022 Author: TOD
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