

Results: Map 1 of 9

Vegetation Type

-  BGW (Native Pasture)
-  BGW (Tree Cover)








Vegetation Condition

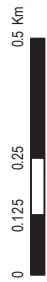
-  Poor
-  Poor-moderate

Fauna Results

-  Brown Treecreeper
-  Diamond Firetail

Infrastructure

-  Site Numbers
-  Latest Development Envelope
-  Turbines (270912)
-  Access Tracks (270912)
-  Electrical Reticulation (05 0912)
-  Roads
-  Previously assessed area


















1:16000@A4

Ref: 4743 - 2/1

Author: AM

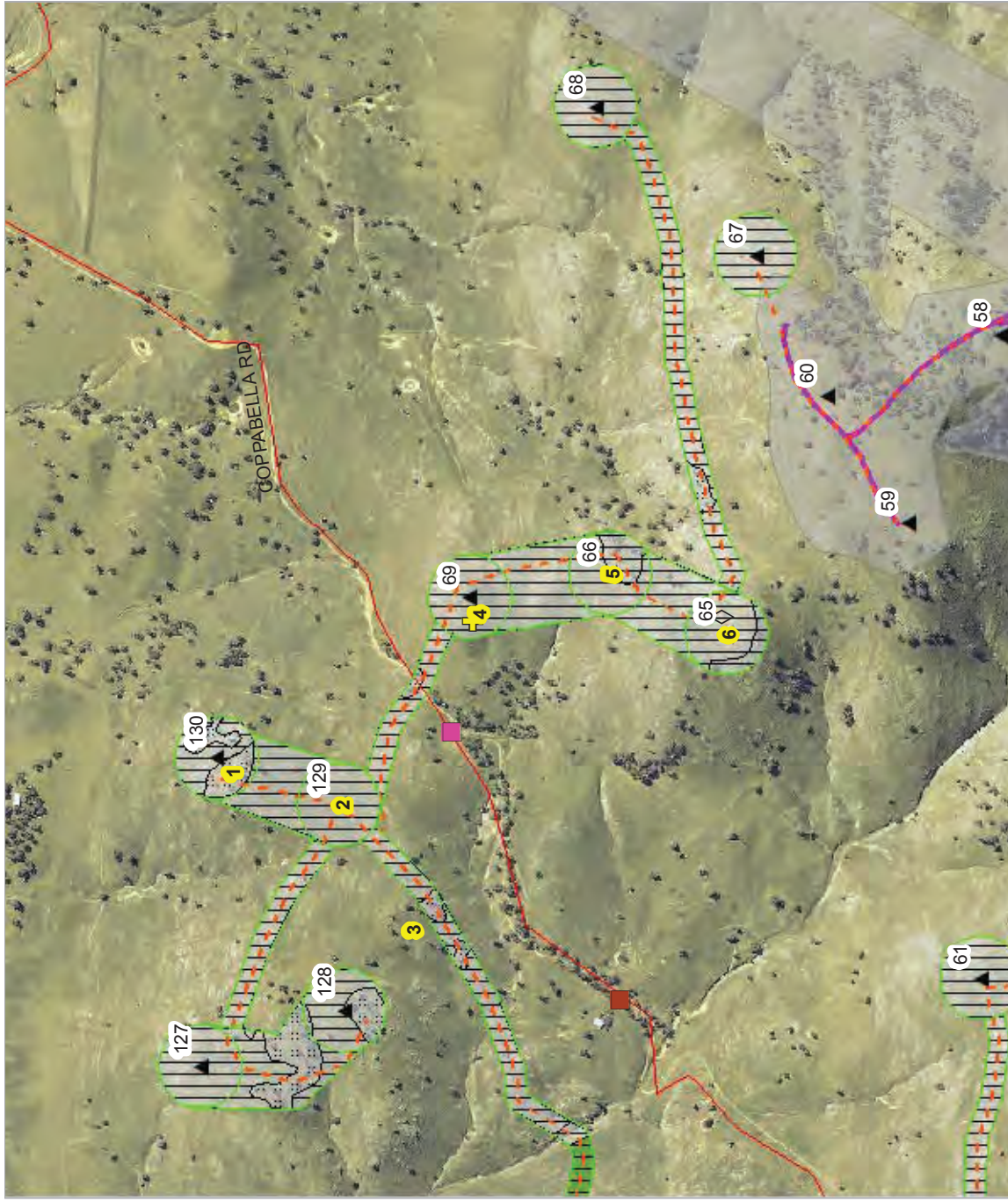
Results: Map 2 of 9

- Vegetation Type**
-  BGW (Native Pasture)
 -  BGW (Tree Cover)
- Vegetation Condition**
-  Poor
 -  Poor-moderate
- Fauna Results**
-  Brown Treecreeper
 -  Diamond Firetail
 -  Grassland reptile habitat
 -  No hollows present
- Infrastructure**
-  Site Numbers
 -  Latest Development Envelope
 -  Turbines (270912)
 -  Access Tracks (270912)
 -  Electrical Reticulation (050912)
 -  Roads
 -  Previously assessed area

0 0.125 0.25 0.5 Km

1:16000 @ A4
Ref. 4743 - 2/2
Author: AM

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Results: Map 3 of 9

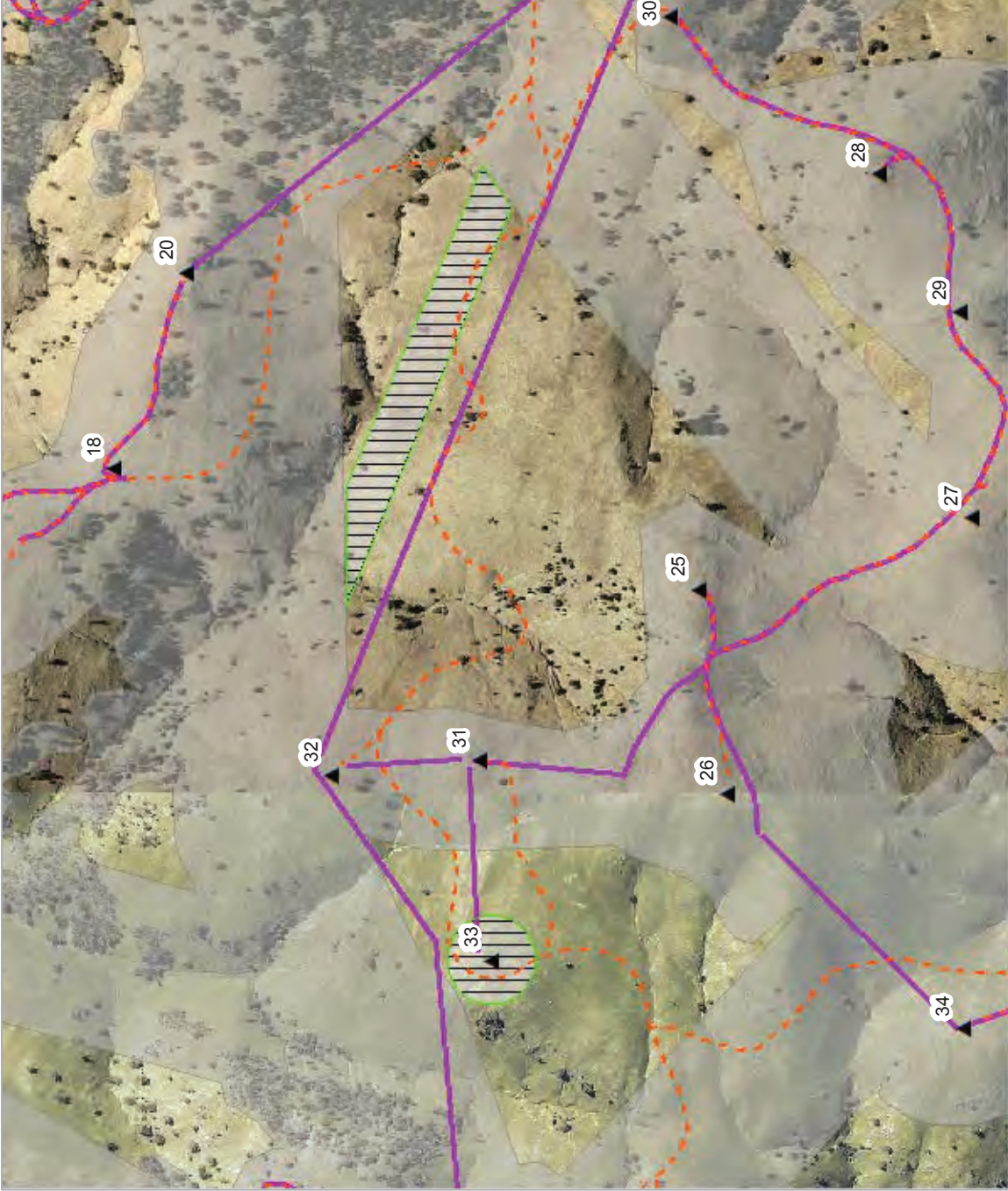
- Vegetation Type**
 - BGW (Native Pasture)
- Vegetation Condition**
 - Poor-moderate
- Infrastructure**
 - Site Numbers
 - Latest Development Envelope
 - Turbines (270912)
 - Access Tracks (270912)
 - Electrical Reticulation (050912)
 - Roads
 - Previously assessed area



1:15000 @ A4
Ref. 4743 - 2/3
Author: AM



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Results: Map 4 of 9















- Vegetation Type**
 - BGW (Native Pasture)
- Vegetation Condition**
 - Poor-moderate
- Infrastructure**
 - Site Numbers
 - Latest Development Envelope
 - Turbines (270912)
 - Access Tracks (270912)
 - Electrical Reticulation (050912)
 - Roads
 - Previously assessed area

0 0.125 0.25 0.5 Km

1:10000 @ A4
Ref. 4743 - 2/4
Author: AM


















Results: Map 5 of 9

- Vegetation Type**
-  BGW (Native Pasture)
 -  BGW (Tree Cover)
- Vegetation Condition**
-  Moderate
 -  Moderate-good
 -  Poor-moderate
- Fauna Results**
-  Grassland reptile habitat
 -  No hollows present
- Infrastructure**
-  Site Numbers
 -  Latest Development Envelope
 -  Turbines (270912)
 -  Access Tracks (270912)
 -  Electrical Retiulation (05 0912)
 -  Roads
 -  Previously assessed area



Results: Map 6 of 9

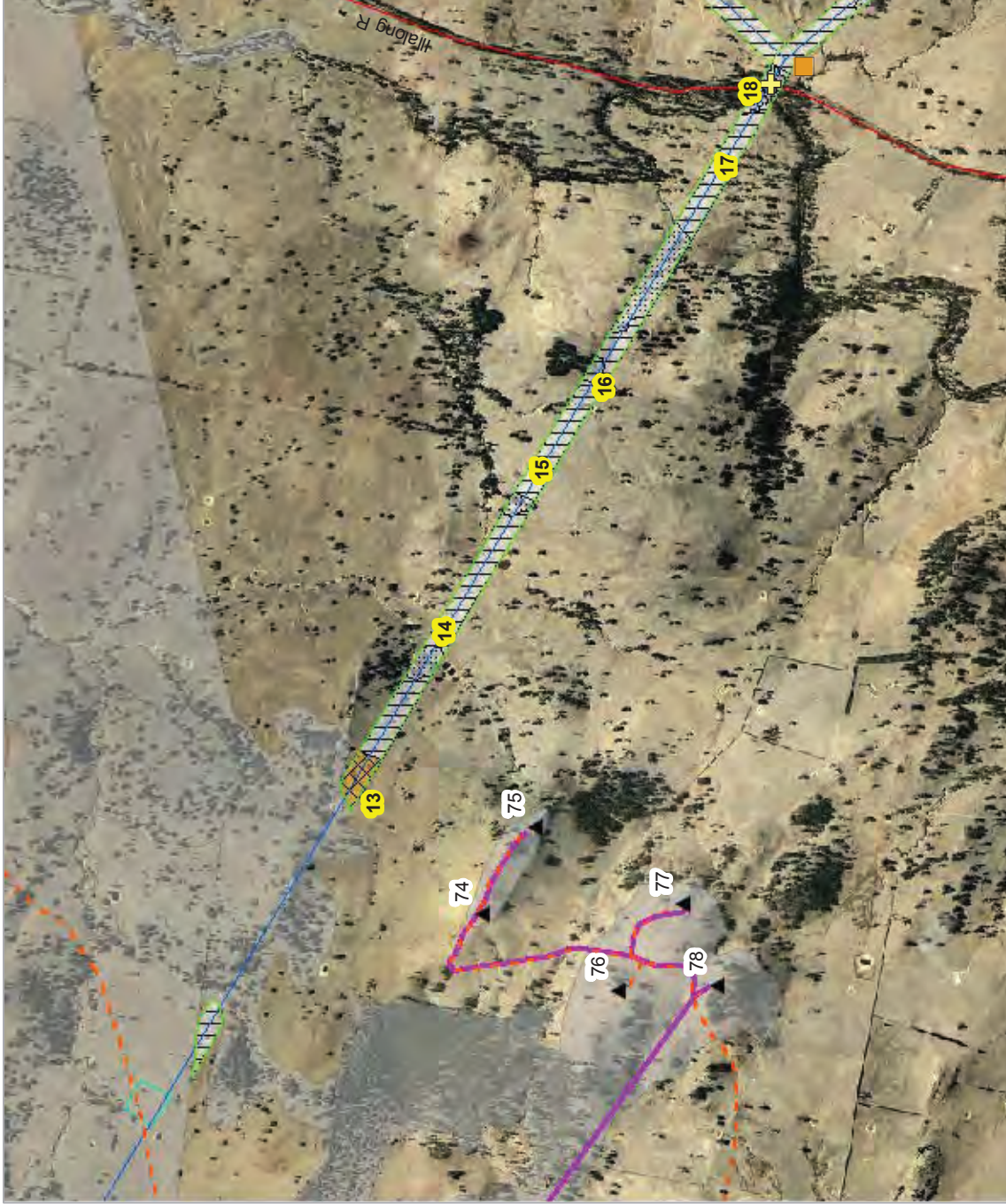
- Vegetation Type**
-  BGW (Grassland)
 -  BGW (Native Pasture)
 -  BGW (Tree Cover)
 -  RRG (Tree Cover)
- Vegetation Condition**
-  Moderate-good
 -  Poor-moderate
- Fauna Results**
-  Little Eagle
 -  No hollows present
- In infrastructure**
-  Site Numbers
 -  Latest Development Envelope
 -  Turbines (270912)
 -  Access Tracks (270912)
 -  Electrical Reticulation (050912)
 -  Substations (180912)
 -  Roads
 -  Previously assessed area















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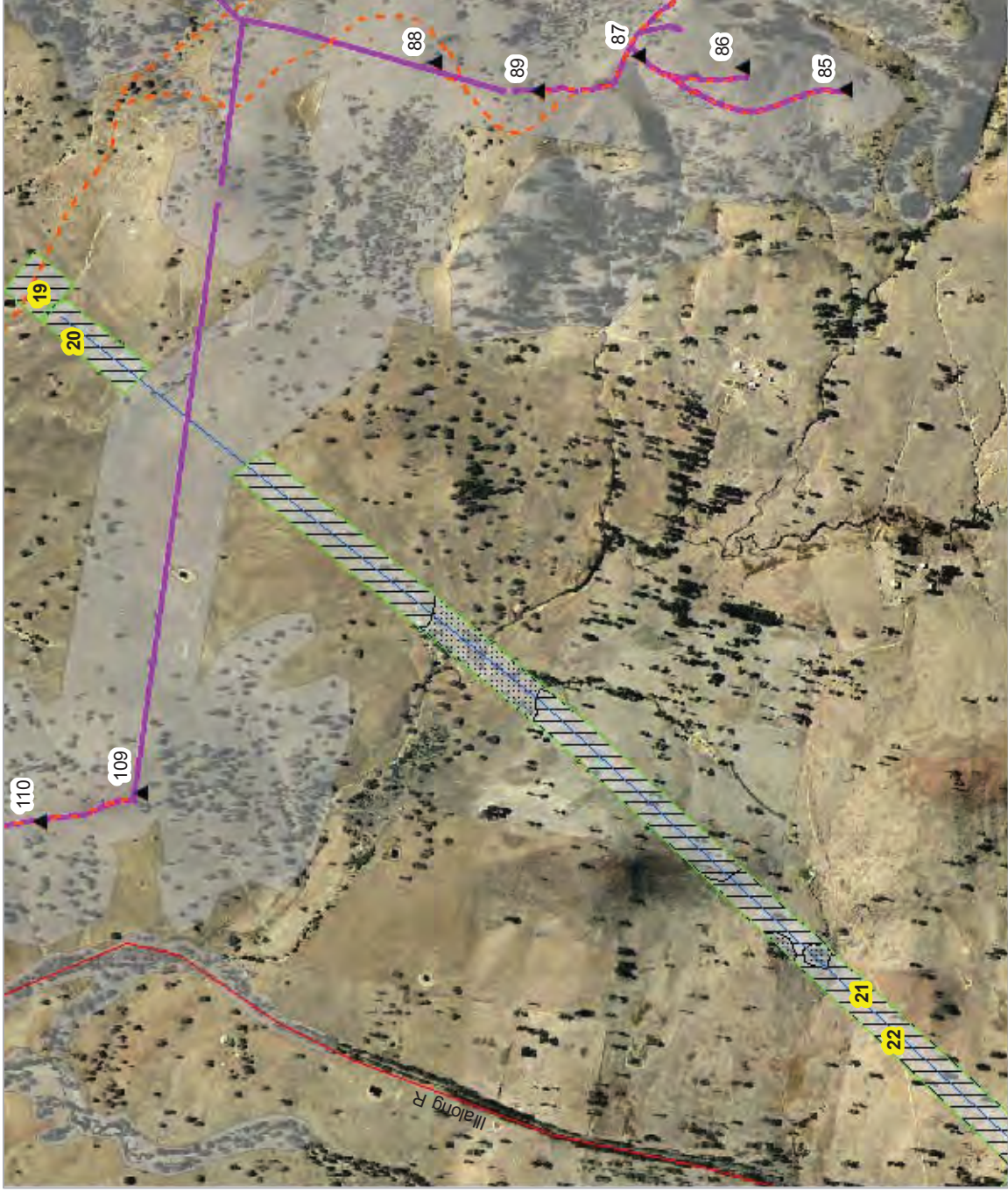
Ref. 4743 - 2/6

Author: AM



Results: Map 7 of 9

- Vegetation Type**
-  BGW (Native Pasture)
 -  BGW (Tree Cover)
- Vegetation Condition**
-  Poor-moderate
- Infrastructure**
-  Site Numbers
 -  Latest Development Envelope
 -  Turbines (270912)
 -  Access Tracks (270912)
 -  Electrical Reticulation (050912)
 -  Powerline Easement (050912)
 -  Substations (180912)
 -  Roads
 -  Previously assessed area



Results: Map 8 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)
- RRG (Tree Cover)

Vegetation Condition

- Moderate-good
- Poor-moderate

Fauna results

- Little Eagle
- No hollows present
- High density hollow-bearing trees

Infrastructure

- Site Numbers
- Latest Development Envelope
- Powerline Easement (050912)
- Roads
- Previously assessed area



0 0.25 0.5 1 Km

1:35000@A4

Ref: 4743 - 2/8

Author: DM



Results: Map 9 of 9

- Vegetation Type**
- BGW (Grassland)
 - BGW (Native Pasture)
 - BGW (Tree Cover)
- Vegetation Condition**
- Moderate
 - Moderate-good
 - Poor-moderate
- Fauna Results**
- Grassland reptile habitat
 - High density hollow-bearing trees
- Infrastructure**
- Site Numbers
 - Substations (180912)
 - Latest Development Envelope
 - Powerline Easement (050912)
 - Previously assessed area



Constraints: Map 1 of 9

Constraints

- Moderate
- Low

Infrastructure

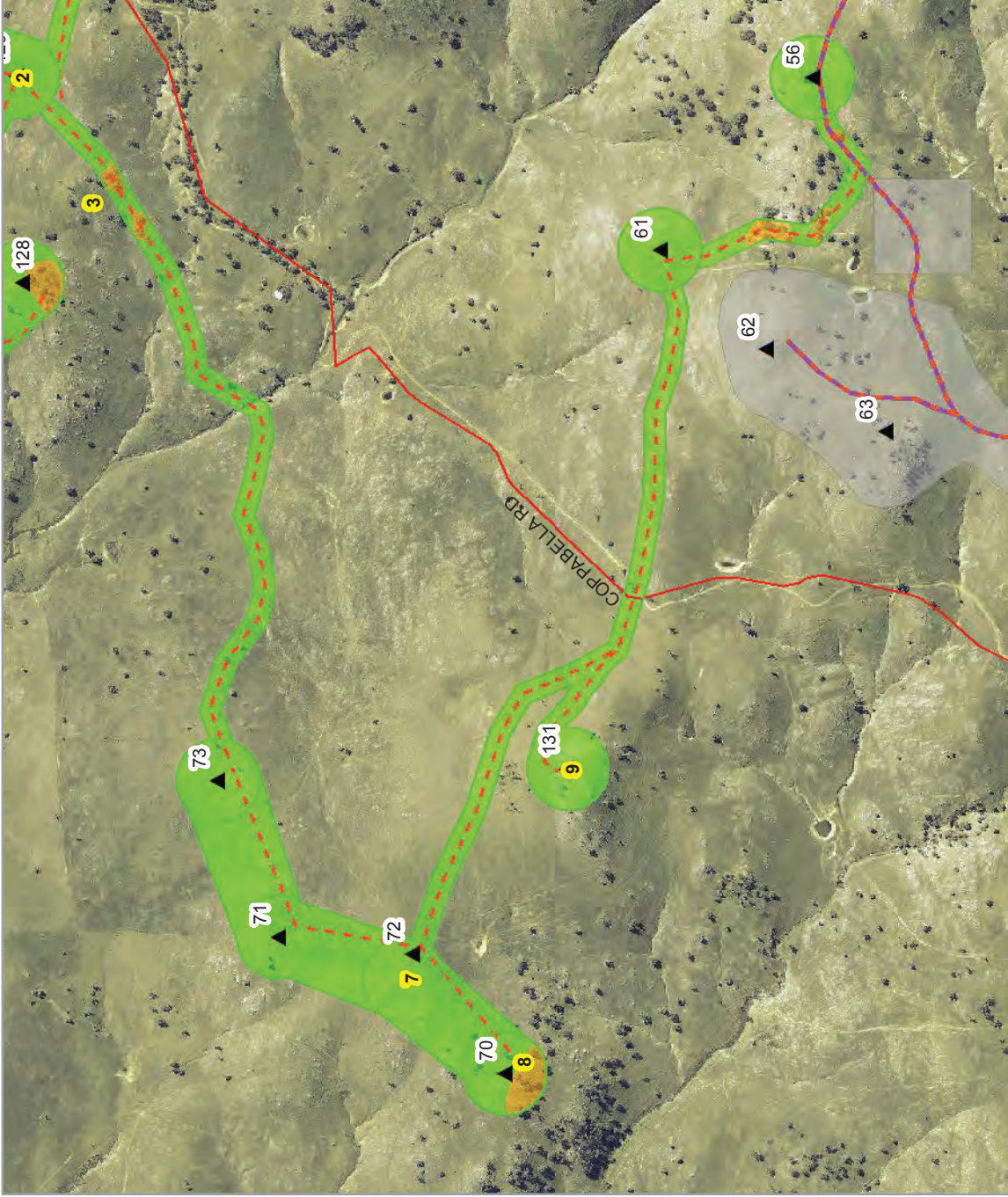
- Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Return Line (00912)
- Roads
- Previously assessed area



1:16000 @ A4
Ref. 4743 - 3/1
Author: AM



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Constraints: Map 2 of 9

Constraints

- Moderate
- Low

Infrastructure

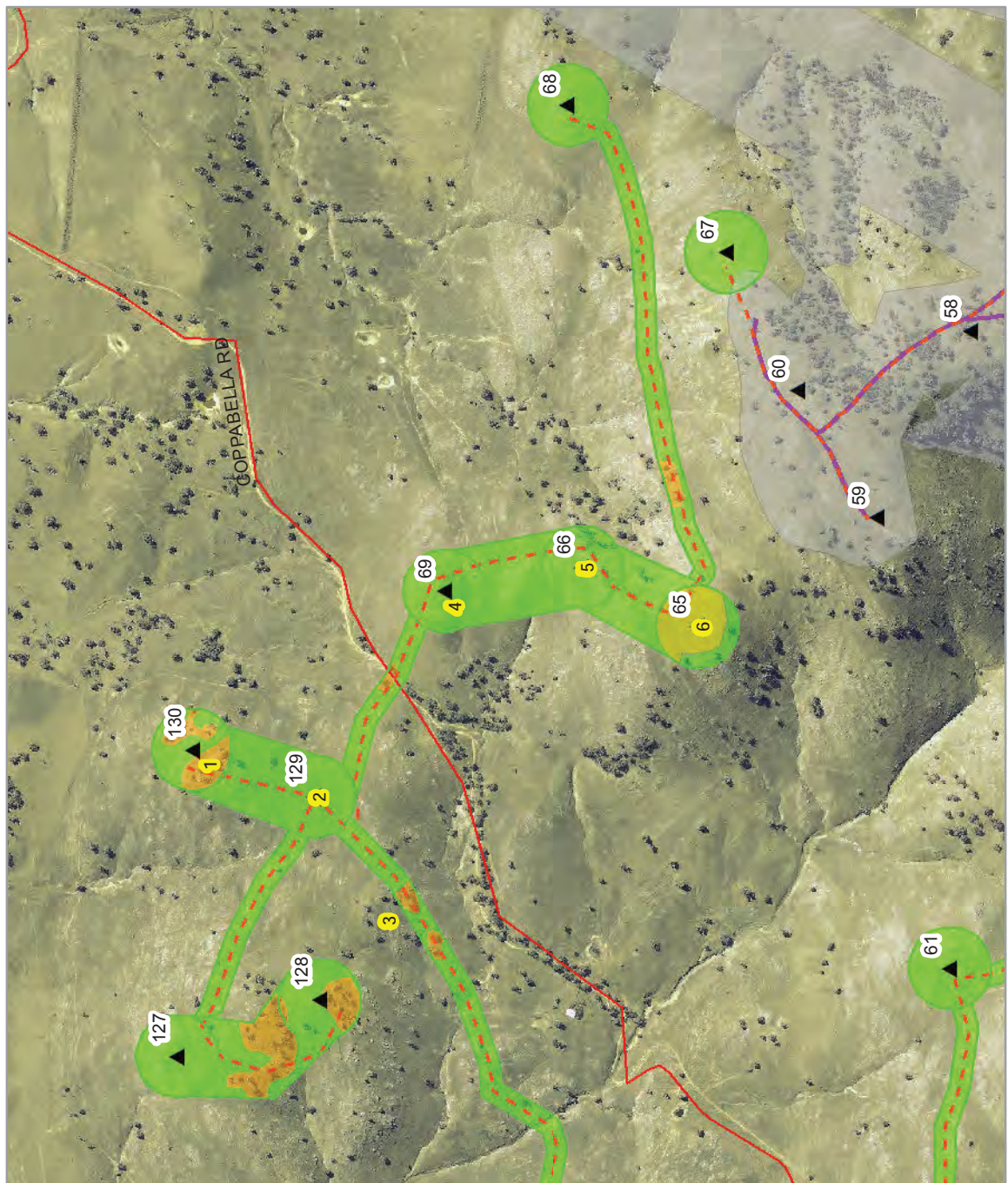
- Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Retention (00912)
- Roads
- Previously assessed area



1:16000 @ A4
 Ref. 4743 - 3/2
 Author: AM



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Constraints: Map 3 of 9

Constraints



Low

Infrastructure



Site Numbers



Latest Development Envelope



Turbines (011112)



Access Tracks (011112)



Electrical Retention (00912)



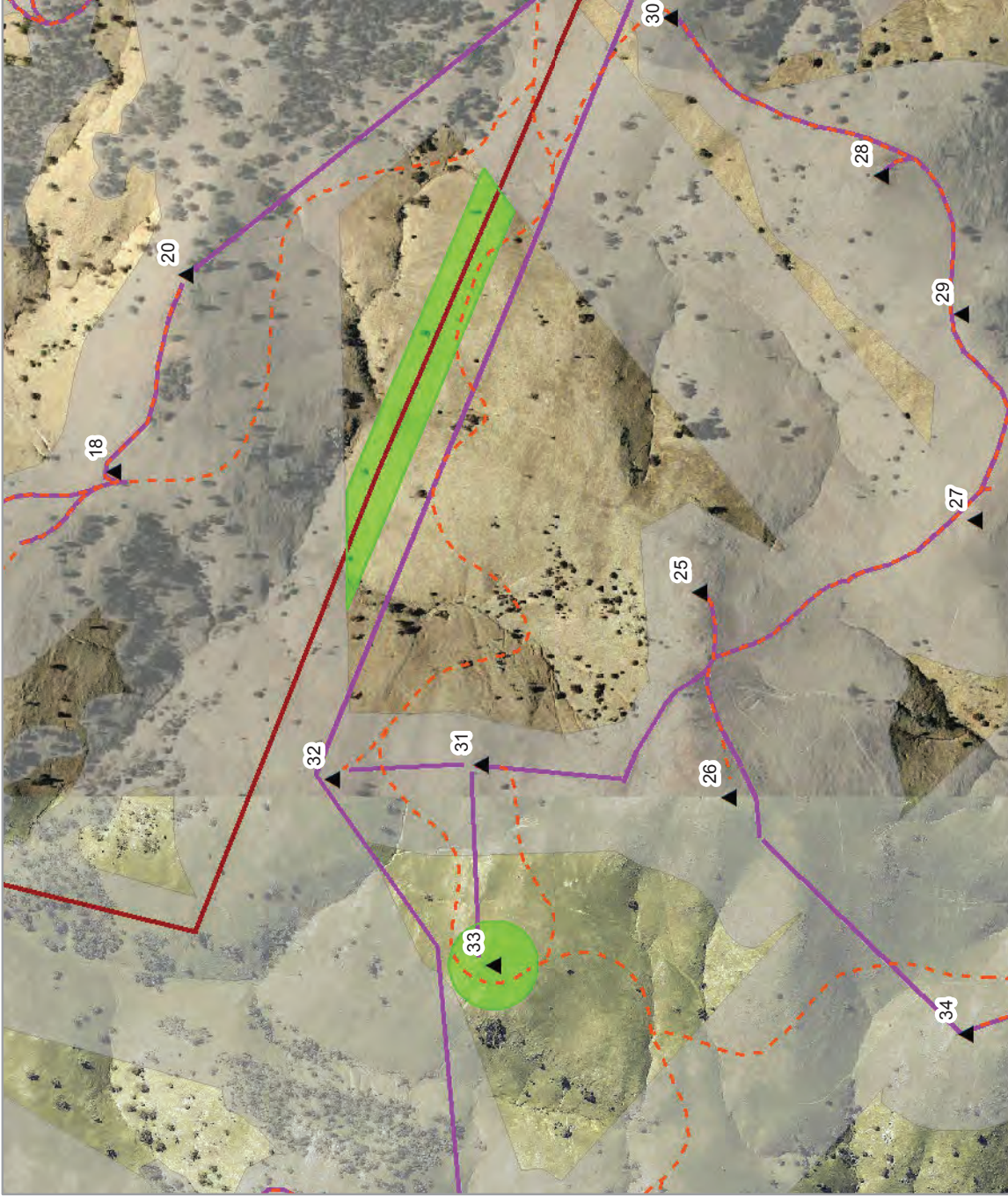
Powerline Easement Option (011112)



Roads



Previously assessed area



1:15000 @ A4
Ref: 4743 - 3/3
Author: AM

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Constraints: Map 4 of 9

- Constraints**
 - Low
- Infrastructure**
 - Site Numbers
 - Latest Development Envelope
 - Turbines (011112)
 - Access Tracks (011112)
 - Electrical Retention (00912)
 - Roads
 - Previously assessed area

0 0.125 0.25 0.5 Km

1:10000 @ A4
Ref. 4743 - 2/4
Author: AM



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Constraints: Map 5 of 9

Constraints

- High
- Moderate
- Low

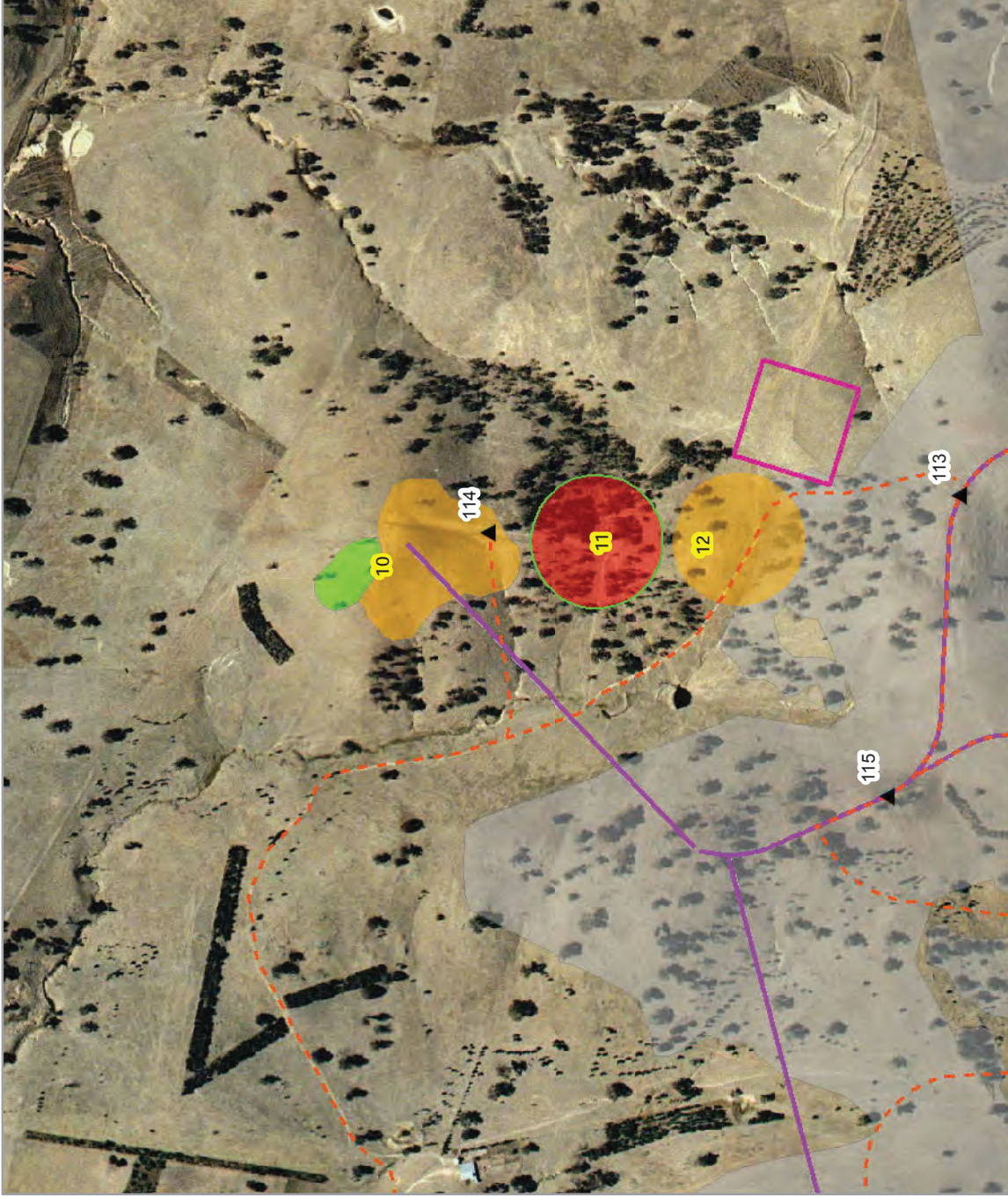
Infrastructure

- Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Retal aon (00912) [02]
- Yass Substation loca aas (01112) [02]
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:10000 @ A4
Ref. 4743 - 3/5
Author: AM

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Constraints: Map 6 of 9

Constraints

- High
- Moderate
- Low

Infrastructure

- Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Retal area (00912)
- Powerline Easement (011112)
- Yass Substations locations (01112)
- Roads
- Previously assessed area



1:30000 @ A4
 Ref. 4743 - 3/6
 Author: AM



Constraints: Map 7 of 9

Constraints

- High
- Moderate
- Low

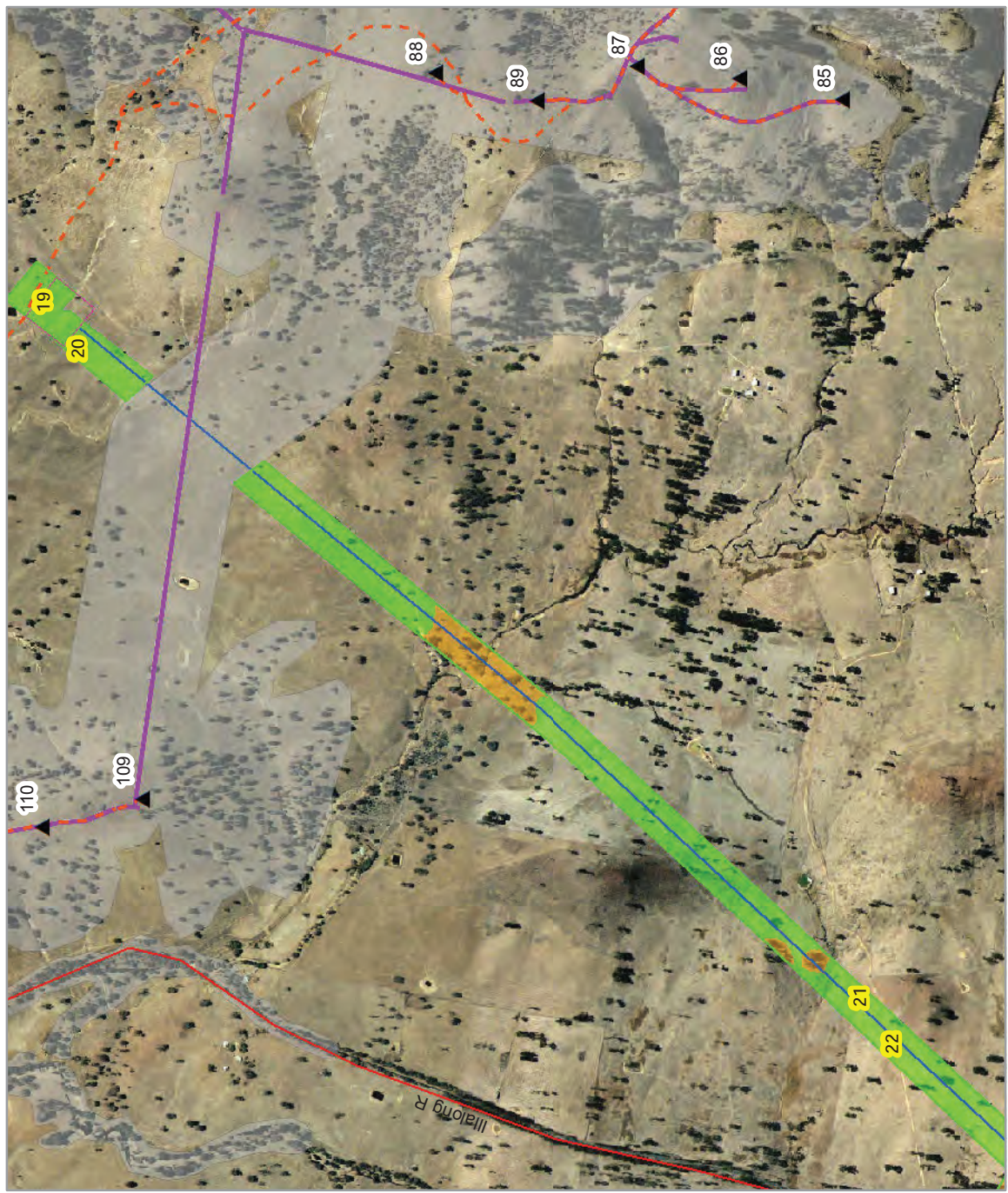
Infrastructure

- Site Numbers
- Yass Substation locations (011112)
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Retention (00912)
- Powerline Easement (011112)
- Roads
- Previously assessed area

0 0.25 0.5 1 Km

1:20000 @ A4
Ref: 4743 - 3/7
Author: AM

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Constraints: Map 8 of 9

Constraints

- High
- Moderate
- Low

Infrastructure

- Site Numbers
- Latest Development Envelope
- Powerline Easement (011112)
- Roads
- Previously assessed area



1:35000 @ A4
Ref. 4743 - 3/8
Author: AM



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Constraints: Map 9 of 9

Constraints

- High
- Moderate
- Low

Infrastructure

- Site Numbers
- Powerline Easement (011112)
- Latest Development Envelope
- Yass Substation locations (011112)
- Previously assessed area

0 0.25 0.5 1 Km

1:50000 @ A4
Ref. 4743 - 3/9
Author: AM



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APPENDIX F REVISED IMPACT AREA CALCULATIONS

Revised impact area calculations for the entire Yass Valley Wind Farm

Table 7-1 Impact area calculations for the revised proposal; Coppabella, Marilba, and new assessment areas.

Yass Wind Farm		Impact areas					Vegetation types									
Infrastructure	Quantity	Width (m)	Length (m)	Total Footprint (ha)	Exotic Pasture	Native Pasture	BGW pasture	BGW trees	BGPFP	DSTF	LBDGF	RRG	BGWke	Total of all veg types		
Turbine footing ^a	148	25	25	9.250	0.000	7.681	1.000	0.500	0.063	0.000	0.006	0.000	0.000	9.250		
Crane hardstand ^b	148	22	40	13.024	0.088	10.340	2.552	0.088	0.000	0.000	0.044	0.000	0.000	13.112		
Tracks ^a	1	8	110,800	88.640	6.400	60.352	15.648	5.968	0.159	0.000	0.000	0.040	0.000	88.567		
Underground powerlines onsite ^b	1	2	64,630	12.926	0.789	9.862	2.018	0.158	0.066	0.000	0.037	0.000	0.000	12.931		
Overhead 33kV powerline cabling / easement ^{a*}	1	14	15,480	21.672	0.000	0.000	0.000	0.840	0.000	0.000	0.522	0.000	0.000	1.362		
Overhead 33kV power pole footings ^a	62	1	1	0.006	0.001	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.007		
Preferred Electrical	1	16	25,510	40.816	0.000	0.000	0.000	5.290	0.000	0.000	0.000	0.947	0.000	6.237		
Connection to	103	1	1	0.010	0.001	0.000	0.010	0.001	0.000	0.000	0.000	0.0003	0.000	0.012		
TransGrid 330kV	3	150	150	6.750	0.000	0.000	6.300	0.000	0.000	0.000	0.450	0.000	0.000	6.750		
Concrete batch plant ^b	2	75	100	1.500	0.000	0.750	1.500	0.000	0.000	0.000	0.000	0.000	0.000	2.250		
Construction compound, staging and storage ^b	2	300	100	6.000	0.000	3.000	3.000	0.000	0.000	0.000	0.000	0.000	0.000	6.000		
				200.595	7.278	91.989	32.030	12.846	0.288	0.000	1.060	0.988	0.000	146.478		
Breakdown by impact type:																
^a Permanent habitat loss (includes all footings and tracks as well as overhead powerlines where they occur in treed areas)					6.402	68.037	22.960	12.599	0.222	0.000	0.979	0.988	0.000	112.185		
^b Temporary habitat loss (areas that can be rehabilitated post construction)					0.877	23.952	9.070	0.246	0.066	0.000	0.081	0.000	0.000	34.293		

Yass Wind Farm		Impact areas				Vegetation types									
Infrastructure	Quantity	Width (m)	Length (m)	Total Footprint (ha)	Exotic Pasture	Native Pasture	BGW pasture	BGW trees	BGBPF	DSTF	LBDGF	RRG	BGWke	Total of all veg types	
Option 2 Electrical Connection to 132kV Line	1	15	19096	28.644	0.000	0.000	0.000	3.053	0.000	0.000	0.960	0.000	0.000	4.013	
	77	1	1	0.008	0.000	0.005	0.002	0.0009	0.000	0.000	0.0003	0.0000	0.000	0.008	
	4	150	150	9.000	0.000	0.000	7.875	0.675	0.000	0.000	0.450	0.000	0.000	9.000	

BGW: Box Gum Woodland, BGBPF: Brittle Gum – Broad-leaved Peppermint Forest, DSTF: Dry Shrub – Tussock Grass Forest, LBDGF: Long-leaved Box Dry Grass Forest, BGWke: Box-Gum Woodland – Kunzea ericoides, RRG: River Red Gum Woodland.

* Overhead cabling has no permanent impact on pasture and other vegetation < 4.5m in height
nghenvironmental provided shape files from surveys to Epuron, who undertook the calculations.

Table 7-2 Revised maximum impact areas on Box Gum Woodland EEC vegetation; Coppabella, Marilba, and new assessment areas

Vegetation condition		Poor	Poor-Mod	Mod	Mod-Good	Good	Total
CEEC 1		no			yes		
EEC 2		no	yes				
BIOMETRIC CONDITION 3		low	mod - good				
Turbine footing ^a		0.313	1.125	0.063	0.000	0.000	1.500
Crane hardstand ^b		0.616	1.936	0.044	0.044	0.000	2.640
Tracks ^a		10.208	9.549	1.305	0.271	0.278	21.611
Underground powerlines onsite ^b		0.369	1.410	0.340	0.036	0.006	2.162
Overhead 33kV powerline cabling		0.000	0.717	0.122	0.000	0.000	0.839
Overhead 33kV power pole		0.001	0.001	0.000	0.000	0.000	0.002
Preferred Electrical Connection to TransGrid 330kV	Overhead powerline ^{a*}	0.000	3.333	0.560	1.397	0.000	5.290
	Overhead power pole footings ^a	0.001	0.007	0.000	0.000	0.000	0.009
	Substation and control bldg ^a	4.050	2.250	0.000	2.250	0.000	8.550
Concrete batch plant ^b		0.750	0.750	0.000	0.000	0.000	1.500
Construction compound, staging		0.000	3.000	0.000	0.000	0.000	3.000
		16.308	24.077	2.434	3.998	0.284	47.102
Breakdown by impact type:							
^a Permanent habitat loss (includes all footings and tracks as well as overhead powerlines where they occur in treed areas)		14.573	16.981	2.049	3.918	0.278	37.800
^b Temporary habitat loss (areas that can be rehabilitated post construction)		1.735	7.096	0.384	0.080	0.006	9.302

¹ potential Commonwealth CEEC status when applied to the Box-Gum Woodland community (floristic criteria only)

² potential NSW EEC status when applied to the Box-Gum Woodland community (floristic criteria only)

³ potential NSW Biometric condition status when applied to the Box-Gum Woodland community (floristic criteria only)

* Overhead cabling has no permanent impact on pasture and other vegetation < 4.5m in height

nghenvironmental provided shape files from surveys to Epuron, who undertook the calculations.

APPENDIX G ADDITIONAL SURVEYS

G.1 SOC 18: FLORA

Note, the following report references the *Draft* Statement of Commitment which was previously numbered SOC 19.

18 November 2009

Julian Kasby
Epuron

Dear Julian

RE: Further vegetation survey work at Yass Valley: Marilba Hills.

Additional survey work was identified as being required in the Draft Statements of Commitment (specifically SoC 19) for the Yass Valley Wind Farm to cover off on vegetation constraints. SoC 19 of the Yass Valley Wind Farm Environmental Assessment (EA) July 2009 states:

Additional targeted surveys would be undertaken, if the identified areas would be impacted by the proposal. These areas include:

Marilba Hills

- *Burrinjuck Spider Orchid, undertaken in mid-October, where the dry forest remnant in the far south of Cluster 7 would be impacted by the proposed works.*
- *Threatened grassy woodland species, undertaken in Spring, if the secondary grassland on the south-western side of Cluster 7 would be substantially impacted*

Mid-October marked the appropriate time to survey for these species. The work was undertaken by a botanist and technical assistant on the 15th October 2009.

The findings of these surveys are provided in a brief report attached to this letter. Survey methodology, results and recommendations are discussed.

If you have any further questions regarding the report, please do not hesitate to contact me.

Kind regards,



Dave Maynard

Project officer
nghenvironmental
02 6492 8311

dave@nghenvironmental.com.au

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Burrinjuck Spider Orchid (*Caladenia* sp. Burrinjuck) targeted survey

Methods

The forest fragment identified as potential habitat for the Burrinjuck Spider Orchid (Figure 1) was searched systematically by two botanists over a 1.5 hour period. The entire forest fragment was searched, employing north-south running transects each spaced 5-10m apart.

This survey satisfies the first component of SoC 19.

Results

The orchid was not detected during the search. This result, combined with the results of the survey conducted in September 2008, indicates that the species is not present at the site. No further surveys are considered to be warranted. We consider that the proposal as set out in the Yass Valley Wind Farm Environmental Assessment (July, 2009) would **not** be likely to significantly affect the Burrinjuck Spider Orchid at this site.

As discussed in the Biodiversity Assessment, the district is heavily cleared and impacts to the forest remnant should be minimised. Specifically, Statements of Commitment 11, 12, 19 and 23 in the EA address measures to reduce impacts on forest fragments.

Targeted survey for threatened grassy woodland species within the diverse secondary grassland

Methods

The area of diverse secondary grassland to the south-west of cluster seven was surveyed utilising the random meander technique described by Cropper (1993). The survey had the aim of identifying the approximate extent of this diverse secondary grassland and associated Yass Daisy population in the vicinity of the proposed substation and access road (Figure 1). Two botanists spent approximately 3 hours on this aspect of the survey.

During the survey, the site was also searched for threatened species previously identified as potentially present, including *Swainsona sericea*, *Cullen parvum* and *Thesium australe*, utilising the random meander technique described by Cropper (1993). Road crossing points that would minimise impacts to threatened and regionally significant species were also identified.

The second component of SoC 19 has been satisfied by this survey.

Results

The Yass Daisy (*Ammobium craspedioides*) listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) and the *Threatened Species Conservation Act, 1995* (TSC Act), was identified within the search area and its extent marked by hand held GPS. Its distribution in this area has been mapped on Figure 1 (red polygon – area corresponds with high diversity native grassland discussed below). This species had been previously identified on the subject site south of cluster seven. No other threatened species were recorded during the survey.

The site carries Box Gum Woodland understorey dominated by Kangaroo Grass (*Themeda triandra*) and Wallaby Grasses (*Austrodanthonia* spp.) with relatively high floristic diversity. Drier areas support Kangaroo Grass and abundant Yass Daisy plants. Linear wet areas beside drainage lines do not carry these species, but have a range of regionally significant species such as Yam Daisy (*Microseris lanceolata*) and the Early Snake Orchid (*Diuris chryseopsis*).

On the basis of understorey diversity, the vegetation belongs to the Box Gum Woodland Endangered Ecological Community (EEC) listed under the TSC Act, despite being almost treeless. The grassland patch has at least 30 non-grass species and easily qualifies as a Critically Endangered Ecological Community (CEEC) under the EPBC Act. In addition to the threatened Yass Daisy, 11 Box Gum Woodland species listed as important by the Commonwealth are present, including the Early Snake Orchid and the daisies Billy Buttons (*Craspedia variabilis*), Scaly Buttons (*Leptorhynchos squamatus*), Yam Daisy, Smooth Solenogyne (*Solenogyne dominii*), Spoon Cudweed (*Stuartina muelleri*) and Austral Sunray (*Triptilodiscus pygmaeus*). Other woodland species present such as Tadgell's Bluebell (*Wahlenbergia multicaulis*) and Slender Tick-trefoil (*Desmodium varians*) are likely to be uncommon or declining in the region.

Figures 1, 2 and 3 clearly show the native grassland vegetation within the affected paddocks, contrasting with the greener low diversity native pasture in surrounding paddocks. The red polygon in Figure 1 shows the approximate extent of the diverse grassland and Yass Daisy population boundary. Remnant woodlands and native pastures dominated by Kangaroo Grass with a high diversity of native forbs are very uncommon in the region and have high conservation value. Kangaroo Grass is a keystone species in this community and its loss is generally associated with a drastic reduction in stand diversity.

Recommendations

It is recommended that the proposal aim to minimise the area of disturbance caused by the construction of the access road and substation. Further it is recommended that the access road be placed to avoid the core Yass Daisy population north of the proposed substation site. Route 1 that is detailed below would achieve this objective..

Figure 1 identifies potential road crossing points (as indicated by the dotted yellow lines) to minimise impacts to the diverse grassland and Yass Daisy population. In order of preference these options are:

- **Route 1 is the preferred option since it avoids the diverse grassland paddock and Yass Daisy population altogether.**
- Route 2 passes through the proposed substation site. This site is already disturbed and of lower conservation value however it is not certain if the area can accommodate the substation as well as the access road.
- Route 3 passes south of the substation site. There are few Yass Daisy plants within 5-10 metres of the existing woodlot boundary. Some Yass Daisy plants and *Themeda* grassland would be disturbed along the western boundary of the property. This route would cross a moist drainage line.
- Route 4 passes through a 10 metre wide corridor alongside a drainage line. This area has no Kangaroo Grass or Yass Daisy but does support a range of regionally significant species. The corridor is within a seepage zone associated with the drainage line to the immediate north.

The assessments of significance conducted as part of the original EA included both the Yass Daisy and Box-Gum Woodland however, it assumed that the area of diverse grassland west of Cluster 7 would not be impacted. **All of the above options, excluding option 1 will result in some level of impact to the Yass Daisy population and/or Box-Gum Woodland EEC within the diverse grassland and revised assessments of significance would be required.**

The diverse grassland paddocks have potential for management as offset sites.



Figure 1: Forest remnant containing suitable habitat for the Burrinjuck Spider Orchid (green line) and approximate extent of the diverse secondary grassland (EEC) and Yass Daisy population (red line). Recommended routes for the road crossing are indicated by the dotted yellow lines (aerial image: Google Earth).



Figure 2: View from north-east of diverse grassland site looking south



Figure 3: View of grassland looking north showing Kangaroo Grass patches (Yass Daisy habitat)

Staff members undertaking surveys

<p>Paul McPherson Dip. (Env. Cont.), B. Sc. (Nat. Res.)</p>	<p>Since commencing at nghenvironmental in 1996, Paul has undertaken environmental assessments and prepared EIA reports for a wide range of proposals located in the Far South Coast, South Coast, Kosciuszko and Southern Tablelands regions.</p> <p>Flora work has included detailed flora surveys in association with the above EIA projects, surveys undertaken for the broadscale mapping of the vegetation of the Far South Coast region and property scale vegetation management planning.</p> <p>Prior to nghenvironmental, Paul worked in the Commonwealth Environment Department. He co-drafted the Commonwealth policy papers on the Regional Forest Agreement process and forest reserve criteria, and wrote numerous Ministerial speeches and parliamentary statements on forest issues.</p>
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ADDENDUM:

Additional survey at Coppabella Hills

Targeting Barking Owl, Squirrel Glider and Bush Stone Curlew

October 2009

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1 INTRODUCTION

In September 2008, a Flora and Fauna Assessment was undertaken to determine the likely biodiversity values and impacts associated with a proposed wind farm site at “Coppabella Hills” near Yass on the Southern Tablelands in NSW. The Coppabella proposal forms part of a larger project, the proposed Yass Valley Wind Farm.

The Flora and Fauna Assessment included a constraints map showing, among other constraints, areas containing multiple hollow-bearing trees – deemed a high constraint due to the habitat they provide.

This report documents the methods and results of further survey effort required to target hollow-bearing trees which may be removed in three areas of the Coppabella Hills site. The study area incorporated three areas of the Coppabella Hills site where hollow bearing trees were present within close proximity to identified indicative turbine locations. The purpose of this additional survey was to determine the importance of the habitat provided by these hollow bearing trees on threatened species that are known or likely to occur within the study area. Threatened species that were targeted specifically during this additional fieldwork included the:

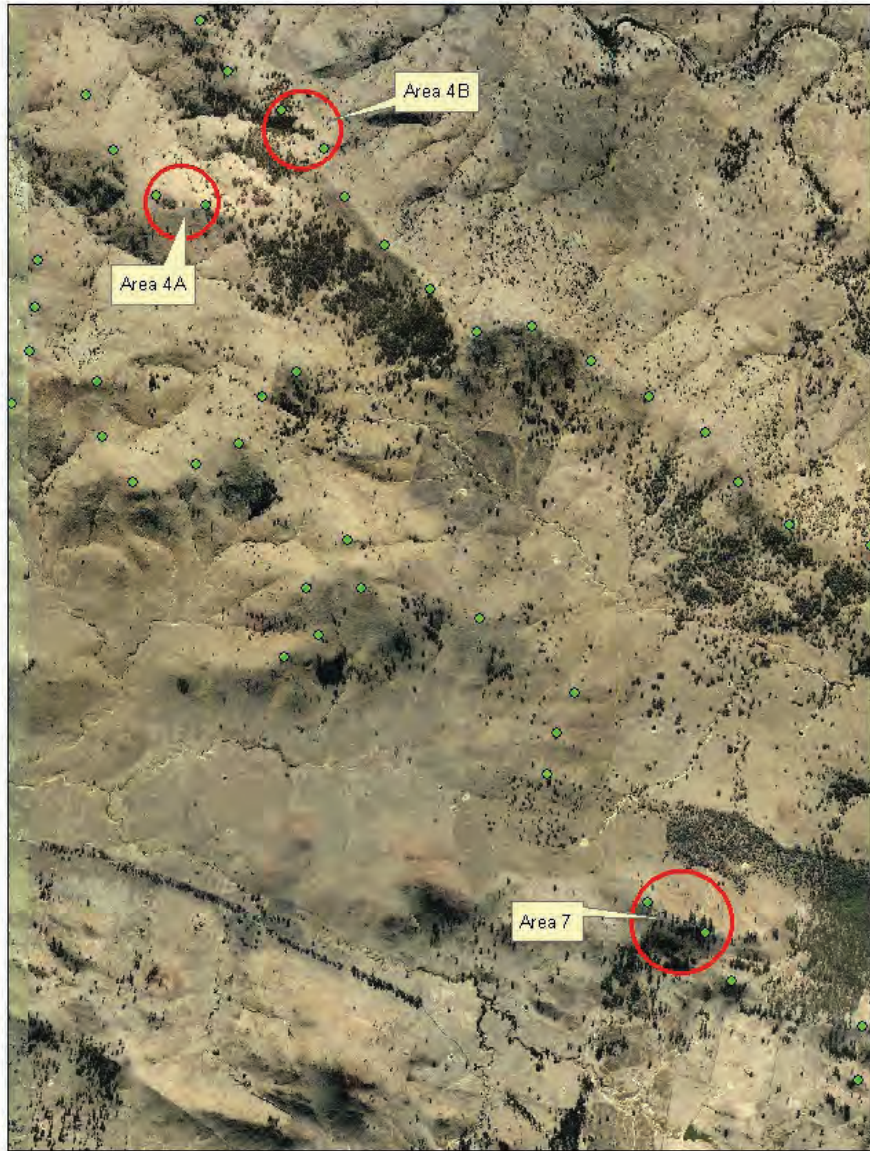
- Squirrel Glider
- Barking Owl

Additionally, the Bush Stone Curlew was targeted in woodland in and around the same study area, during the survey.

Refer to study area,

Figure 1-1.

Coppabella Additional Survey Areas



Legend

- ◆ Proposed Turbines
- Additional Survey Areas

0 0.5 1 2 Kilometres



Figure 1-1: Coppabella Hills additional survey locations. Area names are consistent with the Flora and Fauna Assessment report.

2 METHODS

2.1 FIELD INVESTIGATIONS

Field investigations were undertaken over a four day period from the 13th October to 16th October 2009. The survey team consisted of one biodiversity project officer (Amy Currey, **ngh**environmental) and one technical assistant (Peter Milenkovic, Epuron). An additional technical assistant (Julian Kasby, Epuron) also assisted for one night and the last day of field investigations.

Weather conditions varied over the four day survey period from overcast cool days to cold, windy days. The following table represents weather conditions over the four day survey period.

Table 2-1: Weather Conditions

Date	Minimum Temp	Maximum Temp	Rainfall (mm)	Wind Speed (km/h)
Tuesday 13 th October	7.4°C	16.1°C	6.8mm	31 km/h
Wednesday 14 th October	8.4°C	14.0°C	4.0mm	24km/h
Thursday 15 th October	7.4°C	13.7°C	1.4mm	30km/h
Friday 16 th October	3.8°C	14.5°C	4.0mm	19km/h

(Source: Weatherzone, 2009)

2.1.1 Targeted Squirrel Glider Survey Works

Live trapping using specially designed cage traps were used to survey for Squirrel Gliders at two of the three sites (Area 4B was inaccessible by vehicle). This method was considered more effective than spotlighting or hair-tube analysis as differentiation of hairs from Squirrel Gliders and Sugar Gliders is problematic (Lobert *et al.* 2001), while spotlighting can repeatedly fail to detect the presence of Squirrel Gliders due to their small stature, poor reflective eye shine and quiet behaviour (Van Der Ree 2003), unlike Sugar Gliders, Squirrel Gliders rarely vocalise – calling rates may only be one per night, and not all nights (Goldingay pers. comm.).

Specially designed wire cage traps (30 in total) were positioned across the two sites using an aluminium extension ladder to nail each trap onto selected tree trunks at a height of 3-5 m off the ground. Each trap was covered with plastic and fitted with a piece of poly pipe to assist in providing some protection from wind and rain. Traps were placed approximately 50-100 m apart to maximise the area covered and to accommodate for home ranges and territories of Squirrel Gliders.

Each cage trap was baited with a mixture of honey, rolled oats and peanut butter to attract the Squirrel Glider, while a trail of diluted honey water was sprayed above the trap to a height of 5 – 10 m each morning. The location of each tree trap was marked with a GPS unit. The following table represents the survey effort.

Table 2-2: Number of Squirrel Gliders traps at each site.

Survey Period	Area 4 A	Area 4 B	Area 7	Total trap nights
13 th – 16 th October 2009	6 traps	Nil – due to access issues	8 traps	42

Each traps was set for three nights, set at dusk and checked from dawn the following morning.

2.1.2 Targeted Barking Owl Survey Works

The field investigations were undertaken to coincide with the breeding season of the Barking Owl (documented as July through October) when individual are more vocal and evidence of nesting would be detectable. Spotlighting was conducted over two consecutive nights using two hand held 12v 50w spotlights. Spotlighting was undertaken with call playback to maximise detectability rates.

At each site, spotlighting was undertaken by two people for a maximum of 15 minutes at 5 minute intervals, with call playback being undertaken in between these intervals for 5 minutes. In total, 50 minutes were spent at each site undertaking spotlighting and call playback surveys for the threatened Barking Owl.

Due to access restrictions and safety, spotlighting and call playback survey efforts were undertaken approximately 300 m north of Area 7 and approximately 1 km north-west of sites 4A and 4B. This survey effort is considered to be adequate as the home range of the Barking owl is estimated to be between 30-200 ha with breeding pairs occupying areas at less than 1km to 10 km apart. They have been observed to forage reasonably close to their nesting sites (1-2kms). The Barking Owl is a sedentary species, likely to remain in the same territories all year round.

2.1.3 Bush Stone Curlew Survey Works

At each of the three sites, searches of evidence of Bush Stone Curlews inhabiting the area was undertaken. This species inhabits areas of open forests and woodlands with a sparse grassy understorey with fallen timber present. As this species is largely nocturnal, call playback and spotlighting were undertaken on two consecutive nights by two people for a maximum of 10 minutes at 5 minute intervals, with call playback being undertaken in between these intervals for 5 minutes. In total, 30 minutes were spent at each site, undertaking spotlighting and call playback surveys for the Bush Stone Curlew.

2.1.4 Detailed Hollow Bearing Tree Register

A detailed hollow bearing tree assessment was undertaken at each of the three sites, all of which had two proposed turbine envelopes that could potentially impact on hollow bearing trees. All hollow-bearing trees located within a 50 m radius of each indicative turbine location were recorded with the following details:

- Each tree was recorded using a GPS system
- Photo taken
- Tree species type
- Description of the size and estimation of hollows present in each tree
- Recording DBH (diameter at breast height)

2.2 LIMITATIONS

Several limitations were encountered during the field investigations, including:

- Medium and long term climatic conditions including the current drought has influenced the presence of annual ground cover species
- Past clearing regimes and heavy grazing by sheep across the sites has resulted in a lack of abundance of native and annual species
- Surveys were conducted over brief periods of time to obtain an indicative assessment of the three identified sites, survey results may vary during different seasons and where they are conducted over longer periods of time
- Together with access difficulties and continued wet conditions, access was restricted in some areas, which were traversed on foot, limiting trapping and nocturnal survey work at Area 4B

3 RESULTS

3.1 TARGETED SQUIRREL GLIDER SURVEY WORKS

No Squirrel Gliders were captured at either Area 4A or Area 7 during the trapping survey. All cage traps were inspected each morning with no evidence of animals being caught or consuming the bait mixture. One trap at Area 7 was found closed during each inspection, with nothing caught and the bait still present. This may be due to the strong wind patterns at the site or a malfunction of this cage trap.

Although Area 4A, Area 4B and Area 7 all comprise of a variety of ideal hollows supporting potential roosting and breeding habitat for the Squirrel Glider, the understorey and ground cover species have greatly been modified due to past clearing regimes and the constant ongoing grazing pressures of sheep across the sites. None of the sites contain a shrub layer and none of the eucalypt species were flowering during the time of the field investigations, greatly reducing foraging habitat for this species across the three sites.

3.2 TARGETED BARKING OWL SURVEY WORKS

No Barking Owls were detected during the spotlighting and call playback surveys at each of the two survey locations. This species is unlikely to roost or breed at Area 4A as no large hollows were detected at this site that could provide roosting habitat for this species. At Area 4B, Turbine 2 and Area 7, Turbine 2 a number of large hollows were recorded that could support potential roosting and breeding habitat for this species, however these trees were located outside a 50 m radius of the turbine envelopes.

This species is highly flight mobile with a large home range that can traverse vast tracks of land. Suitable habitat to the north and east of Area 7 is present in flat eucalypt woodland that has no proposed turbine envelopes intended for construction.

At Area 4A, suitable habitat for this species is present in a woodland area approximately 900 m south-east of the site that may support suitable roosting and breeding habitat for this species as no large hollows were evident at Area 4A.

At Area 4B, Turbine 2 is located adjacent woodland area that consists of a number of large hollow bearing trees that may support suitable roosting and breeding habitat for this species. Approximately 16 hollow bearing trees are located within a 50 m radius of this turbine envelope, however the majority of them are too small to provide roosting or breeding habitat for the Barking Owl.

3.3 BUSH STONE CURLEW SURVEY WORKS

Both Area 7 and 4A are highly degraded sites with little fallen timber present. Area 4A is dominated by stinging nettle (*Urtica sp.*) providing minimal if any suitable habitat for the Bush Stone Curlew. At Area 7, the constant degradation of sheep grazing along the ridges has diminished the ground cover species greatly. Sheep faeces are scattered across the entire site with exotic species dominating areas.




Spotlighting and call playback of this species was undertaken on two consecutive nights, however this species was not detected at either Area 7 or Area 4A as the habitat at these two sites is highly degraded providing no coverage, roosting or breeding habitat for this species.




Area 4B did provide some areas of ideal fallen timber across the woodland area to the south. These areas were assessed in detail on foot for presence of the Bush Stone Curlew. The ground cover species were mostly dominated by exotic species, and the site has been constantly degraded by sheep grazing in the area.




3.4 DETAILED HOLLOW BEARING TREE REGISTER



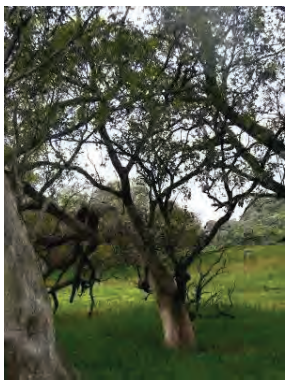
A detailed hollow bearing tree register was undertaken at each of the three sites near the identified turbine envelopes that would potentially impact on hollow resources. The following table represents the results of all hollow bearing trees recorded within a 50 m radius of these turbine envelopes.




Table 3-1: Hollow Bearing Tree Register



Area 4A									
No.	Tree Species	D.B.H	Tree Height	Small < 10 cm	Medium 10 – 20 cm	Large > 20 cm	Total of Hollows	GPS Co-ordinates	Photo
1	Red Stringybark <i>Eucalyptus macrorhyncha</i>	100	8	1	0	1	2	640846 E 6155425 N	
2	Blakely's Red Gum <i>Eucalyptus blakelyi</i>	130	15	>5	2	1	8	640855 E 6155392 N	
3	White Box <i>Eucalyptus microcarpa</i>	70	10	>5	2	0	7	640888 E 6155371 N	

Area 4A									
No.	Tree Species	D.B.H	Tree Height	Small l < 10 cm	Medium 10 – 20 cm	Large e > 20 cm	Total of Hollows	GPS Co- ordinates	Photo
4	White Box <i>Eucalyptus microcarpa</i>	50	8	1	0	0	1	640898 E 6155366 N	
5	White Box <i>Eucalyptus microcarpa</i>	40	8	4	0	0	4	640898 E 6155363 N	
6	White Box <i>Eucalyptus microcarpa</i>	50	7	4	1	0	5	640898 E 6155362 N	

Area 4A									
No.	Tree Species	D.B.H	Tree Height	Small l < 10 cm	Medium 10 – 20 cm	Large > 20 cm	Total of Hollows	GPS Co- ordinates	Photo
7	White Box <i>Eucalyptus microcarpa</i>	70	8	3	4	0	7	640902 E 6155371 N	
8	Stag	50	6	4	0	0	4	640907 E 6155377 N	
9	White Box <i>Eucalyptus microcarpa</i>	30	6	3	2	1	6	640908 E 6155375 N	

Area 4A									
No.	Tree Species	D.B.H	Tree Height	Small < 10 cm	Medium 10 – 20 cm	Large > 20 cm	Total of Hollows	GPS Co- ordinates	Photo
10	Stag	60	8	>5	3	0	8	640915 E 6155396 N	
11	White Box <i>Eucalyptus microcarpa</i>	1 x 60 1 x 30	6	4	2	0	6	640913 E 6155395 N	
12	White Box <i>Eucalyptus microcarpa</i>	60	5	3	1	0	4	640910 E 6155396 N	

Area 4A									
No.	Tree Species	D.B.H	Tree Height	Small < 10 cm	Medium 10 – 20 cm	Large > 20 cm	Total of Hollows	GPS Co- ordinates	Photo
13	White Box <i>Eucalyptus microcarpa</i>	2 x 60	8	3	0	0	3	640898 E 6155401 N	
14	White Box <i>Eucalyptus microcarpa</i>	50	6	1	0	0	1	640901 E 6155400 N	
15	Half Stag	80	10	2	3	0	5	640912 E 6155319 N	

Area 4A									
No.	Tree Species	D.B.H	Tree Height	Small < 10 cm	Medium 10 – 20 cm	Large > 20 cm	Total of Hollows	GPS Co- ordinates	Photo
16	Dead Stag	80	15	>15	6	1	22	640921 E 6155403 N	
17	White Box <i>Eucalyptus microcarpa</i>	100	12	>5	0	0	5	641026 E 6155373 N	
18	Dead Stag	80	6	>10	1	0	11	641073 E 6155398 N	