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Inland Rail Phase 2 Tottenham to Albury Technical & Approvals Consultancy Services

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Overhead Powerline Biodiversity Assessment Report

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Prepared for:
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Revision History

Revision	Date	Comment	Signatures			
			Originated by	Checked by	Technical Approval	Project Approval
A	03/12/19	Preliminary	A. Rigg	N/A	N/A	R. Hunt
0	21/02/20	Final	J. Manders	A. Rigg	A-M. Penna	R. Hunt
						

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1 Introduction

1.1 PROJECT DESCRIPTION

The Australian Government has committed to delivering a significant piece of national transport infrastructure by constructing a high performance and direct interstate freight rail corridor between Melbourne and Brisbane.

The Tottenham to Albury (T2A) enhancement works is the Victorian section and an important part of Inland Rail.

The T2A project objective is to provide vertical and horizontal clearance to facilitate the operation of double-stacked freight trains along the North East Line. Clearance will be provided by either lowering tracks or replacing bridges with a taller structure (referred to as Enhancement Sites). The project will also require the slewing of existing tracks and relocation of signal structures. Ancillary work for T2A includes modifications of overhead powerlines to provide the requisite clearance for double-stacked freight trains.

As the location of the rail intermodal terminal facility at the southern end of the T2A project is yet to be determined, the T2A project is currently being progressed in two stages. The first stage is comprised of discrete project areas from Beveridge to Albury (T2A - Stage 1). Sites north of Beveridge are currently at reference design stage. Further engineering design and environmental surveys on the sites south of Beveridge have been placed on hold. Development of the sites south of Beveridge is contingent on the intermodal decision and as such sites may not be constructed if the intermodal terminal is built at Beveridge.

1.2 ASSESSMENT SCOPE

The Australian Rail Track Corporation (ARTC) identified overhead powerlines crossing the rail that require modification to provide the required clearance for double-stacked freight trains from Beveridge to Albury (T2A – Stage 1).

The overhead line assets are owned and managed by AusNet (distribution powerlines), VicTrack (lines for lighting or signalling) and local Council (low voltage lines for lighting).

Potential biodiversity impacts associated with the overhead powerlines are the focus of this report. In total there are 100 project areas that have been assessed for biodiversity impacts, encompassing the 145 overhead powerlines which require modification.

Modifications to overhead powerlines include the proposed treatments provided in Table 1. The treatment type associated with each asset and project area is included in Table 3, Table 4 and Appendix A and B.

Table 1. Description of modification works

Treatment type	Description of works
Replace pole	Pole replacements require removal of the existing pole by winch truck; and a new pole installed by bore. The replacement pole will be installed into the existing hole where practicable. Ground disturbance will be minimised and is limited to the area around the pole installation area.
Relocate overhead	This treatment can include re-tensioning wires, requiring access by elevated work platforms and trucks but no intrusive ground-disturbing works. However, typically the works involve installing a new pole and then running new overhead conductors between the existing poles and new poles. This is typically done when poles get to the end of their design life and is routinely done as part of the asset owners maintenance program.
Relocate underground	Underground relocation of electrical and telecommunications assets will be by horizontal boring or open trenching. The bore will be located in an entry/exit point and drilled to a depth of up to 5 m. A tipper truck and excavator will be used to collect drilling spoil that will be disposed of according to the Environmental Protection Agency (EPA) requirements. The entry and exit points for the bore will generally be about 10 m^2. There is usually some flexibility in positioning the entry and exit points longitudinally to avoid sensitive areas. Trenching will be used in some instances over short distances, mainly to connect assets from the exit point with infrastructure.

There are also six overhead poles that will be decommissioned. Access may be required for minor electrical works for decommissioning. Ground disturbing works for decommissioning are limited to removal of the existing pole however in some cases the base of the pole will be left in situ. These types of works are routinely done under the asset owners maintenance program.

There are no proposed changes to the operation of the existing electrical assets, and no ecological impacts due to operation of the assets are predicted, therefore operational impacts are excluded from this assessment.

All track slews, track lowers and bridge replacement sites have been considered in separate ecological investigations (refer to KBR 2020b).

1.3 BACKGROUND

The proposed overhead powerline scope involves works to existing assets in previously disturbed areas where vegetation is maintained to provide safe clearances from powerlines under the *Electricity Safety (Electric Line Clearance) Regulations 2015* and its Schedule – Code of Practice for Electric Line Clearance. Despite the clearance requirements there is still potential to impact on threatened species and communities and some vegetation will need to be removed for the T2A – Stage 1 works.

Desktop and field-based assessments were commissioned by ARTC to understand the potential for significant biodiversity values to occur at each overhead powerline site and to understand the potential legislative implications for the project; notably whether there is potential for increased or additional impacts to ecological values that need to be included in the T2A – Stage 1 projects' EPBC Act and EE Act referrals. Predicted ecological impacts associated with the track lowers, slews, bridge replacements and signal modifications for T2A – Stage 1, meet referral criteria under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environment Effects Act 1978* (EE Act).

The Inland Rail Overhead Power Line Sites Desktop Ecological Assessment (ABZECO 2019) assessed 107 overhead powerline sites between Beveridge and Albury, for the potential presence of ecological risk factors.

Following further investigation, seven project areas have been removed from the scope as it has been determined that there is sufficient clearance in these areas and no works are required. The remaining 100

sites constitute the project areas for this report and include areas required for access and construction activities to modify the overhead powerlines.

Recommendations from Overhead Power Line Desktop Assessment (ABZECO 2019) include field surveys to confirm the findings of the desktop assessment. As per these recommendations, this assessment included field-based surveys of all powerline project areas. Eighteen project areas were subject to detailed targeted flora surveys, with the remaining 82 overhead powerline project areas being subject to rapid field assessments. The risk rating used in the desktop assessment is detailed in section 3.

1.4 OBJECTIVE

The current field assessment was designed to confirm the findings of the desktop assessment and identify where further detailed vegetation and targeted fauna assessments are required.

The objective of the assessment is to confirm the potential presence of ecological values identified within the desktop assessment (ABZECO 2019). The report provides a discussion of the project impacts and recommendations to achieve approvals for the project under the following legislation:

- Commonwealth EPBC Act
- Victorian EE Act
- Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act)
- Victorian *Planning and Environment Act 1987* (P&E Act).

The outcomes and recommendations of this report are to be considered as part of the overall project impact and approval requirements for T2A – Stage 1.

2 Applicable Legislation

2.1 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The Commonwealth EPBC Act protects matters of national environmental significance (MNES), including world heritage properties, national heritage places, Ramsar wetlands, commonwealth marine areas, threatened species, ecological communities and migratory species.

Determination of the presence or absence of MNES and predicted impacts to relevant species and communities are considered further in this report to determine whether project impacts could potentially be 'significant', requiring the project to be referred to the Commonwealth Environment Minister.

2.2 ENVIRONMENT EFFECTS ACT 1978

The EE Act provides for assessment of proposed projects that are capable of having a significant effect on the environment. This includes potential impacts to ecological, heritage, cultural and social values. The EE Act requires consideration of 'whole of project' impacts, however, this report is limited to the ecological impacts of the overhead powerline scope. Consideration of 'whole of project' impacts is provided in the EES referral.

The *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (DSE 2006) (The Ministerial guidelines) provide referral criteria for individual types of potential effects on the environment and for combinations of potential effects on the environment. Only ecological EES referral criteria are considered in this report.

Guidelines to determine whether a referral to the Minister is required include the following individual criteria relevant to ecological values and potential impacts in the project areas (DSE 2006):

- potential clearing of 10 ha or more of native vegetation from an area that is an endangered Ecological Vegetation Class (EVC) or is of very high conservation significance.
- potential long-term loss of a significant proportion (1 to 5 per cent) of known remaining habitat or population of a threatened species within Victoria.

Other individual EES referral criteria such as greenhouse gas emissions, are not considered in this report which is limited to consideration of ecological criteria.

The Ministerial guidelines (DSE 2006) also include multiple criteria triggers, where a combination of two or more criteria require a referral. Relevant combination criteria with regards to the projects' potential ecological impacts include:

- potential clearing of 10 ha or more of native vegetation
- matters listed under the FFG Act:
  - potential loss of a significant area of a listed ecological community.
  - potential loss of genetically important population of and endangered or threatened species, including the loss or fragmentation of habitats.
  - potential loss of critical habitat.

- potential significant effects on habitat values of a wetlands supporting migratory bird species.

2.3 FLORA AND FAUNA GUARANTEE ACT 1988

The FFG Act identifies and protects threatened native flora and fauna species, populations or ecological communities or their habitats. The FFG Act is administered by the Department of Environment, Land, Water and Planning (DELWP).

Flora and fauna species, and communities that are listed as threatened and protected under the Act are considered in this assessment.

2.4 PLANNING AND ENVIRONMENT ACT 1987

The P&E Act outlines the legislative frameworks for planning in Victoria and for the development and administration of planning schemes. The P&E Act is administered by each local council through controls established in their respective planning schemes. It is likely that planning approval will be obtained for the project via a planning scheme amendment, due in part to being a project of state and national importance.

All planning schemes contain native vegetation provisions under Clause 52.17, which require a planning permit to remove, destroy or lop native vegetation. Where vegetation to be removed is considered to meet native patch or scattered tree definitions (DELWP 2017a) applications are required to meet the requirements of the Guidelines for the removal, destruction and lopping of native vegetation (DELWP 2017a), referred to as the Guidelines.

3 Desktop Assessment

3.1 DESKTOP ASSESSMENT

The desktop assessment (ABZECO 2019) included a review of databases to determine all relevant terrestrial and aquatic flora and fauna, and ecological communities within a 5 km radius of the identified overhead powerline project areas, including:

- The DELWP Native vegetation information management tool (including modelled location categories, habitat importance maps for rare and threatened species, modelled EVC extents and bioregional conservation status management boundaries)
- EVC benchmarks on descriptions and characteristics for EVCs of each bioregion
- The Victorian Biodiversity Atlas, for previous records of flora and fauna
- The Commonwealth Protected Matters search tool
- Current listed Threatened and Protected species list under the FFG Act
- Planning maps online and Planning Schemes Online
- Aerial photography of the study areas
- Google Maps™ images of accessible parts of all road-accessible project areas.

From these data sources, a likelihood of occurrence assessment was completed to identify the risk level to threatened ecological communities, flora and fauna. The following is an extract of ABZECO (2019) likelihood of occurrence rating criteria (Figure 1).

Box 1. Desktop Likelihood of Occurrence Rating Criteria

Unlikely:

- Threatened species and communities considered locally or regionally absent.
- The site is generally outside of the threatened species range, there are very few or no records nearby (less than 5), and/or any past records are very old (pre-1980).
- Habitat appears absent or unsuitable for the threatened species or community concerned.

Low:

- Habitat areas classed as being of low quality, appear fragmented with few structural elements such as tussock/hummock forming grasses or sedges, inter-tussock spaces, understorey shrubs, logs, rocks and potential hollow-bearing trees.
- Connectivity with higher quality patches may be limited or absent.
- Patches may be weed infested, have little or no natural regeneration, and remaining indigenous species are likely under threat from invasive exotic species.
- No species of conservation significance are known or likely to occur there, there are few records nearby (usually less than 10), and/or any past records are over 20-30 years old.

Moderate:

- Some structural elements appear to have been lost, and invasive species may not be dominant over indigenous species.
- There is usually some connectivity with adjacent habitat of apparent equal or greater quality.
- The site may provide suitable habitat for flora or fauna of conservation significance known or likely to occur in the area.
- Some recent and historic records for the threatened species in the local area, usually less than 20 years old.

High:

- Most structural elements for fauna appear present, understorey species appear healthy.
- The site appears to support habitat or vegetation that is part of a mosaic of relatively contiguous vegetation with connectivity to other areas of habitat.
- The habitat/vegetation is likely toprovide suitable habitat for flora and/or fauna of conservation significance known or considered highly likely to occur in the area, even if dominated by weeds.
- The threatened species is considered likely to be present based on the number of records from recent surveys or historically reported within or near to the study area (generally greater than 10), and/or records usually being less than 20 years old.

Figure 1. Extract of likelihood of occurrence rating criteria based on desktop information

The findings of the desktop report are summarised in Table 2 below, where threatened ecological communities, flora or fauna species have been identified as having moderate or high likelihood of occurrence. Additionally, ABZECO (2019) identified requirements for further surveys, including target species, survey method and timeline for surveys, to confirm the presence of these species.

It was also recommended that field verification of project areas with low likelihood or unlikely presence of threatened ecological communities, flora and fauna, occur to confirm the presence of native vegetation within the project areas.

Table 2: Potential threatened flora species and communities table identified from the desktop assessment.

Threatened ecological communities/Species	Scientific Name	EPBC Act*	FFG Act	Project areas with likely occurrence
THREATENED ECOLOGICAL COMMUNITIES				
Grey Box Grassy Woodland and Derived Native Grasslands of South-Eastern Australia (GBGW)	-	E	-	56, 57, 58, 60, 70, 71, 83, 84, 86, 87, 88, 103, 109, 112, 113
White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland (WBYBBRGW)	-	CE	-	56, 57, 58, 60, 68, 70, 71, 83, 84, 86, 87, 88, 89, 90, 91, 100, 108, 109
THREATENED FLORA				
Clover Glycine	*Glycine latrobeana*	V	threatened	70
Crimson Spider Orchid	*Caladenia concolor*	V	threatened	112, 113
Deane's Wattle	*Acacia deanei*	-	threatened	112, 113
Euroa Guinea-flower	*Hibbertia humifusa* ssp. *erigens*	V	threatened	60
Mountain Swainson-pea	*Swainsona recta*	E	threatened	83,84
Narrow Goodenia	*Goodenia macbarronii*	-	threatened	60,86,87,88,89
Northern Sandalwood	*Santalum lanceolatum*	-	threatened	86,87,88,89
Purple Diuris	*Diuris punctata* var. *punctata*	-	threatened	70,71,83,84,86,87,88,89,90,91,92
Warby Range Swamp Gum	*Eucalyptus cadens*	V	threatened	86, 89
THREATENED FAUNA				
Barking Owl	*Ninox connivens*	-	threatened	99,100,108,109,112,113,122
Brown Toadlet	*Pseudophryne bibronii*	-	threatened	127, 29
Brush-tailed Phascogale	*Phascogale tapoatafa*	-	threatened	36, 38, 44, 46, 140, 51, 55, 56, 57, 58, 60, 108, 109, 112, 113, 122
Golden Sun Moth	*Synemon plana*	CE	threatened	29, 30, 33, 34, 35, 36, 37, 38, 41, 46
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU	threatened	122
Growling Grass Frog	*Litoria raniformis*	V	threatened	127, 29, 30, 33, 34, 36, 37, 41
Powerful Owl	*Ninox strenua*	-	threatened	99, 100, 112, 113
Regent Honeyeater	*Anthochaera phrygia*	CE	threatened	83, 84, 86, 88, 89, 109, 112, 113
Sloane's Froglet	*Crinia sloanei*	E	-	127, 29, 99, 100, 108, 109
Squirrel Glider	*Petaurus norfolcensis*	-	threatened	54, 55, 56, 57, 58, 60, 68, 83, 86, 87, 99, 100, 108, 109, 112, 113
Striped Legless Lizard	*Delma impar*	V	threatened	33, 34, 35, 36, 37, 38, 41, 44, 46, 87,
Swift Parrot	*Lathamus discolor*	CE	threatened	122
Turquoise Parrot	*Neophema pulchella*	-	threatened	83, 86, 87, 88, 89, 108, 109, 112, 113
Blue-billed Duck	*Oxyura australis*	-	threatened	122
Diamond Firetail	*Stagonopleura guttata*	-	threatened	122

Threatened ecological communities/Species	Scientific Name	EPBC Act*	FFG Act	Project areas with likely occurrence
Bush Stone-curlew	*Burhinus grallarius*	-	threatened	113, 122
Freckled Duck	*Stictonetta naevosa*	-	threatened	122
Eastern Great Egret	*Ardea modesta*	-	threatened	122
Intermediate Egret	*Ardea intermedia*	-	threatened	122
White-bellied Sea-eagle	*Haliaeetus leucogaster*	-	threatened	122

*CE – critically endangered

E – endangered

V - vulnerable

4 Methods

Literature and data review comprising database searches and previous assessments were used to inform the design and completion of field assessments. As noted in Section 1.3, two separate field assessments were undertaken for all powerline project areas based on potential ecological risk and to confirm the ABZECO (2019) desktop assessment results (Table 2).

- A rapid field based biodiversity assessment was undertaken for 82 project areas with low ecological value and deemed to be a low risk, or considered to have moderate potential for threatened fauna to occur.
- A targeted flora survey was carried out in 18 project areas identified by the desktop as having a high or moderate likelihood of supporting threatened flora and vegetation communities. These have been highlighted in Table 2.

4.1 RAPID BIODIVERSITY ASSESSMENT

The field assessment was undertaken over five days on the 6th, 7th, 8th, 12th and 13th of November 2019 as a rapid review of 82 overhead powerline project areas to confirm desktop results (ABZECO 2019).

Assessments were primarily completed from public road reserves and rail reserve. Access was agreed with private landholders and managers to access a total of 14 private land parcels within the 82 powerline project areas. Project areas with restricted access to some or all of the area are identified in Table 3, and Appendix A.

The rapid assessment was undertaken to confirm the presence of:

- habitat for threatened flora and fauna species listed under the EPBC Act and FFG Act; based on vegetation condition and requirements of species identified in ABZECO (2019).
- threatened ecological communities listed under the EPBC Act or FFG Act; based on dominant overstorey species, and estimates on patch size, tree density and cover estimates and general observations on understorey cover and diversity.
- patch vegetation (and likely EVC type); which meet the requirements for native patch, including tree cover and understorey cover >25% of native species (DELWP 2017a); however, no Vegetation Quality Assessment (VQA) assessments or mapping of native patch extents were completed.
- presence of scattered trees; as defined by DELWP (DELWP 2017a), however, no mapping or tree values (species, diameter at breast height) were recorded.
- native vegetation; that would trigger a permit to remove under Clause 52.17 of the Victoria Planning Provisions; that is not considered to meet patch definition under the Guidelines (DELWP 2017a).

The results of the assessment for each project area is provided in Appendix A. The extent of threatened ecological communities and habitat for threatened flora and fauna species was noted during the assessment and the extent mapped in Appendix C.

4.1.1 Limitations

The following limitations apply to the rapid biodiversity assessment:

- The findings presented here represent a rapid visual assessment of the vegetation and habitat within the powerline project areas. These values will need to be confirmed during detailed investigations.
- Assessments of the potential presence of threatened ecological communities were based solely on visual assessments and general observations completed from accessible areas to determine consistency with the listed community. Detailed flora assessments to confirm the presence and extent of Threatened ecological communities (TECs) in accordance with policy information on each community will be required during detailed investigations.
- Targeted surveys have not been undertaken for threatened flora or fauna within these project areas, instead suitable and potential habitat for threatened species has been recorded where present.
- No assessments were completed on 23 private land parcels where access was not agreed to by the landholder. Observations of these parcels from adjacent areas were made on the potential for threatened species habitat, threatened ecological communities and native patch vegetation, where possible. Values on land where access was not granted (see Appendices A and B) will need to be confirmed, through detailed field investigations once access has been granted.

4.2 TARGETED FLORA SURVEY

The outcomes of the Inland Rail Overhead Power Line Sites Desktop Ecological Assessment (ABZECO 2019) were used to inform the targeted surveys.

A total of 18 powerline project areas were considered to have a moderate to high risk for threatened flora species and/or threatened ecological communities to be present. These project areas were included in the Targeted Flora Survey.

The field assessments were completed over six days in spring on the 18th and 19th of September and the 7th, 22nd, 23rd and 24th of October 2019.

The project areas were visually inspected using the grid survey technique described by Cropper (1993). Two suitably qualified ecologists searched the project areas by walking in parallel lines at a maximum spacing of 5 m. Given that threatened flora species are often small, this distance was usually closer to 2 m. Any findings were noted, and individual plant locations were captured using a hand-held Global Positioning System (GPS) and mapped (see Appendix D).

These project areas also include potential habitat for threatened fauna species and threatened ecological communities (ABZECO 2019). Any likely threatened ecological communities and potential habitat for threatened fauna are noted in Appendix B and likely extents within project areas indicated in Appendix D.

Where native patch vegetation and scattered trees, as defined under DELWP (2017), were considered to be present within the overhead powerline project areas, these were noted during the Targeted Flora Survey. The presence of native patch, the likely EVC type and presence of scattered trees is indicated in Appendix B.

4.2.1 Limitations

The following limitations apply to the Targeted Flora assessment:

- Six project areas were unable to be surveyed, as landholder access approval to private property had not yet been granted. Assessments were made from the closest accessible areas. Project areas with limitations on accessibility are noted in Table 4 and Appendix B. Ecological values will need to be confirmed during detailed investigations following landholder access approval.

- Detailed assessments against policy information (including number of species, presence of important species and detailed cover estimates) have not been completed in determining likely presence of threatened ecological communities. Detailed flora assessments to confirm the presence and extent of TECs in accordance with policy information on each community will be required during detailed investigations.
- No targeted surveys were completed for threatened fauna species, with potential habitat noted based on the attributes and habitat requirements of threatened fauna species with potential to occur. Additional targeted fauna surveys may be required to confirm presence of threatened fauna species.
- No VQA assessments or mapping of native patch extents and scattered tree locations were completed.

5 Results

5.1 RAPID BIODIVERSITY ASSESSMENT

The results of the rapid assessment are provided in Table 2 below. An expanded table, including the values identified at each project area during the desktop assessment, the field verification, and images of the project areas, is provided in Appendix A. This includes confirmation of the desktop assessment for the presence of habitat for threatened flora and fauna and the likely presence of a threatened ecological community (TEC).

A single FFG Act fauna species, brown toadlet (*Pseudophryne bibronii*) was heard calling within a drainage line, west of Chiltern at Powerline Project Area 109. No other EPBC Act or FFG Act listed threatened flora or fauna species were identified at sites where rapid biodiversity assessment was completed.

5.1.1 General findings

Twenty powerline project areas contained no ecological values. These project areas were generally located along roads at level crossings or within regional towns, including Wangaratta, Benalla and Seymour. A further 18 project areas contained some scattered native vegetation, however, did not meet native patch or scattered tree definition (DELWP 2017a) and are not considered to provide habitat for any listed threatened species or community.

The remaining 42 powerline project areas contain at least some native patch vegetation, scattered trees and habitat. This includes:

- 26 powerline project areas with native patch vegetation (likely EVC type is provided in Appendix C).
- 27 powerline project areas with scattered trees.
- 7 powerline project areas with potential TEC within/adjacent to the project area, including:
  - 3 powerline project areas with potential GBGW.
  - 2 powerline project areas with potential WBYBBRGGW.
  - 3 powerline project areas with Victorian temperate woodland bird community (VTWBC).
- 5 powerline project areas have potential habitat for threatened fauna species.
  - 1 powerline project area (Powerline Project Area 109) with habitat for Sloane's froglet and brown toadlet.
  - 2 powerline project areas with potential habitat for growling grass frog, including two with terrestrial habitat (Project Area 127) and aquatic habitat at Merri Creek (Project Area 29). Project works at Project Area 127 are not expected to impact upon the growling grass frog habitat. Project Area 30 also has potential growling grass frog habitat adjacent to it, though this is not expected to be impacted by project works.
  - 2 powerline project areas with potential habitat for golden sun moth (Project Areas 37 and 38).

- no powerline project areas had potential habitat for threatened flora species.

The majority of powerline project areas were in a similar condition, where trees and tall shrubs have been removed directly beneath the powerlines, with cleared areas extending in widths from 5 m to 10 m out from the powerlines. In most instances, the vegetation usually consisted of derived grassland areas, with occasional low shrubs and regenerating eucalypts. In some cases the vegetation comprised sufficient cover and diversity to be considered a TEC, notably GBGW and WBYBBRGW. In other locations, these significant communities were present surrounding the project area, but previous disturbance under the powerlines has resulted in disturbed vegetation that does not qualify as any TEC. An example of the typical vegetation structure beneath a powerline is shown in Figure 2 below.

Figure 2. Typical vegetation and habitat present beneath overhead powerlines

Native vegetation patches, including those that were considered potential habitat for threatened flora and fauna species and threatened ecological communities, were more frequently recorded within road and rail reserves. Powerline project areas close to high activity areas, including road level crossings, regional towns and around railway stations, were more likely to be degraded, often containing no native vegetation or only scattered native grasses that did not meet patch definition (DELWP 2017a). Private land was generally cleared of native vegetation and habitat and was predominately grazed paddocks with exotic pasture. An example of the vegetation typically present at project areas in high activity areas is shown in Figure 3 below.

Figure 3. Typical vegetation present beneath overhead powerlines adjacent to roads (photo taken in Wangaratta)

Woodland vegetation and habitat did occur within a large number of powerline project areas. The trees comprising the woodland habitat generally presented at the outer edge of the project area. Woodland habitats then generally extended away from the overhead powerlines.

Table 3: Rapid biodiversity assessment results per project area and summary of the proposed works.

Site Number	Chainage	Asset Type	Summary of proposed works	Native Vegetation Present (52.17)	Native patch (DELWP 2017a)	Scattered trees (DELWP 2017a)	Threatened ecological community	Threatened flora habitat	Threatened fauna habitat
127	47.26	Electrical LV	Relocate underground	Yes	Yes	No	No	No	Yes (EPBC Act & FFG Act)
29	48.4	Electrical 22kV	Replace pole	Yes	Yes	No	No	No	Yes (EPBC Act & FFG Act)
30	50.65	Electrical LV	Relocate Underground	Yes	No	No	No	No	Yes (EPBC Act & FFG Act) adjacent to project area
128	53.39	Electrical 22kV	Replace pole	Yes	Yes	Yes	No	No	No
		Electrical LV	Relocate Underground						
31 (includes some inaccessible private land)	54.39	Electrical 22kV	Relocate Overhead	Yes*	No*	Yes*	No*	No*	No*
32	55.11	Communications	Decommission or abandon – access only	No	No	No	No	No	No
33	64.22	Electrical 66kV	Replace pole	Yes	Yes	No	No	No	No
		Electrical 22kV	Replace pole						
34	65.31	Electrical 22kV	Replace pole	Yes	Yes	No	No	No	No
35 (includes some inaccessible private land)	67.04	Electrical 22kV	Replace pole	Yes*	Yes*	Yes*	No*	No*	No*
36	70.2	Electrical LV	Replace pole	Yes	Yes	No	Yes (EPBC Act)	No	No

Site Number	Chainage	Asset Type	Summary of proposed works	Native Vegetation Present (52.17)	Native patch (DELWP 2017a)	Scattered trees (DELWP 2017a)	Threatened ecological community	Threatened flora habitat	Threatened fauna habitat
37 (includes some inaccessible private land)	71.63	Electrical 22kV	Replace pole	Yes*	Yes*	Yes*	Yes* (FFG Act)	No*	Yes* (EPBC Act & FFG Act)
38 (includes some inaccessible private land)	73.43	Electrical 22kV	Replace pole	Yes*	Yes*	No*	Yes* (FFG Act)	No*	Yes* (EPBC Act & FFG Act)
		Electrical LV	Replace pole						
129	75.31	Electrical LV	Relocate underground	No	No	No	No	No	No
39	75.67	Electrical 66kV	Replace pole	Yes	No	Yes	No	No	No
		Electrical LV	Relocate underground						
130	76.87	Infrastructure	Replace pole	No	No	No	No	No	No
		Infrastructure	Replace pole						
131	76.9	Infrastructure	Replace pole	No	No	No	No	No	No
41 (inaccessible private land)	77.88	Electrical 22kV	Replace pole	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*
42	78.62	Electrical 22kV	Replace pole	Yes	Yes	Yes	Yes (EPBC Act)	No	No
43	80.01	Electrical 22kV	Replace pole	Yes	No	Yes	No	No	No
44	87.4	Electrical 66kV	Replace pole	Yes	No	No	No	No	No
45	89.79	Electrical 22kV	Relocate underground	Yes	No	Yes	No	No	No
		Electrical LV	Relocate underground						
46 (inaccessible private land)	95.18	Electrical 22kV	Replace pole	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*
47	98.21	Electrical 22kV	Replace pole	Yes	Yes	No	No	No	No

Site Number	Chainage	Asset Type	Summary of proposed works	Native Vegetation Present (52.17)	Native patch (DELWP 2017a)	Scattered trees (DELWP 2017a)	Threatened ecological community	Threatened flora habitat	Threatened fauna habitat
48	98.31	Electrical 66kV	Replace pole	Yes	Yes	No	No	No	No
		Electrical 22kV	Replace pole						
132	98.62	5x Electrical LV	Relocate underground	Yes	No	Yes	No	No	No
49	99.14	3x Electrical LV	Replace pole	No	No	No	No	No	No
		Electrical 22kV	Relocate underground						
139	99.31	Communications	Relocate underground	No	No	No	No	No	No
50	99.58	Electrical 22kV	Replace pole	Yes	No	Yes	No	No	No
140	100.03	Communications	Relocate underground	Yes	No	No	No	No	No
		Electrical LV	Relocate underground						
51	108.65	Electrical 22kV	Replace pole	Yes	Yes	Yes	Yes (EPBC Act & FFG Act)	No	No
52	114.95	Electrical 22kV	Replace pole	No	No	No	No	No	No
53	116.15	Electrical 22kV	Relocate overhead	No	No	No	No	No	No
54	122.11	Electrical 12.7kV	Replace pole	Yes*	No*	Yes*	No*	No*	No*
55	127.46	Electrical 22kV	Replace pole	Yes	Yes	Yes	No	No	No
59 *location at 136.525 not assessed	136.525	Electrical LV	Relocate overhead	Yes	Yes	Yes	No	No	No
	136.69	Electrical 22kV	Replace pole						
		Electrical LV	Decommission or abandon– access only						
61	150.85	Electrical LV	Relocate overhead	Yes	No	No	No	No	No

Site Number	Chainage	Asset Type	Summary of proposed works	Native Vegetation Present (52.17)	Native patch (DELWP 2017a)	Scattered trees (DELWP 2017a)	Threatened ecological community	Threatened flora habitat	Threatened fauna habitat
62	151.12	2x Electrical LV	Relocate underground	No	No	No	No	No	No
63	151.76	Electrical 22kV	Relocate underground	Yes	No	Yes	No	No	No
64	158.96	Electrical 22kV	Replace pole	Yes	No	No	No	No	No
65	169.45	2x Electrical LV	Relocate underground	No	No	No	No	No	No
		Electrical 22kV	Relocate underground						
		Communications	Relocate underground						
66	170.19	Electrical 22kV	Replace pole	Yes	Yes	Yes	No	No	No
67	171.5	Electrical 22kV	Replace pole	Yes	Yes	No	No	No	No
68	177.25	Electrical 22kV	Replace pole	Yes	Yes	No	No	No	No
69	183.13	Electrical 22kV	Replace pole	Yes	No	No	No	No	No
		Electrical LV	Replace pole						
72	191.9	Electrical 22kV	Replace pole	No	No	No	No	No	No
73	193.3	2x Electrical 22kV	Replace pole	Yes	No	No	No	No	No
		2x Electrical 66kV	Replace pole						
74	194.1	Electrical 22kV	Replace pole	Yes	No	Yes	No	No	No
75	195	Electrical LV	Decommission or abandon– access only	No	No	No	No	No	No
76	196.84	Electrical 22kV	Replace pole	Yes	No	No	No	No	No
77	197.58	Electrical 22kV	Replace pole	No	No	No	No	No	No
78	198.07	Electrical 22kV	Replace pole	No	No	No	No	No	No

Site Number	Chainage	Asset Type	Summary of proposed works	Native Vegetation Present (52.17)	Native patch (DELWP 2017a)	Scattered trees (DELWP 2017a)	Threatened ecological community	Threatened flora habitat	Threatened fauna habitat
		Electrical 66kV	Replace pole						
79	201.28	Electrical 22kV	Replace pole	Yes	No	Yes	No	No	No
80	204.76	Electrical 22kV	Replace pole	Yes	No	Yes	No	No	No
81	208.4	2x Electrical 220kV	Replace pole	Yes	Yes	No	Yes (EPBC Act)	No	No
		Electrical 66kV	Replace pole						
82	210.97	Electrical 22kV	Replace pole	Yes	No	No	No	No	No
92	225.64	Electrical 22kV	Replace pole	Yes	Yes	No	No	No	No
93	230.4	Electrical 22kV	Replace pole	No	No	No	No	No	No
94	231.17	Electrical 22kV	Replace pole	No	No	No	No	No	No
		Electrical LV	Replace pole						
134	232.95	Electrical LV	Relocate underground	Yes	No	Yes	No	No	No
96	233.6	Electrical LV	Replace pole	Yes	No	Yes	No	No	No
135	233.78	2x Infrastructure (Guy/Stay)	Replace pole	Yes	Yes	No	No	No	No
98 (Located within Green Street/Wangaratta Enhancement Site)	234.1	Electrical LV	Relocate overhead	No	No	No	No	No	No
		Infrastructure (Guy/Stay)	Relocate overhead						
136	234.15	Infrastructure	Replace pole	No	No	No	No	No	No
137	234.6	Electrical 22kV	Replace pole	No	No	No	No	No	No
99	236.29	Electrical 22kV	Replace pole	Yes	No	No	No	No	No

Site Number	Chainage	Asset Type	Summary of proposed works	Native Vegetation Present (52.17)	Native patch (DELWP 2017a)	Scattered trees (DELWP 2017a)	Threatened ecological community	Threatened flora habitat	Threatened fauna habitat
100	237.29	Electrical 22kV	Replace pole	Yes	Yes	No	No	No	No
102	239.3	Electrical 22kV	Replace pole	Yes	No	No	No	No	No
138	239.89	Infrastructure	Replace pole	Yes	No	No	No	No	No
103	240.78	Electrical 22kV	Replace pole	Yes	Yes	Yes	No	No	No
105	256.97	Electrical 22kV	Replace pole	Yes	No	Yes	No	No	No
106	258.33	Electrical 22kV	Replace pole	Yes	Yes	No	No	No	No
107	259.21	Electrical 22kV	Replace pole	Yes	Yes	No	No	No	No
108	262.03	Electrical 22kV	Replace pole	Yes	No	Yes	No	No	No
109	267.19	Electrical 22kV	Replace pole	Yes	Yes	Yes	Yes (EPBC Act)	No	Yes (EPBC Act & FFG Act)
110	269.25	Electrical 22kV	Replace pole	Yes	No	No	No	No	No
111	270.91	Electrical 22kV	Replace pole	Yes	No	Yes	No	No	No
		Electrical LV	Replace pole						
114	279.2	Electrical LV	Replace pole	Yes	No	Yes	No	No	No
115	279.52	Electrical 22kV	Replace pole	Yes	No	No	No	No	No
116	280.91	Electrical 22kV	Replace pole	Yes	No	No	No	No	No
118	283.33	Electrical LV	Replace pole	Yes	No	No	No	No	No
119	284.93	Electrical 22kV	Replace pole	No	No	No	No	No	No
120	286.94	Electrical 66kV	Replace pole	Yes	No	No	No	No	No
121	290.91	Electrical 66kV	Replace pole	Yes	No	No	No	No	No

Site Number	Chainage	Asset Type	Summary of proposed works	Native Vegetation Present (52.17)	Native patch (DELWP 2017a)	Scattered trees (DELWP 2017a)	Threatened ecological community	Threatened flora habitat	Threatened fauna habitat
122	301	Electrical 330kV	Replace pole	Yes	Yes	No	No	No	No

**private land not accessible, to be determined*

LV – low voltage

kV – kilovolt

6 Impact and Legislative Review

6.1 PROJECT IMPACT

Impacts will vary depending on the location and scope of works. A summary of the works required for the various treatments is provided in Table 1.

The project areas extend over road reserve, rail reserve and private land, where there are often existing disturbed areas including access tracks used for maintenance of the assets that can be utilised by the project, including for project access, parking and placement of poles. The majority of powerline project areas are readily accessible from roads or from private land. Additionally, where the installation of new poles is required, micro-siting is feasible to avoid ecological values in most instances.

6.2 TARGETED FLORA SURVEY

Table 4 identifies the presence of any listed threatened flora species recorded during the targeted survey. The table also identifies if a TEC is considered likely to be present within the project area, or where TECs occur in the surrounding location but not within the project area. Potential fauna habitat that has been confirmed within the overhead powerline project area is also listed in the below table.

Detailed results, including the values identified at each project area during the desktop assessment are provided in Appendix B.

The targeted flora survey identified two EPBC Act listed flora species, Euroa guinea flower (*Hibbertia humifusa* ssp. *erigens*) at Powerline Project Area 60, south of Euroa, and mountain swainson-pea (*Swainsona recta*) at Powerline Project Area 84, south of Glenrowan. At these sites, the mountain swainson-pea was found within plant guards and was considered to be planted. Two groups of plant guards were observed, with many not containing any plants, indicating several had not survived.

Two threatened ecological communities listed under the EPBC Act were likely present, either within or immediately adjacent to the project area. These were GBGW and WBYBBRGW. The location of these communities is provided in Table 3 and Appendix B and mapped in Appendix C.

Two threatened species and one threatened ecological community listed as threatened under the FFG Act were recorded during the surveys. These were:

- buloke was recorded near Powerline Project Area 57, between Avenel and Longwood.
- diamond firetail (*Stagonopleura guttata*) was observed at Powerline Project Area 60
- VTWBC was considered present at several locations.

The location of these FFG Act listed matters are included in Table 3.

Table 4. Targeted flora survey results

Powerline project area	Chainage	Asset type	Summary of proposed works	Threatened flora species	Likely threatened ecological community	Potential threatened fauna habitat
54	122.14	Electrical 12.7kV	Replace pole	No threatened species were identified.	No threatened ecological communities were considered present.	No threatened species or habitat were identified
56	128.95	Electrical 12.7kV	Replace pole	No threatened species were identified.	No threatened ecological communities were considered present. However, GBGW and VTWBC are located immediately adjacent (EPBC Act & FFG Act).	No threatened species or habitat were identified
57	133.6	Electrical 22kV	Replace pole	Buloke (FFG Act) recorded adjacent to project area	Woodland is considered to be VTWBC (FFG Act).	No threatened species were identified
58	134.87	Electrical 22kV	Replace pole	No threatened species were identified.	Woodland is considered to be VTWBC (FFG Act).	No threatened species were identified
60	143	Electrical 12.7kV	Replace pole	Euroa guinea-flower population recorded in rail reserve. (EPBC Act & FFG Act)	Woodland is considered to be VTWBC in road and rail reserve (FFG Act).	Diamond Firetail (FFG Act)
70	188.65	Electrical 22kV	Replace pole	No threatened species were identified.	No threatened ecological communities were considered present.	No threatened species or habitat were identified
71	191.44	Electrical 22kV	Replace pole	No threatened species were identified.	No threatened ecological communities were considered present.	No threatened species or habitat were identified

Powerline project area	Chainage	Asset type	Summary of proposed works	Threatened flora species	Likely threatened ecological community	Potential threatened fauna habitat
83	213.94	Electrical 66kV	Replace pole	No threatened species were identified.	No threatened ecological communities were considered present. Potential GBGW community and VTWBC in surrounding area (EPBC Act & FFG Act).	No threatened species or habitat were identified.
84	215.58	Electrical 66kV	Replace pole	Mountain swainson-pea (planted) were present. (EPBC Act & FFG Act)	GBGW is located along the flatter plains to the southern end of the project areas (EPBC Act). Woodland is considered to be VTWBC (FFG Act).	No threatened species were identified.
	216.210	Communications	Relocate underground	No threatened species were identified.	WBYBBRGW is located along higher elevations to the north of the project areas (EPBC). Woodland is considered to be VTWBC (FFG Act).	
		Communications	Relocate underground			
		Electrical LV	Relocate underground			
		Communications	Relocate underground			
		Communications	Relocate underground			
		Communications	Relocate underground			
86	219.95	2x Electrical 22kV	Replace pole	No threatened species were identified.	No threatened ecological communities were considered present.	No threatened species or habitat were identified
87	220.72	Electrical 22kV Electrical 66kV	Relocate overhead	No threatened species were identified.	No threatened ecological communities were considered present.	No threatened species or habitat were identified

Powerline project area	Chainage	Asset type	Summary of proposed works	Threatened flora species	Likely threatened ecological community	Potential threatened fauna habitat
					Potential WBYBBRGW community in surrounding area (EPBC Act).	
88	221.72	Electrical 22kV	Replace pole	No threatened species were identified.	No threatened ecological communities were considered present. Potential WBYBBRGW community in surrounding area (EPBC Act).	No threatened species or habitat were identified
89	221.97	Electrical LV	Replace pole	No threatened species were identified.	Vegetation that occurs between Warby Range Road and rail is potentially part of WBYBBRGW community (EPBC Act).	No threatened species or habitat were identified
90	222.26	Electrical 22kV	Relocate underground	No threatened species were identified.	No threatened ecological communities were considered present. Potential WBYBBRGW community in surrounding area (EPBC Act).	No threatened species or habitat were identified
91	223.52	Electrical 22kV	Replace pole	No threatened species were identified. Potential habitat for purple diuris in private land to the west (FFG Act).	Vegetation is part of WBYBBRGW which extends along the rail corridor on east and west side. WBYBBRGW also extends into adjacent private land to the west (EPBC Act).	No threatened species or habitat were identified
103	240.78	Electrical 22kV	Replace pole	No threatened species were identified.	No threatened ecological communities were considered present.	No threatened species or habitat were identified

Powerline project area	Chainage	Asset type	Summary of proposed works	Threatened flora species	Likely threatened ecological community	Potential threatened fauna habitat
112	271.320	Communications	Relocate underground	No threatened species were identified.	No threatened ecological communities were considered present.	No threatened species or habitat were identified
	271.325	Electrical LV	Relocate underground			
	271.380	Electrical LV	Relocate overhead			
	272.22	Electrical 22kV	Replace pole			
113	273.69	Electrical 22kV	Replace pole	No threatened species were identified	VTWBC recorded adjacent to project area (FFG Act).	No threatened species or habitat were identified

In addition to the listed threatened flora species identified, four species listed on the Advisory list of threatened flora (DEPI 2014) were also recorded. These species are considered rare or threatened in Victoria, but are not listed as threatened under the FFG Act or EPBC Act. These species are recorded in table 5 below.

Table 5. Advisory listed flora species recorded in project areas

Powerline project area	Chainage (km)	Common name	Species name	Advisory listing
56	128.95	Cottony haeckeria	*Cassinia ozothamnoides*	Vulnerable
60	143	Late-flowering flax-lily	*Dianella tarda*	Vulnerable
84	215.58	Basalt podolepis	*Podolepis linearifolia*	Endangered
91	223.52	Golden cowslip	*Diuris behrii*	Vulnerable

6.2.1 Threatened ecological communities

The following TECs listed under the EPBC Act and FFG Act have been recorded within the project areas (further detailed is provided in Appendix A and B):

- GBGW (EPBC Act)
- WBYBBRGGW (EPBC Act)
- VTWBC (FFG Act).

In most instances, the communities are located immediately adjacent to the project areas, or extend slightly into the edges of the project area. The majority of works that are proposed to occur either within or adjacent to a TEC are pole replacements. As the vegetation and habitat directly beneath the powerline is generally modified and often not considered to be part of the TEC, pole placements can be sited to avoid impacts to the adjacent community.

However, three locations, Powerline Project Area 84, 89 and 91, support TECs which occur within a large proportion of the project area and the area surrounding the poles and cannot easily be avoided. Works at these locations may result in impacts to the EPBC Act listed GBGW and WBYBBRGGW communities. These areas should be targeted for further investigation during detailed design to minimise impacts to these significant TECs.

There is predicted to be no impacts to the VTWBC due to the localised nature of the works and minimal impacts to woodland habitat.

6.2.2 Threatened flora species

No threatened flora were recorded within project areas during targeted surveys.

The following threatened flora species listed under the EPBC Act and FFG Act have been recorded in close proximity to the project areas (further detailed is provided in Appendices B):

- Euroa guinea-flower (EPBC Act and FFG Act), recorded adjacent to Powerline Project Area 60
- Mountain swainson-pea (EPBC Act and FFG Act), recorded adjacent to Powerline Project Area 84
- Buloke (FFG Act), recorded adjacent to Powerline Project Area 57.

Purple diuris (listed under the FFG Act) was not recorded during surveys but has potential habitat present adjacent to Powerline Project Area 91 (further detail is provided in Appendices A and B).

It is considered that there is suitable flexibility within the scope of works to be able to avoid impacts to threatened flora species.

A significant population of Euroa guinea-flower (totalling 82 individuals) was recorded within the vicinity of overhead Powerline Project Area 60. Only 2 individuals occurred within or in close proximity (2 m) to the project area boundary (see maps in Appendix C). It is recommended that a no-go zone be established in the rail reserve containing the population and that the project area be revised to avoid the area. It is recommended that an alternative access point, through adjacent private land (where the pole is being replaced) is identified to avoid impacts to the species.

The mountain swainson-pea location near Powerline Project Area 84 should also be avoided. The individuals are located 6-7 m from the project area. Although these plants are considered planted, the surrounding area is considered suitable habitat and may be important for the species re-introduction into the area, after being considered extinct in Victoria (DELWP 2017b). Photos of this project area are included in Appendix B. These individuals are potentially important for conservation efforts in Victoria. Impacts to the surrounding habitat (also considered to be the EPBC Act listed TEC, GBGW) that extends into Powerline Project Area 84, should also be minimised (see above under Threatened ecological communities).

Sixteen buloke individuals were recorded in the vicinity of Powerline Project Area 57, although no individuals were located within the project area. It is not expected that these individuals will be impacted.

Powerline Project Area 91 contained potential habitat for purple diuris. The project area was subject to a targeted flora survey and the species was not detected in the rail reserve portion of the powerline project area, which contained suitable habitat. Potentially suitable habitat also extended to the private property to the west of the rail reserve, within a patch of WBYBBRGGW recorded within Powerline Project Area 91. The proposed works required to the existing pole on private property, would likely result in impacts and loss of potential habitat for the purple diuris. It is recommended that impacts to potential habitat be minimised where possible. If impacts cannot be avoided, further surveys within the habitat on private property may be required to determine the presence and impact to the species.

6.2.3 Threatened fauna species

The following threatened flora species listed under the EPBC Act and FFG Act have been recorded within the project areas (further detailed is provided in Appendix B):

- Brown toadlet (FFG Act)
- Diamond firetail (FFG Act).

The following fauna species have confirmed potential habitat present (further detailed is provided in Appendices A and B):

- Golden sun moth (EPBC Act and FFG Act)
- Sloane's froglet (EPBC Act)
- Growling grass frog (EPBC Act and FFG Act)

Due to the nature of the habitat present within project areas and the minimal impacts to trees and woodland habitat, it is predicted that habitat for birds (including diamond firetail) and arboreal mammals will not be impacted.

It is also expected that aquatic habitats, including those considered potential habitat for brown toadlet, Sloane's froglet and growling grass frog, will be avoided by works. Each of the project areas that contain potential aquatic frog habitat (Powerline Project Areas 127 and 109) require only pole replacement and it

is expected that the poles and works will be located away from aquatic habitat in cleared and disturbed areas, such as adjacent roads, vehicle tracks and cleared laydown and stockpile locations (see Appendix C for mapped habitat Project Areas 127 and 109).

Growling grass frog are dependent on terrestrial habitat for foraging, shelter and local movements (DEWHA 2009a). Terrestrial vegetation, fallen logs and ground debris surrounding waterbodies provide essential shelter and hibernation project areas for adult frogs, and frogs move across open ground, such as grasslands, to move between waterbodies and to access foraging resources (DEWHA 2009a). Impacts to potential terrestrial habitat for growling grass frog, located at Powerline Project Areas 30 and 127 in close proximity to the Merri Creek, should also be avoided, where possible. At Project Area 127 a small tributary to the Merri Creek crosses the project area under a culvert to the south, which should allow for impacts to avoid the waterway. Project Area 30 has an unnamed road and several cleared areas associated with the Epping-Kilmore Rd level crossing which could be utilised to avoid the terrestrial habitat at the eastern portion of the impact area.

Overall, as potential impacts are small and localised areas of terrestrial habitat, the works are not expected to impact significantly on growling grass frog.

If some terrestrial habitat cannot be avoided, it is recommended to target works at these project areas outside of the species breeding and activity period (usually October to March) (Clemann & Gillespie 2012).

Potential habitat for golden sun moth was limited to small areas of derived grassland around Broadford, where the species has been recorded recently (ABZECO 2019). The largest areas were likely present on private land within Powerline Project Area 37 that was not able to be accessed during the rapid assessment. Based on visual assessments from adjacent areas, habitat was primarily located around proposed access locations. Further assessment of the project area and access should be completed to prioritise access via existing access tracks. Where habitat cannot be avoided, further targeted surveys will be required to determine the presence of golden sun moth. Another small area of habitat for golden sun moth is located at Powerline Project Area 38. Due to the small impact area and its proximity to proposed works, it is expected that the pole replacement works can avoid potential golden sun moth habitat. However, if impacts to potential habitat cannot be avoided, targeted surveys may be required to determine presence of the species. The survey period for golden sun moth is late October to early January (DEWHA 2009b).

6.3 LEGISLATIVE REQUIREMENTS

Due to the nature of the works, including the location within previously disturbed and cleared areas, it is considered that the majority of project works can be sited to avoid impacts to listed threatened ecological communities, threatened flora species and habitat for threatened fauna.

Some significant ecological values, including listed ecological communities and populations of threatened flora (Euroa guinea-flower at Powerline Project Area 60), are present either within or immediately adjacent to the project area. It is recommended that works in these locations be reviewed in relation to the recorded ecological values identified in this report to confirm that significant values can be avoided.

There are a small number of project areas that support significant ecological values where there is a higher likelihood that impacts cannot be avoided. Based on the impacts assessed above, the following legislative implications apply to the project, which considers current project impacts associated with other T2A project scope of works within Victoria (KBR 2020b).

6.3.1 Environment Protection and Biodiversity Conservation Act 1999

The total impact to the GBGW community at the overhead powerline project areas (0.568 ha) will need to be added to that currently predicted for the Enhancement Sites (3.543 ha) within the broader Beveridge to

Albury section of the project. The overall T2A project impact to GBGW of 4.111 ha, is currently considered to be a significant impact (KBR 2020b).

Impacts to the critically endangered WBYBBRGGW community may potentially occur at Powerline Project Areas 84, 89 and 91 with a potential maximum impact of 0.36 ha. These impacts will need to be confirmed, however, if not reduced or avoided, then the impact is potentially significant. As there are no impacts to WBYBBRGGW from the Enhancement sites of the T2A project, the predicted impact at the three powerline project areas is the only potential impact to the community over the Beveridge to Albury section of the project (T2A – stage 1).

Although several other flora and fauna species have been recorded or have habitat recorded, impacts are not likely to be significant, due to the small and localised nature of works and the ability to adjust impacts to target disturbed areas, which are readily available around nearby roads and private land. However, impact areas for each project area need to be confirmed to determine extent of impacts to species and habitat. Where habitat cannot be avoided, further targeted surveys may be warranted to confirm the presence of listed species. These project areas are:

- Powerline Project Areas 127, 29 and 30 for growling grass frog
- Powerline Project Areas 37 and 38 for golden sun moth
- Powerline Project Area 60 for Euroa guinea-flower
- Powerline Project Area 84 for mountain swainson-pea
- Powerline Project Area 109 for Sloane's froglet

6.3.2 Flora and Fauna Guarantee Act 1988

Potential habitat was also identified for purple diuris in private land within Powerline Project Area 91. If this area cannot be avoided, further targeted survey of potential habitat impacted will be required to determine if any individuals would require removal. Significant populations for the species are present along the rail reserve in this locality, however, the species was not observed in the immediately adjacent rail reserve. It is likely that impacts will be limited to a small number of individuals, if present. It is not expected that the impact will be to a significant number of the species population, and therefore, is not expected to be significant.

Brown toadlet was heard calling at Powerline Project Area 109. The wetland area and drainage identified within the project area is considered to be habitat for the species (Appendix C). It is expected that the pole placement at this location will avoid aquatic habitat and that the species will not be impacted by works.

6.3.3 Guidelines for the removal, destruction and lopping of native vegetation

The Guidelines apply to the removal of native vegetation under Clause 52.17 of planning schemes in Victoria. Under the Guidelines the project will be considered via a Detailed Assessment Pathway. Compliance with the Guidelines will include a VQA, an 'avoid and minimise' statement and the meeting of offset requirements. As discussed above, VQAs were not undertaken as part of this assessment.

VQAs need to be completed to calculate offset obligations.

Avoid and minimise

During the reference design phase the following avoid and minimisation measures have been applied:

- Utilisation of existing access tracks and alternative areas to avoid impacts to threatened species and communities

- Identification of no-go zones for construction to avoid impacts to threatened ecological communities and threatened flora species.

Throughout all phases of project planning, design and construction opportunities to avoid and minimise impacts will be assessed.

Offset Requirement

The DELWP modelled EVC layer (DELWP 2019) was used to determine the approximate offset requirement for removal of native vegetation (DELWP 2017a). Thirty-seven project areas with modelled EVC layers were confirmed to have native patch vegetation present. An additional four project areas with no modelled EVC layer were found to have native patch vegetation present during the field survey.

The extents of native patch vegetation within the project areas were run through the EnSym tool to run a scenario test. The modelled EVC layer was used for the 37 sites where native patch vegetation was confirmed to be present in the rapid field assessment, and the field verified extents of native vegetation within the project area were used for an additional 4 project areas that did not have modelled EVC present. A standard condition score of 0.3 was used for all modelled and field verified extents, which reflects the largely modified nature of the vegetation, with generally good landscape scores.

The predicted impact to native vegetation for the overhead powerline scope is 7.196 ha of native vegetation. This would require an offset of 2.701 general units.

It is noted that no scattered trees are included in this calculation. Due to the requirements to maintain vegetation clear of powerlines under the *Electricity Safety (Electric Line Clearance) Regulations 2015,* the number of trees likely to be impacted by the works is considered to be low. The total number of scattered trees will need to be defined during VQAs and included in the project offset calculations. Several project areas were field verified to have native vegetation present where none was modelled, these project areas were added manually to the EnSym calculation. Final offset calculations for the whole of the T2A project will also include the impacts for all the proposed works between Beveridge and Albury, including for track lowers, track slews, bridge replacements and signal structure modifications.

6.3.4 Environment Effects Act 1978

The overhead powerline project area impacts will be considered with the other project components for T2A – Stage 1, including bridge replacement, track lowering, track slews and signal structure modifications, for whole of project impacts and consideration against the EE Act referral criteria.

Based on the modelled data, a total of 7.2 ha of native vegetation is proposed to be impacted, comprising of:

- 6.25 ha of endangered EVCs
- 0.94 ha of vulnerable EVCs.

The amount of vegetation loss will need to be confirmed through detailed design and site assessment. Based on modelled data, the impacts to endangered EVCs for overhead powerlines works (6.25 ha) combined with the impacts to endangered EVC for the remainder of the project areas (track slews, bridge replacements, track lowers and signalling modifications) (8.031 ha), the total of 14.281 ha exceeds the EES individual referral criteria of loss of greater than 10 ha of an endangered EVC. The total loss of an endangered EVC for all project works between Beveridge and Albury, meets the single referral criteria under the guidelines (DSE 2006).

There are no impacts expected to FFG Act listed communities. Impacts to FFG Act listed flora and fauna are likely to be only to small areas of potential habitat. These project areas are:

- Brown toadlet at Powerline Project Area 109

- Buloke adjacent to Powerline Project Area 57
- Diamond firetail recorded at Powerline Project Area 60
- Euroa guinea-flower located at Powerline Project Area 60
- Golden sun moth at Powerline Project Areas 37 and 38
- Growling grass frog at Powerline Project Areas 127, 29 and 30
- Mountain swainson-pea located at Powerline Project Areas 84
- Purple diuris adjacent to Powerline Project Area 91
- Sloane's froglet at Powerline Project Area 109

Potential habitat recorded for the above species is not considered important or critical for the above species and any impacts are not considered to meet EES referral criteria (DSE 2006). The exception is the population of Euroa guinea-flower at Powerline Project Area 60, which is considered significant for the species; however, the habitat containing the population is recommended to become a 'no-go zone' to avoid impacts to the species and the habitat within the rail reserve.

Additionally, impacts to the above species will generally be avoided through targeting works (including pole placement and access) to avoid individuals of threatened species and their habitat.

7 Conclusion and recommendations

7.1 CONCLUSION

A number of significant ecological values have been recorded within and adjacent to the powerline project areas. In most instances, these values are restricted to public land, mainly within the rail and road reserves. Where project areas are present within private land, the vegetation is generally modified, being grazed, ploughed or improved with nutrients, for agriculture. Occasionally, vegetation and habitat do persist within parcels of private land, mostly in areas where there is only light grazing (of small numbers of stock or horses).

It is likely that significant environmental values, including threatened ecological communities, threatened flora species and potential habitat for threatened fauna species can be avoided by works through siting access and pole placement in disturbed areas.

Further review of scope and clearance during detailed design is recommended for three project areas, which have reduced scope for siting works to avoid impacts to significant ecological values.

The project is being referred under the EPBC Act due to significant impacts to the GBGW community (KBR 2020b). It is likely that that additional impacts of 0.568 ha to this community will occur as a result of the overhead powerline works. There is also potential for impacts to 0.36 ha of WBYBBRGGW community to be potentially significant. The extent of impacts to these two communities will need to be confirmed.

In the absence of completing a VQA assessment, the calculations of vegetation loss have been conservatively based on modelled data. The actual impacts are expected to be less than what is predicted based on the modelled data. Using modelled EVC data (DELWP 2019), the overhead lines works are expected to result in a loss of up to approximately 7.20 ha of native vegetation. The impacts from overhead powerline works will be included in the T2A (stage 1) EES referral and EPBC referral.

The impact to native vegetation will also require additional offset requirements. Based on the modelled EVC data (DELWP 2019) used to inform potential offsets through the EnSym tool, the impact to native vegetation is expected to be 2.701 general habitat units. However, VQAs have not been completed to confirm quality and extent, plus scattered trees were not considered in the offset calculation, which may alter the offset requirements predicted here.

7.2 RECOMMENDATIONS

The recommendations associated with the overhead powerlines are summarised here:

Impact area definition recommendations

- In areas where threatened flora, fauna or ecological communities have been identified, undertake further review of access points and project area extents to avoid and minimise impacts where possible
- Review works at Powerline Project Areas 84, 89 and 91 to identify opportunities to avoid impacts to threatened ecological communities.
- Avoid impacts to nearby aquatic habitat present at powerline Project Areas 29 and 109 and utilise cleared and disturbed areas to avoid impacts to threatened frog species.

- Position entry and exit points of bores at Powerline Project Areas 127 and 30 to avoid growling grass frog habitat.
- Avoid potential habitat for golden sun moth at Powerline Project Areas 37 and 38, where possible, including using existing vehicle tracks and using alternative access options.
- Review alternative access from the east at Site 51, to avoid impacts to VTWBC and GBGW.

Further survey recommendations

- Complete VQA assessments for powerline project areas where native patch extents and scattered tree have been identified.
- Complete detailed flora surveys during spring to confirm that likely and potential threatened ecological communities meet the defining characteristics of threatened ecological communities stated in applicable policy documents.
- Complete detailed ecological surveys during spring within all private land that was not accessible during the current survey to determine any further ecological values.

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Appendix A

Rapid Powerline Assessments – detailed table of results

We Deliver

Type	Summary of proposed works	Desktop Assessment Results		Field Confirmation				
		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical LV	Relocate underground	126: Swampy Riparian Complex	Swamp Everlasting	East	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
				Central	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
				West	Low quality patch containing silver wattle	126: Swampy Riparian Complex	Potential growling grass frog habitat. Location to be a 'no-go zone'	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	18: Riparian Woodland	Matted Flax-lily	East	Scattered native vegetation including blackwood and immature eucalypts Avoid southern mahogany LOT in south east corner	18:Riparian Woodland	Potential Growling Grass Frog habitat (project area is located 5m from Merri Creek)	
				West	Low quality patch containing blackwood and Chinese scrub	18: Riparian Woodland	No TEC or potential habitat for threatened species observed	
rical LV	Relocate Underground	18: Riparian Woodland	N/A	East	No native vegetation or habitat for threatened species	18: Riparian Woodland	Potential Growling Grass Frog habitat adjacent to survey area (pond and Merri Creek nearby)	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	Scattered native vegetation, including 2-3 blackwoods and sifton bush	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV rical LV	Replace pole Relocate Underground	127: Valley Heathy Forest	N/A	East	Patch of silver wattle Scattered native grasses (project area was mown at time of assessment) Scattered regrowth trees Montpellier Broom	127: Valley Heathy Forest	No TEC or potential habitat for threatened species observed	
				East 2	Planted buloke Rosemary grevillea Scattered native vegetation	No EVC	VROT Rosemary Grevillea (not listed)	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	Scattered native vegetation (including Chinese scrub and hop goodenia) Planted native vegetation	No EVC	No TEC or potential habitat for threatened species observed	
				West 2	Good quality patch of native vegetation, including a diverse understory	47: Valley Grassy Forest	No TEC or potential habitat for threatened species observed	
rical 22kV	Relocate Overhead	127: Valley Heathy Forest 23: Herb-rich Foothill Forest	N/A	East	Scattered trees in south west corner	No EVC	No TEC or potential habitat for threatened species observed	
				West	Private land – inaccessible	Unknown	Unknown	No photo

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
munications	Decommission or abandon – access only	47: Valley Grassy Forest	N/A	East	1 planted large red Ironbark.	No EVC	No TEC or potential habitat for threatened species observed	
				Central	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
				West	No native vegetation or habitat for threatened species (planted eucalypt in centre)	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 66kV rical 22kV	Replace pole Replace pole	23: Herb-rich Foothill Forest	WBYBBRG	East	Poor quality patch of lightwood	No EVC	No TEC or potential habitat for threatened species observed	
				West	Private land – inaccessible without V/Line access. Looks like scattered Chinese scrub only from accessible areas.	Unknown	No TEC or potential habitat for threatened species observed	No photo
rical 22kV	Replace pole	22: Grassy Dry Forest	WBYBBRG	East	1 silver wattle at edge (avoid)	No EVC	No TEC or potential habitat for threatened species observed	
				West	Patch of native grasses at south east side Planted indigenous vegetation, including red box at roadside	22: Grassy Dry Forest	Potential habitat for VTWBC observed.	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	293: Riparian Forest/Creekline Grassy Woodland Mosaic 47: Valley Grassy Forest	N/A	East	Poor quality patch of native vegetation, including Chinese scrub, exotic or native spear grasses, river red gum and grey box impacted by weeds and grazing Scattered native grasses further into paddock	47: Valley Grassy Forest	No TEC or potential habitat for threatened species observed	
				West	Private land – inaccessible (access denied). Location could not be viewed during the assessment.	Unknown	Unknown	No photo
rical LV	Replace pole	47: Valley Grassy Forest	VTWBC	East	Scattered native grasses, heavily grazed	No EVC	No TEC or potential habitat for threatened species observed	
				West	Private land – inaccessible Northern most point of project area contains a patch of good quality native vegetation, which appears to extend into private land, as viewed from adjacent rail and road reserves.	47: Valley Grassy Forest	Unknown – potential WBYBBRGGW	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	175: Grassy Woodland	N/A	East	Private land – inaccessible. Potential for golden sun moth, considering apparent grassland and previous records. However, grass species present and habitat quality needs to be confirmed during a detailed site assessment.	Unknown	Unknown – potential habitat for golden sun moth	No photo
				West	Good quality patch of native vegetation in rail reserve, with no mature trees Western side of project area is private land and inaccessible without access agreement and could not be easily viewed from adjacent areas.	175: Grassy Woodland	VTWBC	
rical 22kV rical LV	Replace pole Replace pole	55: Plains Grassy Woodland 175: Grassy Woodland	VTWBC	East	Private land – inaccessible. Likely contains native vegetation, however, this assessment needs to be confirmed, as the location could not be easily viewed from adjacent rail reserve.	Unknown	Unknown	No photo
				West	Patch of native vegetation to north, including tussock-grasses, needle grasses and chocolate lilies. Scattered immature eucalypts and native grasses to south.	175: Grassy Woodland	Potential golden sun moth habitat VTWBC	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical LV	Relocate underground	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
rical 66kV rical LV	Replace pole Relocate underground	N/A	N/A	East	Scattered trees	No EVC	No TEC or potential habitat for threatened species observed	
				West	Scattered native vegetation 2x scattered river red gum should be avoided.	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
tructure tructure	Replace pole Replace pole	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
tructure	Replace pole	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
ical 22kV	Replace pole	175: Grassy Woodland	N/A		Private land - inaccessible	Unknown	Unknown	No photo
ical 22kV	Replace pole	175: Grassy Woodland 55: Plains Grassy Woodland	N/A	East	Scattered river red gum regrowth to north Patch of native grasses to south	175: Grassy Woodland	GBGW	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	Private land – inaccessible, possibly native grasses present that was visible from adjacent rail reserve.	Unknown	Unknown	
rical 22kV	Replace pole	55: Plains Grassy Woodland	N/A	East	Scattered native grasses	No EVC	No TEC or potential habitat for threatened species observed	
				West	Scattered regrowth Scattered native grasses	175: Grassy Woodland	No TEC or potential habitat for threatened species observed	
rical 66kV	Replace pole	175: Grassy Woodland	VTWBC WBYBBRG	North West	No native vegetation or habitat for threatened species Avoid adjacent trees	175: Grassy Woodland	VTWBC	No photo

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
		55: Plains Grassy Woodland		South West	Native regrowth including red box and Chinese scrub	175: Grassy Woodland	VTWBC	
				South East	Avoid planted native shrubs inside fenced area. Nothing outside fenced area.	No EVC	No TEC or potential habitat for threatened species observed	
				North East	Avoid scattered regrowth trees between project area and rail track. Nothing within project area.	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV rical LV	Relocate underground Relocate underground	175: Grassy Woodland	N/A	East	Avoid planted eucalypts to north, including indigenous species river red gum and grey box. Scattered wallaby grasses	No EVC	No TEC or potential habitat for threatened species observed	
				West	Scattered trees including regrowth yellow box Scattered wetland species including rushes	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	56: Floodplain Riparian Woodland	N/A	East	Private land – inaccessible	Unknown	Unknown	No photo
				West	Private land – inaccessible	Unknown	Unknown	No photo
rical 22kV	Replace pole	N/A	N/A	East	Scattered native grasses 1x scattered tree Scattered silver wattles	No EVC	No TEC or potential habitat for threatened species observed	No photo

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
rical 66kV rical 22kV	Replace pole Replace pole	N/A	N/A	East	Patch of silver wattle	55: Plains Grassy Woodland	No TEC or potential habitat for threatened species observed	
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
ectrical LV	Relocate underground	N/A	N/A		2x scattered river red gums at south should be avoided	No EVC	No TEC or potential habitat for threatened species observed	
ectrical LV rical 22kV	Replace pole Relocate underground	N/A	N/A		Planted trees on MacIntyre St	No EVC	No TEC or potential habitat for threatened species observed	
munications	Relocate underground	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	N/A	N/A	East	Scattered trees	No EVC	No TEC or potential habitat for threatened species observed	
				West	Avoid scattered trees in access	No EVC	No TEC or potential habitat for threatened species observed	
munications rical LV	Relocate underground Relocate underground	61: Box Ironbark Forest	VTWBC		Scattered native grasses Scattered understory species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	55 Plains Grassy Woodland	VTWBC	East	Patch of native vegetation including native grasses, shrubs and one large grey box.	55 Plains Grassy Woodland	VTWBC GBGW	
				West	Scattered grasses Scattered trees (regrowth)	55 Plains Grassy Woodland	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Relocate overhead	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	 

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	287: Plains Grassy Woodland/ Box Ironbark Forest Complex	VTWBC	East	Patch of native vegetation including grey box and Chinese scrub	55: Plains Grassy Woodland	No TEC or potential habitat for threatened species observed	
				West	Patch of native vegetation including grey box, understory species but affected by weeds	55: Plains Grassy Woodland	No TEC or potential habitat for threatened species observed	
rical LV	Decommission or abandon – access only	274: Grassy Woodland/	N/A	East	Scattered tree	No EVC	No TEC or potential habitat for threatened species observed	No photo

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV rical LV	Replace pole Relocate overhead	Plains Grassy Woodland Complex 55 Plains Grassy Woodland		North East	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
				West	Good quality patch of native vegetation including grey box, and diverse understory species. Scattered trees Scattered native grasses Avoid adjacent large tree which contains hollows	55: Plains Grassy Woodland	No TEC or potential habitat for threatened species observed	 
rical LV	Relocate overhead	N/A	N/A		Scattered indigenous grasses Planted native trees	No EVC	No TEC or potential habitat for threatened	No photo

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
ectrical LV	Relocate underground	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	No photo
rical 22kV	Relocate underground	55: Plains Grassy Woodland 56:Floodplain Riparian Woodland	N/A		Scattered Trees	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	N/A	N/A	East	Scattered native grasses, extending into private land, as seen from fence line in the rail reserve.	No EVC	No TEC or potential habitat for threatened species observed	
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
ectrical LV ical 22kV nunications	Relocate underground Relocate underground Relocate underground	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	 

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	N/A	N/A		Patch of native vegetation Scattered trees Montpellier broom	68: Creekline Grassy Woodland	No TEC or potential habitat for threatened species observed within project area. Adjacent to VTWBC habitat	 
rical 22kV	Replace pole	N/A	N/A	East	Patch of native vegetation including white box and yellow box.	55: Plains Grassy Woodland	Too poor quality to qualify as WBYBBRGGW	
				West	Scattered native grasses 1 scattered tree between the track and the project area	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	55: Plains Grassy Woodland	VTWBC WBYBBRG	East	Patch of native vegetation at the edge of patch Scattered native vegetation within project area Avoid trees at edge of project area	No EVC	No TEC or potential habitat for threatened species observed	
				West	Scattered native grasses	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV rical LV	Replace pole Replace pole	55: Plains Grassy Woodland	N/A	East	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	Scattered native grasses	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	55: Plains Grassy Woodland	N/A	East	Planted native vegetation in private land.	No EVC	No TEC or potential habitat for threatened species observed	
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
ectrical 22kV ectrical 66kV	Replace pole Replace pole	55: Plains Grassy Woodland	N/A	North East & West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
				South East	1 scattered silver wattle – avoidable	No EVC	No TEC or potential habitat for threatened species observed	
				South West	Avoid trees to south west, outside project area	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	N/A	N/A		Avoid the patch of large old trees to north of project area 1 scattered tree silver wattle within project area – avoidable	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical LV	Decommission or abandon – no works	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	N/A	N/A	East	Scattered regrowth native grasses	No EVC	No TEC or potential habitat for threatened species observed	
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	N/A	N/A		Cumbungi located in drain	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV rical 66kV	Replace pole Replace pole	N/A	N/A	North East	Very old large river red gum in rail reserve (outside project area)	No EVC	No TEC or potential habitat for threatened species observed	
				South East	Borrow pit between track and private land contains native vegetation (inaccessible)	No EVC	No TEC or potential habitat for threatened species observed	No photo

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	N/A	N/A	East	Big pond in borrow pit within project area Drain alongside track contains cumbungi and river red gum scattered trees Access along track clear	No EVC	No TEC or potential habitat for threatened species observed	
				West	Native vegetation in drain including wallaby Grass Access not possible along track	No EVC	Potential listed wallaby grass	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	55: Plains Grassy Woodland	N/A	North	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
				South	Scattered trees with disturbed understory Patch of fenced native vegetation between the project area and the Hume Freeway.	No EVC	No TEC or potential habitat for threatened species observed	
ectrical 220kV rical 66kV	Replace pole Replace pole	N/A	N/A	East	Scattered native vegetation	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	Patch of native vegetation (also considered to be a TEC) that extends into the rail corridor. Private land contained a patch of native vegetation. This was viewed from over the fence from the adjacent rail reserve.	55: Plains Grassy Woodland	GBGW TEC	
rical 22kV	Replace pole	N/A	N/A	East	Scattered native vegetation	No EVC	No TEC or potential habitat for threatened species observed	No photo
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	175: Grassy Woodland	VTWBC Purple Diuris Warby Range Swamp Gum	East	Patch of native grasses from powerline south	175: Grassy Woodland	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	Patch of grey box regrowth	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	240: Plains Grassy Woodland/ Creekline Grassy Woodland/ Wetland Formation Mosaic	N/A	East	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV rical LV	Replace pole Replace pole	N/A	N/A	East	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
rical LV	Relocate underground	N/A	N/A		1 scattered tree (river red gum) on west side should be avoided	No EVC	No TEC or potential habitat for threatened species observed	
rastructure	Replace pole	N/A	N/A	North	Planted native vegetation only	No EVC	No TEC or potential habitat for threatened species observed	No photo

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				South	Scattered lightwood	No EVC	No TEC or potential habitat for threatened species observed	
ical LV	Relocate overhead	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	No photo
tructure	Replace pole	N/A	N/A		No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	No photo
ical 22kV	Replace pole	N/A	N/A		No native vegetation or habitat for threatened species Avoid scattered tree to east	No EVC	No TEC or potential habitat for threatened species observed	
ical 22kV ical 22kV	Replace pole Replace pole	240: Riverine Grassy Woodland/ Riverine Swampy Woodland Mosaic	VTWBC WBYBBRG	East	Scattered regrowth river red gum	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
rical LV	Relocate overhead	N/A	N/A		Scattered native grasses Planted native trees under pole river red gum and apple box	No EVC	No TEC or potential habitat for threatened species observed	
tructure	Replace pole	803: Plains Woodland	N/A		Scattered native grasses	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	N/A	N/A		Scattered native vegetation 1x scattered tree	175: Grassy Woodland 55: Plains Grassy Woodland	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	803: Plains Woodland	N/A	East	1x scattered tree Scattered native vegetation	No EVC	No TEC or potential habitat for threatened species observed	
				West	1x scattered tree	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	803: Plains Woodland	N/A	East	Patch of native vegetation including grey box	55: Plains Grassy Woodland	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	803: Plains Woodland	N/A	East	Patch of native vegetation including regenerating grasses, especially in private land. Planted scattered trees	803: Plains Woodland / 55: Plains Grassy Woodland / 175: Grassy Woodland	No TEC or potential habitat for threatened species observed	
				West	Scattered native grasses, planted trees	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	47: Valley Grassy Forest	GBGW VTWBC WBYBBRG		Scattered native grasses adjacent to fence, otherwise clear. Scattered trees along access track – avoid use of track	55: Plains Grassy Woodland	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	55: Plains Grassy Woodland 68: Creekline Grassy Woodland	GBGW VTWBC WBYBBRG Late-flower flax-lily Mugga		Patch of native vegetation including yellow box, white box and wetland habitat Scattered trees	68: Creekline Grassy Woodland	WBYBBRG Brown toadlet heard calling Potential habitat for threatened species Sloane's froglet	
rical 22kV	Replace pole	47: Valley Grassy Forest	N/A	East	Scattered native vegetation	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV rical LV	Replace pole Replace pole	153: Alluvial Terraces Herb-rich Woodland/ Valley Grassy Forest Complex	N/A		Scattered native vegetation including jersey cudweed Scattered trees on western edge of project area - avoidable	No EVC	No TEC or potential habitat for threatened species observed	
rical LV	Replace pole	152: Alluvial Terraces Herb-rich Woodland/ Plains Grassy Woodlands Complex	N/A	East	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				West	Scattered trees on edge of project areas - avoidable	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	N/A	N/A		Scattered native vegetation including jersey cudweed	No EVC	No TEC or potential habitat for threatened species observed	
rical 22kV	Replace pole	55: Plains Grassy Woodland	N/A	East	Scattered indigenous grasses	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
				Central	Scattered native vegetation of jersey cudweed	No EVC	No TEC or potential habitat for threatened species observed	
				West	No native vegetation or habitat for threatened species	No EVC	No TEC or potential habitat for threatened species observed	No photo
rical LV	Replace pole	N/A	N/A		Scattered indigenous grasses	No EVC	No TEC or potential habitat for threatened species observed	

		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 22kV	Replace pole	N/A	N/A		No native vegetation or habitat for threatened species.	No EVC	No TEC or potential habitat for threatened species observed	 
rical 66kV	Replace pole	N/A	N/A		Scattered native vegetation	No EVC	No TEC or potential habitat for threatened species observed	

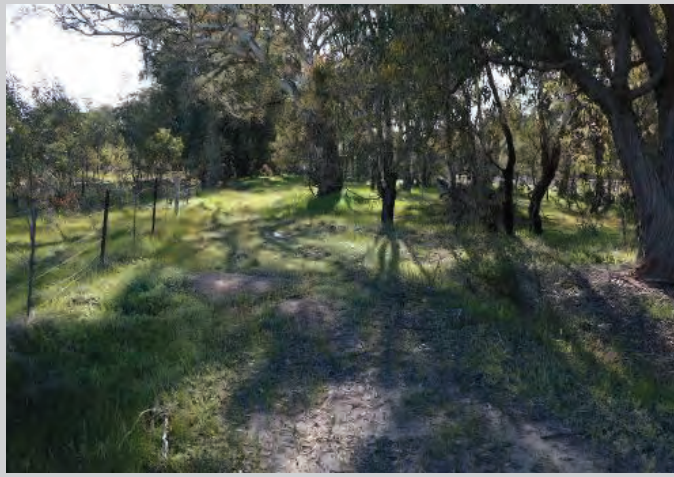
		Modelled EVC	TEC/Threatened Species	Project area	Project area Characteristics	EVC Field Assessment	TEC/Threatened Species Field Confirmation	Image
rical 66kV	Replace pole	N/A	N/A		Scattered native grasses	No EVC	No TEC or potential habitat for threatened species observed	 
rical 330kV	Replace pole	815: Riverine Swampy Woodland	VTWBC	East	No native vegetation in project area, avoid 2 scattered trees either side of access track	815: Riverine Swampy Woodland	No TEC or potential habitat for threatened species observed	No photo
				West	Patch of river red gum – easily avoided	No EVC	No TEC or potential habitat for threatened species observed	

Appendix B

Targeted Powerline Assessments – detailed table of results

We Deliver

e	Predicted threatened species (ABZECO 2019)	Observed Threatened species	Predicted TEC (ABZECO 2019)	Potential TEC	Image
	N/A	No threatened flora species observed	GBGW VTWBC	No TEC was observed	
	N/A	Cottony haeckeria	GBGB VTWBC WBYBBRGGW	GBGW was recorded adjacent to the project area. Area directly beneath powerline is not considered to be part of the community.	No photo
	N/A	Rosemary grevillea	GBGB VTWBC WBYBBRGGW	No TEC is considered present within the project area. GBGW and VTWBC is present in surrounding areas.	
	N/A	No threatened flora species observed	GBGB VTWBC WBYBBRGGW	No threatened ecological recorded within the project area.	

Euroa Guinea-flower Narrow goodenia	Euroa Guinea-Flower	GBGB VTWBC WBYBBRGGW	The vegetation was mixed eucalypt forest, dominated by river red gum. The VTWBC was considered present along the rail and road reserve.	 
Clover glycine Purple diuris Mugga	No threatened flora species observed	GBGB VTWBC WBYBBRGGW	No threatened ecological recorded within the project area.	

	Purple diuris	No threatened flora species observed	GBGB VTWBC WBYBBRGGW	No threatened ecological recorded within the project area.	
	Mountain swainson-pea Purple diuris	No threatened flora species observed	GBGB VTWBC WBYBBRGGW	No threatened ecological recorded within the project area. GBGW is considered present in surrounding area, including adjacent to access tracks to the project area.	
	Mountain swainson-pea Purple diuris	Mountain swainson-pea were found planted	GBGB VTWBC WBYBBRGGW	GBGW is located along the flatter plains to the southern end of the project areas. WBYBBRGW is located along higher elevations to the north of the project areas. All woodland habitat is considered to be VTWBC.	

	Narrow goodenia Northern Sandalwood Purple diuris Warby range swamp gum	No threatened flora species were observed	GBGB VTWBC WBYBBRGGW	No threatened ecological recorded within the project area.	
	Narrow goodenia Northern Sandalwood Purple diuris Warby range swamp gum	No threatened flora species were observed	GBGB VTWBC WBYBBRGGW	No threatened ecological recorded within the project area. WBYBBRGGW community is potentially present in surrounding area.	
	Golden cowslips Narrow goodenia Northern Sandalwood Purple diuris Warby range swamp gum	No threatened species were observed	GBGB VTWBC WBYBBRGGW	No threatened ecological recorded within the project area.	

Narrow goodenia Northern Sandalwood Purple diuris Warby range swamp gum	No threatened species were observed	VTWBC	Vegetation that occurs between Warby Range Road and rail is potentially part of WBYBBRGW community. However, is of lower quality directly beneath the powerlines	
Purple diuris Warby range swamp gum	No threatened species were observed	VTWBC	No threatened ecological recorded within the project area. WBYBBRGGW community is potentially present adjacent to the project area.	
Purple diuris Warby range swamp gum	No threatened species were observed. Potential habitat in private land to the west was viewed from the fence-line within the rail reserve. Targeted survey did not enter this property.	VTWBC	Vegetation is part of WBYBBRGW which extends along the rail corridor on east and west side. WBYBBRGW also extends into adjacent private land to the west.	 

	N/A	No threatened flora species were observed	GBGW WBYBBRGGW	No threatened ecological recorded within the project area.	
	N/A	No threatened flora species were observed	GBGW WBYBBRGGW		
	Crimson spider orchid Deane's wattle Cottony cassinia	No threatened species were identified	GBGB VTWBC WBYBBRGGW	No threatened ecological recorded within the project area.	

	Crimson spider orchid Deane's wattle Mountain swainson-pea Hooded mosquito-orchid Dookie daisy	No threatened species were identified	GBGB VTWBC WBYBBRGGW	VTWBC recorded adjacent.	

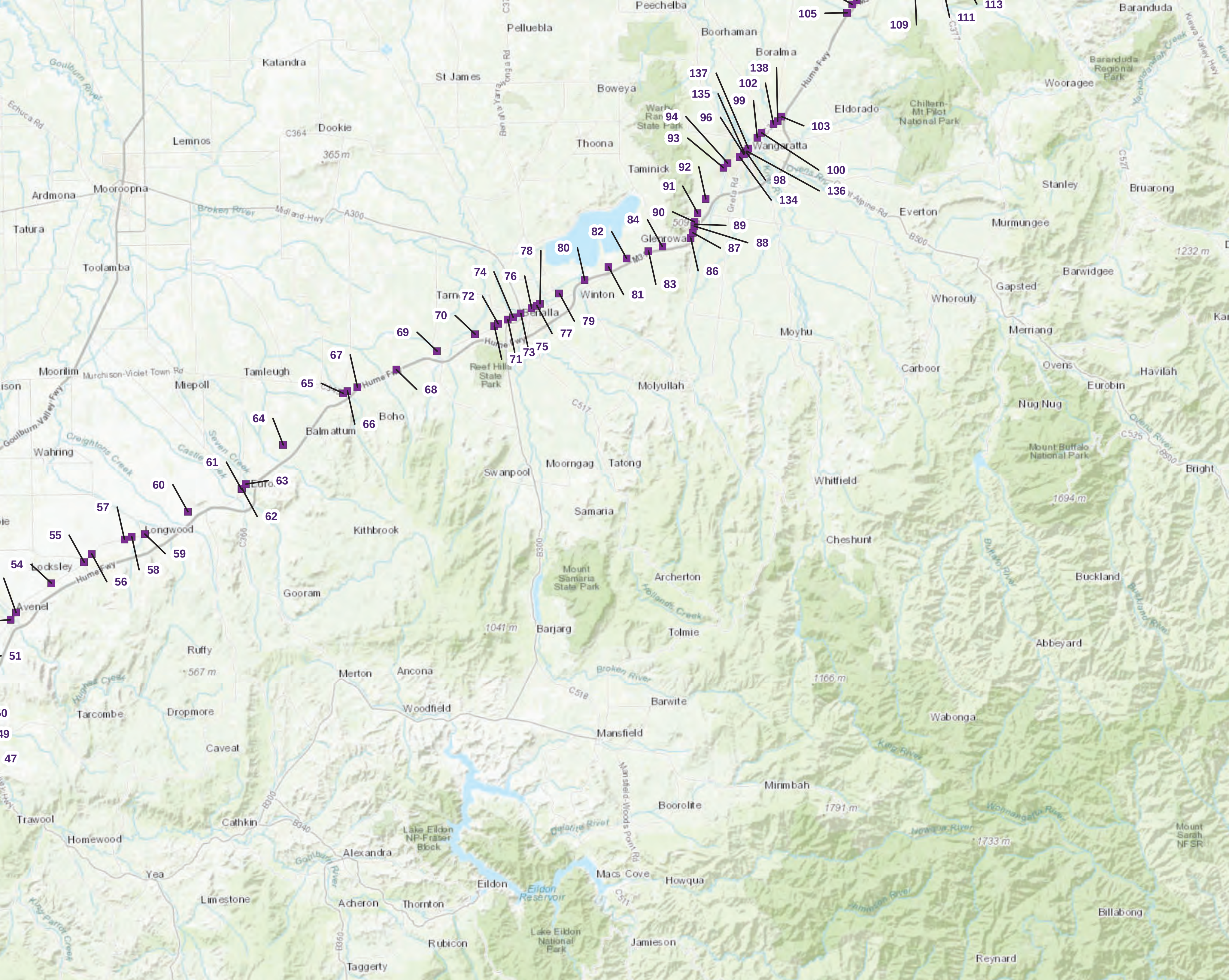
Appendix C

C1 – Landscape Context Map

C2 – Rapid Assessment Results Map

C3 – Targeted Survey Results Map

We Deliver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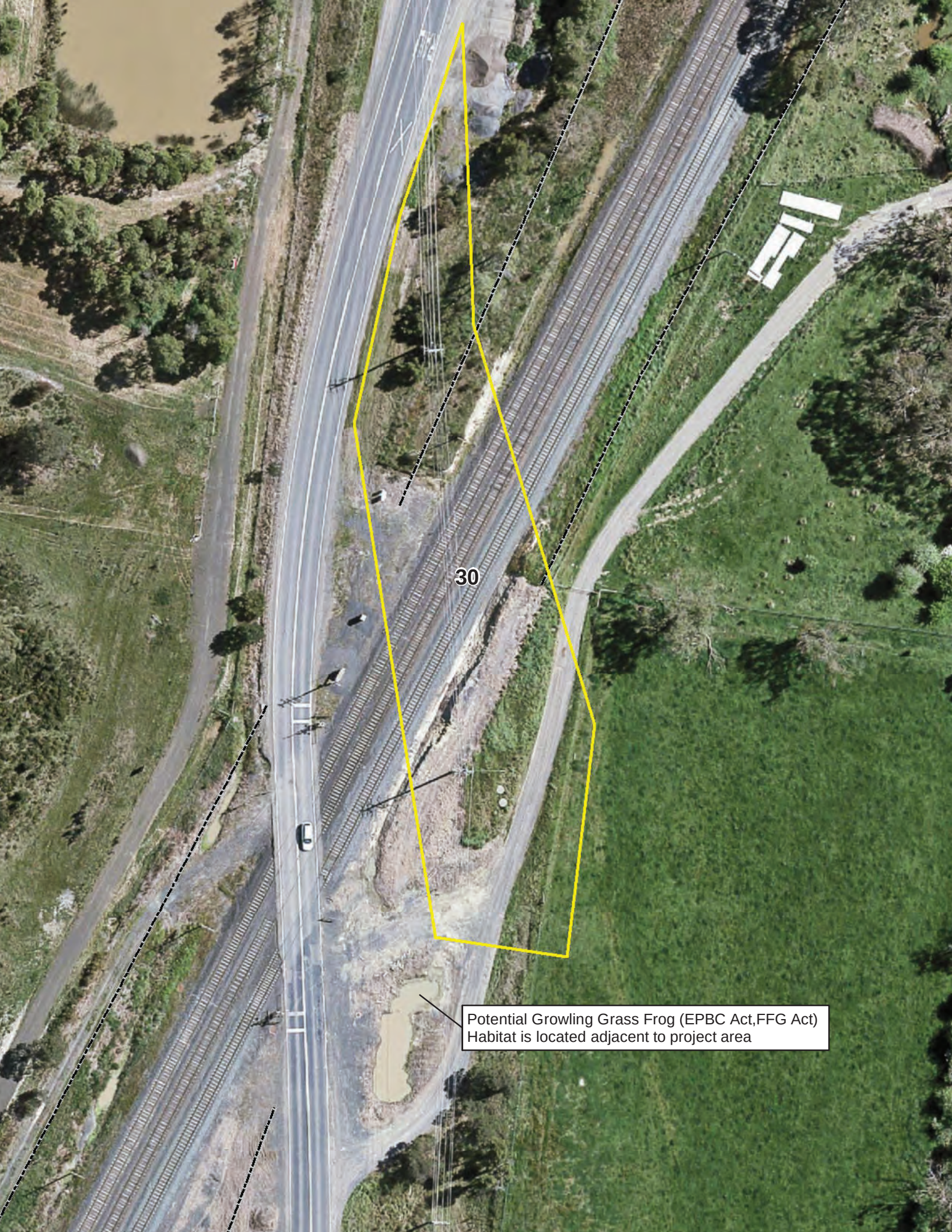
Peechelba
Pelluebla
Boorhaman
Boralma
Barnaduda
Katandra
St James
Boweya
Eldorado
Wooragee
Dookie
Lemnos
Thoona
Wangaratta
Taminick
Stanley
Bruarong
Ardmona
Mooroopna
Tatura
Everton
Murmungee
Glenrowan
Toolamba
Winton
Barwidgee
Gapsted
Whorouly
Benalla
Moyhu
Merriang
Moorilim
Miepoll
Tamleugh
Carboor
Ovens
Havilah
Molyullah
Eurobin
Nug Nug
Boho
Balmattum
Wahring
Swanpool
Moorngag
Tatong
Whitfield
Bright
Euroa
Samaria
Longwood
Kithbrook
Cheshunt
Locksley
Gooram
Archerton
Buckland
Avenel
Barjarg
Tolmie
Abbeyard
Ruffy
Merton
Ancona
Barwite
Tarcombe
Dropmore
Woodfield
Mansfield
Wabonga
Caveat
Mirimbah
Boorolite
Trawool
Cathkin
Homewood
Alexandra
Yea
Eildon
Macs Cove
Howqua
Limestone
Acheron
Thornton
Billabong
Rubicon
Jamieson
Reynard
Taggerty


127
127
127
127
Potential Growling Grass Frog (EPBC Act, FFG Act)
Habitat is located within project area


29
29
Potential Growling Grass Frog (EPBC Act, FFG Act)
Habitat is located within project area


30
Potential Growling Grass Frog (EPBC Act,FFG Act)
Habitat is located adjacent to project area


34


Potential WBYBBRGGW (EPB
is located within project area
tial WBYBBRGGW (EPBC Act)
ted within project area
36
36
36
36
36


Potential habitat for Golden Sun Moth (EPBC Act;FFG Act) in project area (within private land not assessed)
VTWCB (FFG Act) located within project area
37
37
37


VTWBC (FFG Act) and potential habitat for Golden Sun Moth (EPBC Act; FFG Act) is located within project area
38
38
38


42
42
Potential GBGW (EPBC
is located within project a


Potential GBGW (EPBC Act) and VTW
is located within project area
51
GBGW (EPBC Act) present
adjacent to project area
51


81
81
GBGW (EPBC Act)
is located within project area


VTWCB (FFG Act)
is located within project area
100


109
Habitat for Brown Toadlet (
and potential habitat for Sl
and WBYBBRGGW (EPBC
within project area


56
GBGW (EPBC Act) and VTWBC (FFG Act) are located immediately adjacent to project area
56


57
VTWBC (FFG Act) is located adjacent to project area
57
57


58
58
VTWBC (FFG Act)
is located within project area


VTWBC (FFG Act) is located within project area
60
60


83
83
Potential GBGW (EPBC Act)
and VTWBC (FFG Act)
adjacent to project area


Potential WBYBBRGGW (EPBC Act) and VTWBC (FFG Act) present within project area
otential GBGW (EPBC Act) nd VTWBC (FFG Act) resent within project area
84
84
Potential GBGW (EPBC Act) present within project area


87
87
87
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87
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87
Potential WBYBBRG (EPBC
adjacent to project area


Potential WBYBBRG (EPBC Act) present within project area
89
89
89
89


90
Potential WBYBBRG (EPBC Act) adjacent to project area


91
WBYBBRGGW (EPBC Act)
is located within project area
(private land not assessed)
WBYBBRGGW (EPBC Ac
is located within project ar
91


113
VTWBC (FFG Act) is located within project area
113
VTWBC (FFG Act) is located within project area
113