

**ECOLOGICAL ASSESSMENT REPORT**

**FOR**

**PROPOSED MIXED USE DEVELOPMENT**

**AT**

**52 SINCLAIR ST, GOULBURN NSW**

**Prepared for: KDC**

**4 June 2019**

**AEP Ref: 1812**



## EXECUTIVE SUMMARY

Anderson Environment & Planning was engaged by KDC to undertake an Ecological Assessment Report for a proposed mixed use development at 52 Sinclair St, Goulburn NSW.

The subject site is approx. 8.22ha in size. The area proposed for development is currently disturbed paddock containing both native and exotic species, with remnant woodland to the northwest. The site occurs within the Goulburn-Mulwaree LGA.

Two vegetation communities were identified within the study area through examination of *Native Vegetation Map Report Series No. 4*. (DIPNR 2004) and ground-truthing:

- DSF9 – Tableland Low Woodland; and
- GW23 – Tableland Hills Grassy Woodland.

Flora and fauna species recorded in the subject site were as expected in this locality in disturbed and remnant vegetation.

Assessment under section 7.3 of the *Biodiversity Conservation Act 2016* (NSW) (BC Act) determined that, with some mitigation efforts employed, no significant impacts are likely to occur to any threatened species or ecological communities as a result of the proposal. No relevant thresholds within the BC Act are triggered, hence the 5-Part Test supplied is considered sufficient for assessment purposes.

Consideration of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) revealed that impacts on Matters of National Environmental Significance (MNES) are considered unlikely to occur.

General recommendations are included at the end of this report for consideration to minimise localised impacts on biodiversity as a result of the development of the site.



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## 1.0 Introduction

It is proposed that a mixed use development be constructed at 52 Sinclair St, Goulburn.

At the request of KDC (the client), Anderson Environment & Planning (AEP) have undertaken necessary investigations to assess relevant thresholds within the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and thereafter to inform the production of a 5-part test assessment report addressing the proposed development.

This report is specifically intended to indicate the likelihood of the proposed development having a significant impact on threatened species or ecological communities. In this regard, the report aims to recognise the relevant requirements of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act), the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The purpose of this report is to:

- Describe ecological values of the study area;
- Explore the potential for threatened species to utilise the area; and
- Assess ecological impacts associated with the proposal against relevant legislation.

Potential ecological impacts on native species in general are also considered, as are recommendations for minimising any impacts within the scope of the development.

For the purposes of referencing, this document should be referred to as:

Anderson Environment & Planning (2019). *Ecological Assessment Report for Mixed Use Development at 52 Sinclair St, Goulburn NSW*. Unpublished report for KDC, April 2019.



## 2.0 Site Particulars

- **Address** – 52 Sinclair St, Goulburn NSW
- **Title Details** – Lot 22 DP750050
- **LGA** – Goulburn Mulwaree
- **Subject Site** – The above mentioned lot
- **Study area** – The study area includes the subject site and the immediate surrounds of the proposed development.
- **Zoning** – Under the *Goulburn Mulwaree Local Environmental Plan 2009* (the LEP), the study area is zoned E3 Environmental Management, B6 Enterprise Corridor and RU6 Transition.
- **Current Land Use** – The site contains two sealed roads and paddock grazed by horses and rabbits. Remnant woodland stands in the northwest corner.
- **Surrounding Land Use** – Surrounding land is zoned E3 - Environmental Management, B6 - Enterprise Corridor and RU6 - Transition. A council waste management facility is located nearby.

**Figure 1** depicts the location of the site laid over an aerial photograph of the locality.



**Figure 1 – Site Location**

Disclaimer: While all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

### Legend

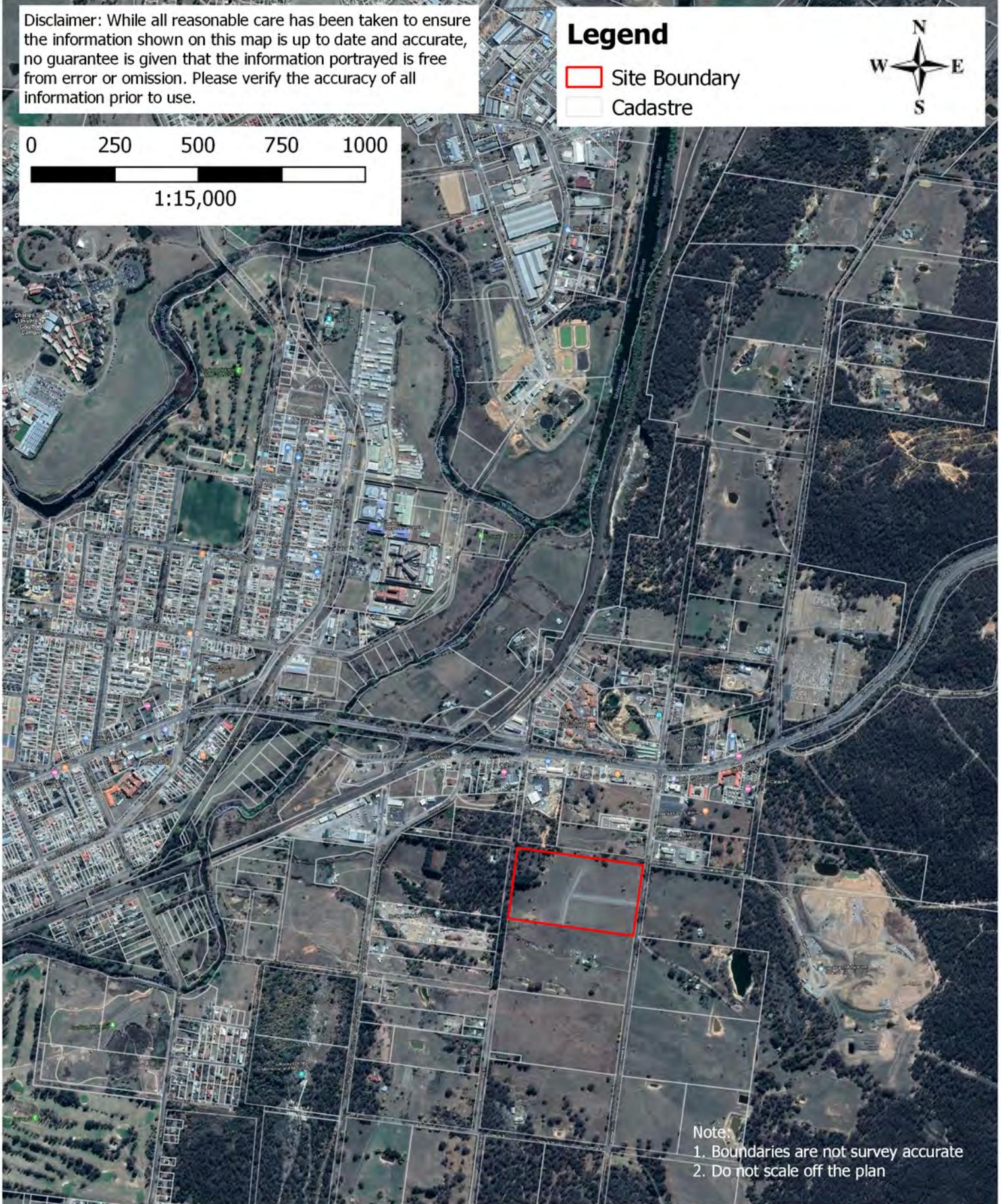
-  Site Boundary
-  Cadastre



0 250 500 750 1000



1:15,000



- Note:
1. Boundaries are not survey accurate
  2. Do not scale off the plan



# AEP

Title: Figure 1 - Site Location

Date: Jan 2019

Location: 52 Sinclair St, Goulburn NSW

Client: KDC

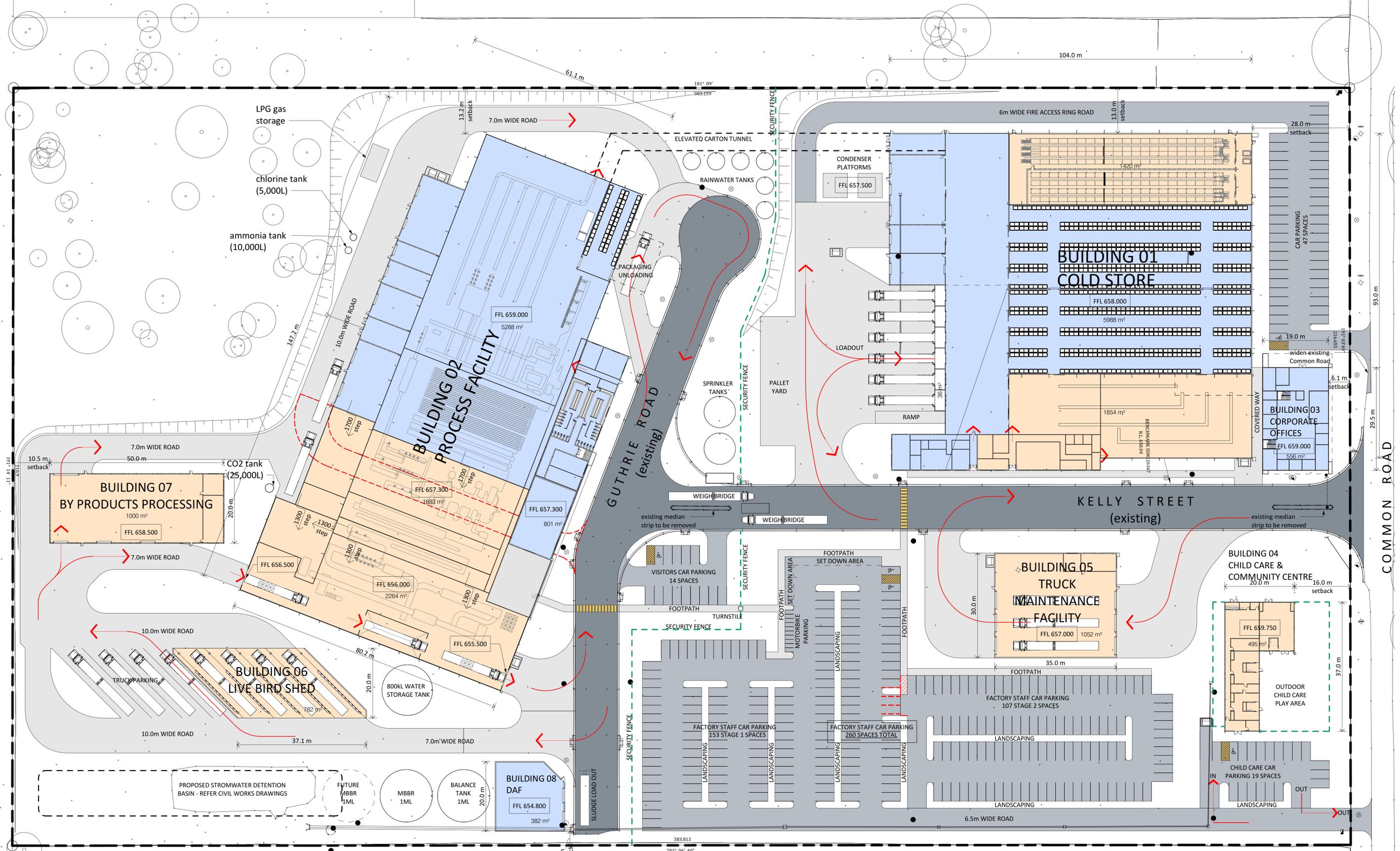
AEP ref: 1812



### 3.0 Proposed Development

The proposed development involves the construction of several buildings, carparks and ancillary buildings. The development is collectively considered 'mixed use development'. Approximately 0.12ha of native vegetation at disturbed woodland edge is expected to be removed, and 0.29ha of vegetation in total. There is additional potential for impact on two trees near the proposed batter in the north of the development.

A proposed plan of development is included as **Figure 2**.



# PROPOSED PROCESSING FACILITY OVERALL SITE PLAN - FINAL STAGE - NO CONTOURS

**WILEY**  
 Brisbane Office: Level 3 100 Ipswich Road  
 Woolloongabba Brisbane Queensland, Australia 4102  
 Melbourne Office: Westmeadows VIC Australia 3049  
 Sydney Office: Level 1 102 Bennelong Road  
 Olympic Park Sydney NSW Australia 2127  
 P 1300 385 988 E connect@wiley.com.au  
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Project No - W21314  
 Dwg No - 00K008 - 3  
 Date - 03/04/19

A1 = 1:500 (A3 = 1:1000) 0 5 10

Plot Date 3/04/2019 3:39:34 PM Cad File No C:\Wiley Revit Local\W21314-00-Arch\_Kristin.melton@wiley.com.au.rvt



## 4.0 Scope and Purpose

Investigations were carried out in the study area and via literature / database searches to gather information required to adequately address Section 7.3 of the *Biodiversity Conservation Act 2016* (known as the "5-part test") and the clearing thresholds under the *Biodiversity Conservation Regulation 2017*. Under the regulations, permissible clearing on site before triggering the Biodiversity Offsets Scheme (BOS) is directly related to minimum lot size established by the relevant Local Environment Plan. The BOS will also be triggered where clearing takes place on Biodiversity Values land.

Also afforded consideration were the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act).

The assessment approach was tailored to undertake sufficient works to ensure that legislative requirements were met relating to threatened species and native species in general for the proposed specific development. This was achieved by background research and literature review, database searches, consultation, targeted ecological fieldwork and mapping, detailed habitat assessment, and ultimately impact assessment consideration against the type and form of development proposed.

Impact assessment was undertaken with due reference to the "*Threatened Species Assessment Guidelines*" (DECC 2007).

Specifically, the scope of this study is to:

- Identify vascular plant species occurring within the study area, including any threatened species listed under the BC Act or EPBC Act;
- Identify and map the extent of vegetation communities within the study area, including any Endangered Ecological Communities (EECs) listed under the BC Act or EPBC Act;
- Identify any fauna species, including threatened and migratory species, and populations or their habitats, which occur within the study area and are known to occur in the wider locality;
- Assess the potential of the proposed development to have a significant impact on any threatened species or ecological communities (or their habitats) identified from the study area; and
- Describe measures to be implemented to avoid, minimise, manage or monitor potential impacts of the proposal.

In addition to the survey work conducted within the site boundary and its immediate surrounds, consideration has been afforded to the wider locality, via database searches within 10km of the site and via appreciation of habitat areas that may be linked ecologically to the site.

## 5.0 Study Certification and Licencing

This report was written by Craig Anderson BAppSc (EAM) and Frances O'Brien BEnv LLB MEL of Anderson Environment & Planning.

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101313;
- Animal Research Authority (Trim File No: 14/600(2)) issued by NSW Agriculture; and
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 14/600(2)) issued by NSW Agriculture.

### Certification:

As the principal author, I, Craig Anderson, make the following certification:

- The results presented in the report are, in the opinion of the principal author and certifier, a true and accurate account of the species recorded, or considered likely to occur within the Survey Area;
- Commonwealth, state and local government policies and guidelines formed the basis of project surveying methodology, unless specified departures from industry standard guidelines are justified for scientific and/or animal ethics reasons; and
- All research workers have complied with relevant laws and codes relating to the conduct of flora and fauna research, including the *Animal Research Act 1995*, *National Parks and Wildlife Act 1974* and the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes.

Principal Author and Certifier:



### **CRAIG ANDERSON**

Director  
Anderson Environment & Planning  
4 June 2019

## 6.0 Methods

The field surveys for the site have been prepared and performed with due recognition of the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft* (DEC 2004), and also more contemporary standards relating to Amphibians (DECC 2009) and Threatened Plants (OEH 2016).

The size of the site, the type of native vegetation and habitats remaining, the status of existing and proposed surrounding land use, and the level and type of habitat linkages to other proximate bushland areas were considered in formulating the methodology employed and described below.

The assessment approach was tailored to undertake sufficient works to ensure that legislative requirements were met relating to threatened species and native species in general for the proposed development.

To ensure a robust impact assessment approach, where any potential doubt remained over species impact, presence within the study area was assumed to ensure a conservative approach was employed.

### 6.1 Literature Review

Main information sources reviewed included:

- Aerial Photograph Interpretation (API) of the site and surrounding locality;
- *Native Vegetation Map Report Series No. 4*. (DIPNR 2004);
- State survey guidelines (DEC 2004; DECC 2009; OEH 2016);
- OEH Threatened Species, Populations and Ecological Communities website (<http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/>); and

In addition, database searches were carried out, namely:

- Review of flora and fauna records held by the NSW Office of Environment & Heritage (OEH) Atlas of NSW Wildlife within a 10km radius of the site (January 2019); and
- Review of flora and fauna records held by the Commonwealth Department of Energy and Environment (January 2019).

Vegetation was surveyed utilising a variety of methods, as outlined below.

- Review of *Native Vegetation Map Report Series No. 4*. (DIPNR 2004);
- Aerial Photo Interpretation (API) to identify any notable variations within the site;
- Consultation of 1:25,000 topographic map series for the area;



- Study area inspection to ground truth unit(s) identified by API; and
- Identification of the vegetation map units occurred via identification of required dominant species in community structural layers.

The final derived vegetation map was based on dominant species present in the over-storey, shrub and ground layers. The dominant species composition, structural and physical attributes were all considered when assigning the best fit community type.

Consideration was given to the potential for the derived vegetation communities to constitute Endangered Ecological Communities (EECs) as listed under the BC Act and/or EPBC Act. The floristic composition, geomorphological characteristics and geographical extent were important considerations in this process.

## 6.2 Field Surveys

### 6.2.1 Flora

A general flora survey was undertaken to produce a flora species list for the subject site, to search specifically for threatened flora species known from the wider area, and to gather data necessary to both derive vegetation community type(s) and to meet relevant survey guidelines. Such works included:

- Identification of all vascular plant species encountered during fieldwork. Random Meander Technique (Cropper 1993) within the study area was utilised to maximise species encountered. Specific searches were undertaken within areas proposed for development. A full list of all flora species recorded during fieldwork is included as **Appendix A**.

The location of all flora survey effort is provided within **Figure 3**.

### 6.2.2 Habitat

An assessment of the relative habitat values present within the subject site was carried out. This assessment focused primarily on the identification of specific habitat types and resources within the study area favoured by known threatened species from the region. The assessment also considered the potential value of the study area (and surrounding areas) for all major guilds of native flora and fauna.

The assessment was based on the specific habitat requirements of each threatened fauna species with regards to home range, feeding, roosting, breeding, movement patterns and corridor requirements. Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages.

In particular, focus was put on documenting the presence of key habitat features such as tree hollows. Hollows are an important resource utilised by a variety of native fauna, and are particularly relevant for several of the likely key threatened species in this locality.

Vertebrate and invertebrate species use hollows as diurnal or nocturnal shelter sites, for rearing young, feeding, thermoregulation, and to facilitate ranging behaviour and dispersal.

Tree hollows were recorded and mapped within the subject site utilising the methodology of tree hollow identification set by OEH in the BioBanking field plot methodology (Feb 2009), namely:

*“A hollow is only recorded if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm across; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); and (d) the hollow is at least 1 m above the ground (this omits hollows in cut stumps or at the base of trees)”.*

The location of hollow-bearing trees observed within the subject site are shown in **Figure 3** and summarised in **Appendix C**.

### 6.2.3 Fauna

Fauna survey has been carried out utilising techniques as outlined below. Fauna Survey effort is shown in **Figure 3**.

Incidental records of any fauna species observed during fieldwork were noted. This included opportunistic sightings of secondary indications (scratches, scats, diggings, tracks, etc.) of any resident or migratory species. Searches were also conducted for whitewash, regurgitation pellets and prey remains from Owls, chewed (*Allo*)*Casuarina* cones from Black-Cockatoos, chewed fruit remains from frugivorous birds, etc. Species present are marked on the Expected Fauna Species List (**Appendix B**).

### 6.2.4 Survey Dates, Times & Activity

**Table 1 – Field Survey Periods**

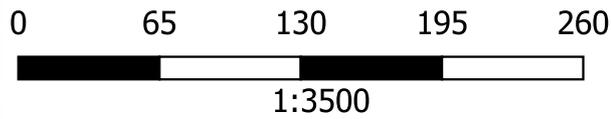
Date	Time	Field Activity	No. of Persons on Site
08/01/19	13:30 – 16:30 17:30 – 18:00	Site familiarisation, flora survey, fauna survey, general observations	1

The above survey methodology is considered to provide sufficient understanding of the biodiversity of the subject site and wider study area, and in particular the specific development nodes given the disturbed nature of the vegetation assemblages therein.

In addition, by applying rigorous habitat assessment to more mobile species for OEH Atlas records within the locality, it was ensured that all possible use of the subject site and wider study area by notable species was considered, and hence accommodated within subsequent biodiversity assessment and management recommendations.

A summary of the field survey effort is shown in **Figure 3** below.

Disclaimer: While all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.



## Legend

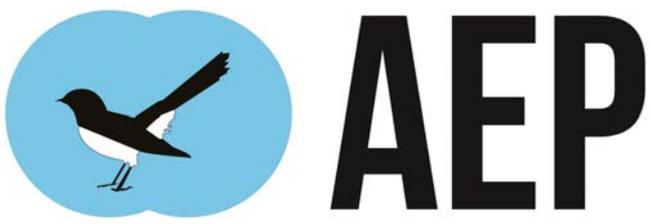
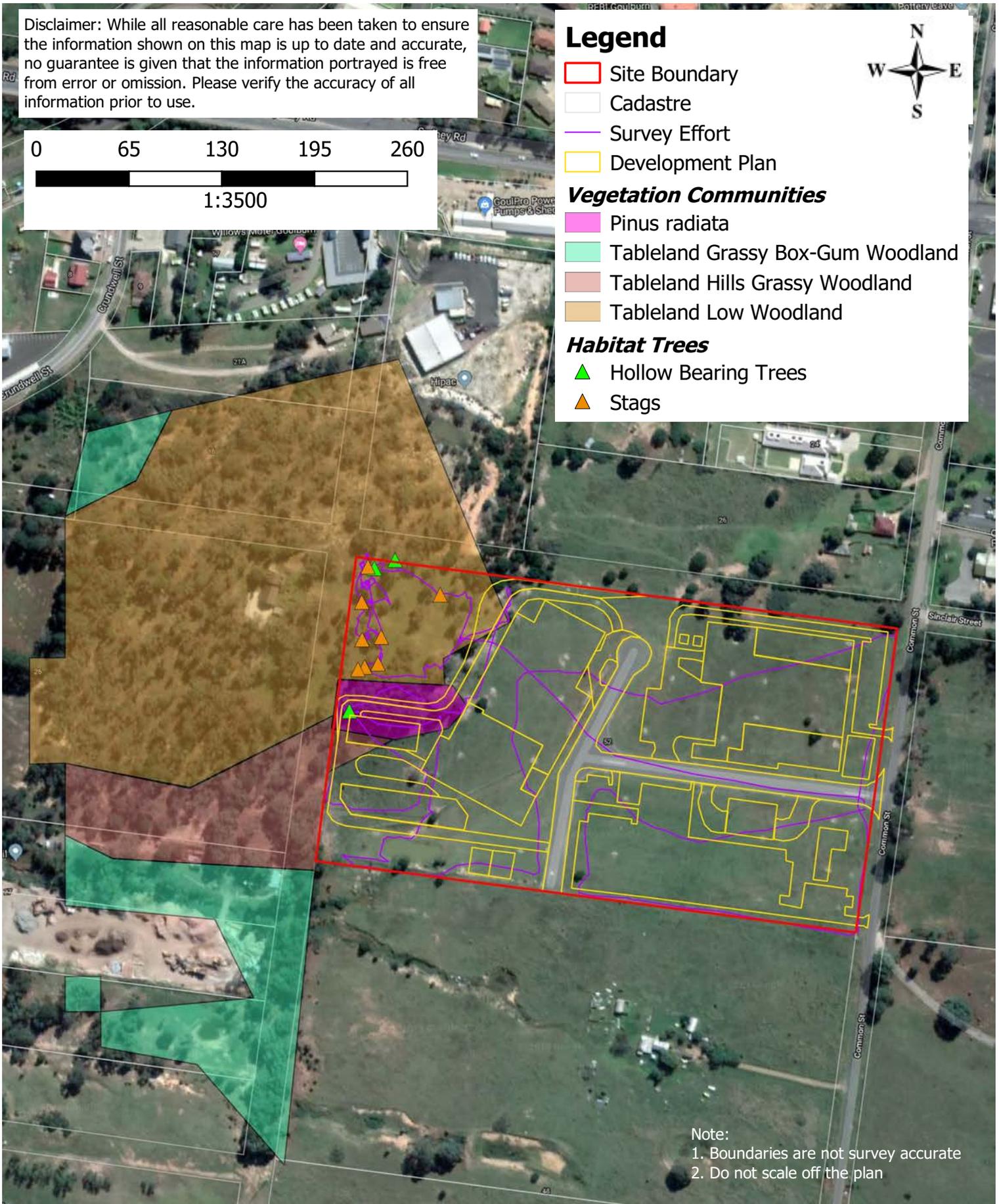
- Site Boundary
- Cadastre
- Survey Effort
- Development Plan

### Vegetation Communities

- Pinus radiata
- Tableland Grassy Box-Gum Woodland
- Tableland Hills Grassy Woodland
- Tableland Low Woodland

### Habitat Trees

- Hollow Bearing Trees
- Stags



Title: Figure 3 - Vegetation and Survey Effort Date: June 2019

Location: 52 Sinclair St, Goulburn NSW

Client: KDC

AEP ref: 1812



## 7.0 Results

### 7.1 Database Searches

Searches were undertaken of databases within a 10km radius of the site as per OEH (BC Act listings) & DoEE (EPBC Act listings) (**Table 4**). Note that any records considered erroneous, historic only, or obviously of no relevance to the site in regards to habitat (e.g. seabirds, marine species etc.) have been omitted.

The potential for the listed threatened species to occur within the site is considered below. Detailed ecological profile descriptions of species can be found at:

<https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species>

**Table 2 – Threatened Species Appraisal**

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
<b>Plants</b>				
<i>Rutidosia leptorrhynchoides</i> (2)	Button Wrinklewort	E	E	Not observed during surveys. Surveys conducted during recommended survey times. Unlikely to be present on site due to grazing impacts and presence of competitive herbaceous species.
<i>Bossiaea oligosperma</i> (1)	Few-seeded Bossiaea	V	V	Not observed during surveys. Sparse shrub layer at site means species unlikely to have been missed during surveys. Main known population located in Windellama, approximately 25km south of the site. Unlikely to be present on site.
<i>Diuris aequalis</i> (2)	Buttercup Doubletail	E	V	Not observed during surveys. Surveys conducted outside of known flowering periods. Limited potential habitat present on site due to grazing impacts and presence of competitive herbaceous species <b>SUBJECT SPECIES</b>
<i>Pomaderris delicata</i> (1)	Delicate Pommaderris	E	CE	Not observed during surveys. Sparse shrub layer at site means species unlikely to have been missed during surveys. Preferred habitat not present on site. Unlikely to be present on site.
<b>Birds</b>				
<i>Hieraaetus morphnoides</i> (2)	Little Eagle	V		Not observed during surveys. Potential foraging habitat present. Suitable nesting habitat present. May form part of a larger home range. <b>SUBJECT SPECIES</b>
<i>Falco subniger</i> (1)	Black Falcon	V		Not observed during surveys. Potential foraging habitat present. No suitable nesting habitat present. May form part of a larger home range.
<i>Collocephalon fimbriatum</i> (1)	Gang-gang Cockatoo	V		Not observed during surveys. Potential habitat present. <b>SUBJECT SPECIES</b>
<i>Chthonicola sagittata</i> (1)	Speckled Warbler	V		Not observed during surveys. Woodland too small and disturbed to provide suitable habitat. Unlikely to utilise site.
<i>Anthochaera phrygia</i> (1)	Regent Honeyeater	E	CE	Not observed during surveys. Potential foraging habitat present. May form part of a larger foraging range. <b>SUBJECT SPECIES</b>
<i>Daphoenositta chrysoptera</i> (3)	Varied Sittella	V		Not observed during surveys. Potential foraging habitat present. Suitable nesting habitat present. <b>SUBJECT SPECIES</b>
<i>Artamus cyanopterus cyanopterus</i> (2)	Dusky Woodswallow	V		Not observed during surveys. Potential foraging habitat present. Suitable nesting habitat present. <b>SUBJECT SPECIES</b>
<i>Petroica boodang</i> (1)	Scarlet Robin	V		Not observed during surveys. Potential foraging habitat present. Suitable nesting habitat present. <b>SUBJECT SPECIES</b>

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
<b>Mammals</b>				
<i>Saccolaimus flaviventris</i> (1)	Yellow-bellied Sheath-tail-bat	V		Potential foraging and roosting habitat present. Assumed present. <b>SUBJECT SPECIES</b>
<i>Falsistrellus tasmaniensis</i> (2)	Eastern False Pipistrelle	V		Potential foraging and roosting habitat present. Assumed present. <b>SUBJECT SPECIES</b>
<i>Miniopterus schreibersii oceanensis</i> (4)	Eastern Bentwing-bat	V		Potential foraging habitat present. Assumed present. <b>SUBJECT SPECIES</b>
<b>Herpetofauna</b>				
<i>Litoria aurea</i> (1)	Green and Golden Bell Frog	E	V	Not observed during surveys. Dam present on site but contains little vegetation. Unlikely to utilise site.

**Table Key - Status (BC Act & EPBC Act):**

CE: Critically Endangered; E: Endangered; V: Vulnerable

(#): Denotes the number of Atlas records with a 10km radius of the subject site



From the above, the following species are considered as the key subject species / indicator species for this site. This is due to either being recorded on site, potentially likely to forage and/or roost on the site, or the site potentially forms an important part of a local home range for resident species and some potential habitat will be removed.

**Table 3 – Subject Species**

Scientific Name	Common Name	BC Act	EPBC Act
<b>Plants</b>			
<i>Diuris aequalis</i> (2)	Buttercup Doubletail	E	V
<b>Birds</b>			
<i>Hieraetus morphnoides</i> (2)	Little Eagle	V	
<i>Callocephalon fimbriatum</i> (1)	Gang-gang Cockatoo	V	
<i>Daphoenositta chrysoptera</i> (3)	Varied Sittella	V	
<i>Anthochaera phrygia</i> (1)	Regent Honeyeater	E	CE
<i>Artamus cyanopterus cyanopterus</i> (2)	Dusky Woodswallow	V	
<i>Petroica boodang</i> (1)	Scarlet Robin	V	
<b>Mammals</b>			
<i>Saccolaimus flaviventris</i> (1)	Yellow-bellied Sheath-tail-bat	V	
<i>Falsistrellus tasmaniensis</i> (2)	Eastern False Pipistrelle	V	
<i>Miniopterus schreibersii oceanensis</i> (4)	Eastern Bentwing-bat	V	

**Table Key - Status (BC Act & EPBC Act):**

CE: Critically Endangered, E: Endangered, V: Vulnerable  
 (#) - Indicates number of Atlas Records within 10km of the subject site

## 7.2 Vegetation Communities

Fieldwork was conducted to ground-truth vegetation mapping produced by DIPNR (2004). DIPNR (2014) identified two ecological communities within the development site. These are:

- DSF9 – Tableland Low Woodland, and
- GW23 – Tableland Hills Grassy Woodland.

GW24 – Tableland Grassy Box-Gum Woodland (commensurate with EEC White Box Yellow Box Blakely’s Gum Woodland) is mapped as being present offsite to the southwest. Ground-truthing has identified most of the area mapped as Tableland Hills Grassy Woodland as now containing a near-monoculture of *Pinus radiata* (Radiata Pine).

### 7.2.1 Tableland Low Woodland



Upper stratum of this vegetation community is characterised on site by *Eucalyptus rossii* (Inland Scribbly Gum), *Eucalyptus mannifera* (Brittle Gum) and *Eucalyptus macrorhyncha* (Red Stringybark). Few shrubs are present, and are mostly exotic species including *Lycium ferocissimum* (African Boxthorn) and *Rubus fruticosus agg.* (Blackberry). To the south of the woodland is a near-monocultural stand of *Pinus radiata*, otherwise containing two specimens of *Lycium ferocissimum*.

### 7.2.2 Tableland Hills Grassy Woodland

Only a small patch of this community is located on site, extending from a larger patch offsite. There are strong similarities between this ecosystem and the EEC Tableland Grassy Box-Gum Woodland, which has been mapped offsite to the south west.

The species identified on site represent only the shrub and groundcover layers of this ecosystem, due to previous disturbance. These include *Plantago varia*, *Hardenbergia violacea* and *Cheilanthes sieberi*.

### 7.2.3 Residue of the Study Area



The remainder of the site is comprised of grazed paddock land, containing a mixture of native and non-native species. The majority of the area is dominated by *Pennisetum clandestinum* (Kikuyu) and *Dactylon cynodon* (Couch). Other species present include *Paspalum dilatatum*, *Echium plantagineum* (Patterson's Curse), *Plantago varia* (Variable Plantain), and *Poa sieberiana* (Tussock Grass).

A dam in the south of the site features *Juncus continuus* and *Einadia nutans* (Creeping Saltbush).

Vegetation communities for the study area are shown in **Figure 3** above.



### 7.3 Flora

Flora surveys have resulted in the identification of 45 species within the study area. Approximately 51% of these species are exotics, principally invasive weed species associated with areas of previous disturbance and cleared grassland.

A full list of flora species identified by surveys conducted within the study area is included in **Appendix A**.

### 7.4 Threatened Plants

No threatened flora species were recorded within the study area.

### 7.5 Habitat Assessment

The study area offers some habitat features for native fauna as outlined below.

- **Trees** – Several large native trees are present in the development area. Three of these are hollow-bearing. In addition, there are multiple stag trees present. One hollow bearing tree is proposed for removal.
- **Patch size / connectivity** – The overall site of approximately 8.22ha comprises approximately 1.14ha of vegetation other than grassland. Of this, approximately 0.8ha is native vegetation (excluding the pine monoculture). This vegetation is part of an isolated patch approximately 10ha in size. It has limited connectivity to a riparian corridor to the west of the site, and limited connectivity to a vegetation patch in the south which sweeps around to the east of the site. Connectivity is mostly formed by stands of paddock trees.
- **Riparian areas** – the subject site contains a dam with some surrounding vegetation (mainly graminoids). Hydrophilic fauna species such as dragonflies and frogs were observed in these areas.

In summary, the areas of native vegetation within the study area would provide suitable habitat opportunities and resources for a range of species suited to the habitat type.

### 7.6 Fauna

Fauna surveys to date have identified 20 species within the site and immediate surrounds, being 15 bird, three mammal, one reptile and one amphibian species.

The study area includes potential foraging, breeding and nesting habitat for several species.

Other notable species, including some more mobile (flying) threatened species, are also considered to potentially utilise the site on an intermittent basis as part of a larger home range. Such species are considered further in following Sections.



An Expected Fauna Species List has been generated for the study area and is included as **Appendix B**, with all fauna species recorded during fieldwork noted therein.



## 8.0 Avoid and Minimise

As part of this development, the proponent has included the following avoid and minimise strategies:

- Retention of the existing dam and revegetation of the area surrounding it to improve habitat values and provide a buffer between the development and EEC offsite;
- Retention of the majority of habitat trees; and
- Landscape planting of native species, including planting of species consistent with identified vegetation communities at the interface between retained vegetation and the development.



## 9.0 Biodiversity Offsets Scheme Thresholds

Under the BC Act and associated regulation, the Biodiversity Offset Scheme (BOS) will be triggered if the following occurs:

- Clearing of native vegetation exceeds thresholds set out in clause 7.2 of the BC Regulations;
- Clearing of native vegetation takes place on Biodiversity Values Mapped land; or
- Clearing of native vegetation creates significant impacts as evaluated by the 5-part test.

**Table 4** sets out the clearing thresholds.

**Table 4 – BOS Clearing Trigger Thresholds**

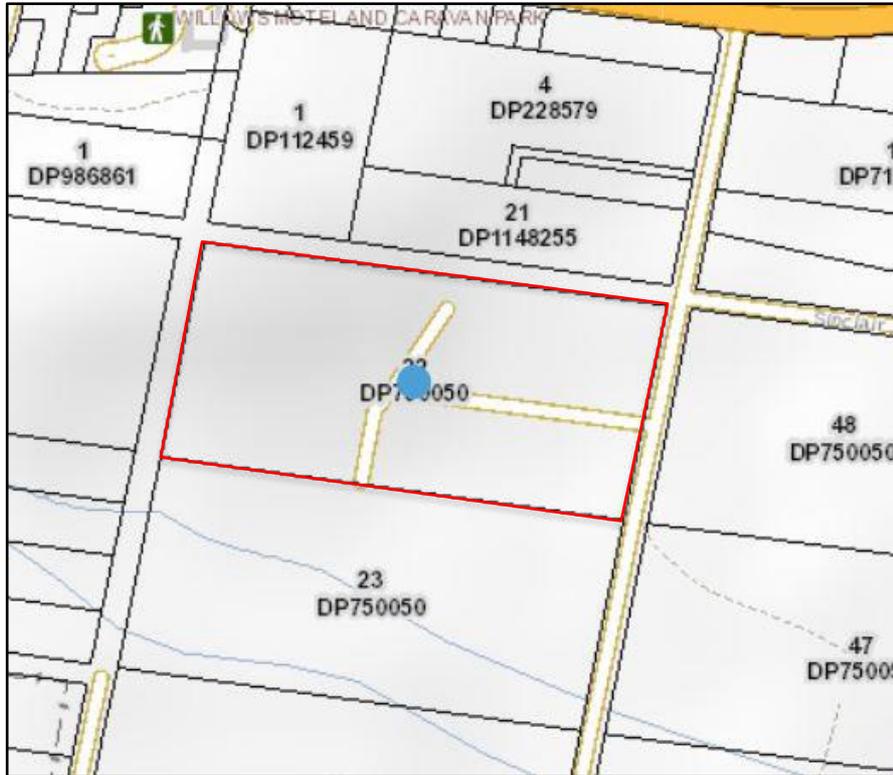
Minimum lot size of land	Area of clearing
Less than 1 hectare	0.25 hectare or more
Less than 40 hectares but not less than 1 hectare	0.5 hectare or more
Less than 1,000 hectares but not less than 40 hectares	1 hectare or more
1,000 hectares or more	2 hectares or more

Under the LEP, the minimum lot size for the subject land is 100ha. This equates to an area of 1ha or more that must be cleared to trigger the BOS. The proposed development will not trigger the BOS in this regard as approximately 0.12ha of disturbed native shrubland is expected to be impacted. Clearing of *Pinus radiata* is not included in this calculation as it is not a native species.

According to the Biodiversity Values Map, no biodiversity values will be impacted by the proposed development (**Figure 4**). The proposed development will not trigger the BOS in this regard.



# AEP



**Figure 4 - Biodiversity Values Mapping NSW Government (2018).**

The areas mapped as Biodiversity Values are shown in purple with the subject site outlined in red. The 5-part test is covered in **Section 10** of this report.



## 10.0 Key Species Considerations

Following all of the works outlined in previous Sections, the species identified for further consideration have been categorised into guilds. By considering these species and their lifecycle needs, many other species are also inadvertently considered as well in identifying key features. The analysis below considers key lifecycle features for each guild of species in more detail, and assists in informing the subsequent 5-part test assessment.

**Table 5 – Key Species Analysis**

<b>Guild / Species</b>	<b>Key Habitat Feature</b>	<b>Comment</b>
<b>Buttercup Doubletail</b>	Tableland Low Woodland	Recorded in forest, low open woodland with grassy understorey and secondary grassland on the higher parts of the Southern and Central Tablelands. Populations tend to contain few, scattered individuals; despite extensive surveys, a total of only about 200 plants from 20 populations are known (OEH, 2019).
<b>Little Eagle</b>	Foraging Resources	Foraging resources present on site.
	Nesting Habitat	Some suitable nesting habitat present on site, as well as in connected vegetation offsite.
	Connectivity & Patch Size	Vegetation on site and to the west of the site are not well connected to other treed areas.
<b>Gang-gang Cockatoo</b>	Foraging Resources	Foraging resources present on site.
	Nesting Habitat	Some suitable nesting habitat present on site, as well as in connected vegetation offsite.
	Connectivity & Patch Size	Vegetation on site and to the west of the site are not well connected to other treed areas.
<b>Woodland Birds</b> including Varied Sitella Regent Honeyeater Dusky Woodswallow	Foraging Resources	Foraging resources present on site.
	Nesting Habitat	Some suitable nesting habitat present on site, as well as in connected vegetation offsite.
	Connectivity & Patch Size	Vegetation on site and to the west of the site are not well connected to other treed areas.
<b>Scarlet Robin</b>	Foraging Resources	Foraging resources present on site.
	Nesting Habitat	Suitable nesting and roosting habitat present in connected vegetation off-site.
	Connectivity & Patch Size	Vegetation on site and to the west of the site are not well connected to other treed areas.
<b>Microbats</b> including Yellow-bellied Sheath-tail-bat, Eastern False Pipistrelle, and Eastern Bentwing-bat	Roosting & Maternity Habitat	Habitat is present for hollow dwelling species, but not cave dwelling.
	Foraging	Whilst microbat species have differing micro-habitat preferences for foraging habitat, they all seek insects in and around forested areas, and may also at times forage in proximity of developed areas.



## 11.0 5-Part Test Assessment

Section 7.3 of the BC Act lists five factors that must be taken into account in determining the significance of potential impacts of proposed activities on threatened species, populations, ecological communities and/or their habitats as listed within the BC Act.

The 5-part test is used to determine whether there is likely to be a significant impact, and thus whether the BOS is triggered.

For the purposes of the 5-part test assessment, the subject site is the area directly affected by the proposal. The study area covers the subject site and its immediate surrounds.

**(a) *in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction***

The proposed development will be situated on highly disturbed land. Direct impacts on a species are generally unlikely to occur.

### **Buttercup Doubletail:**

Not recorded in surveys (conducted outside recommended survey times. Only two records in 10km search. Populations tend to contain few, scattered individuals; despite extensive surveys, only about 200 plants in total, from 20 populations are known. Unlikely to be present on site due to grazing impacts and presence of competitive herbaceous species.

### **Gang-gang Cockatoo:**

A single record of this species is recorded from 2004 over 5km from the development site. It is considered very unlikely that any local population of these species is dependent on the resources within the subject site. Given the lack of records and small area of suitable foraging habitat to be removed, it is very unlikely that the development will have a significant impact upon this species.

### **Woodland Birds:**

Potential foraging and roosting habitat is available on the subject site. Varied Sitella was recorded approximately 2km from the development site in 2016. Dusky Woodswallow, on the other hand, has not been recorded within 5km of the subject site or within the area in the last four years. It is considered very unlikely that any local population of these species is dependent on the resources within the subject site. Regent Honeyeater could use the site as part of a larger range. The remnant native vegetation contains flower-bearing species that could provide seasonal foraging habitat, but is highly unlikely to be the species' only reliable food source. As such, it is considered unlikely that the development as proposed will significantly impact on the local population of any of these species.



**Scarlet Robin:**

This species has not been recorded within 5km of the subject site nor within the last five years. Only a single 2013 record exists over 7km to the northeast of the site. It is unlikely that this species is utilising the site.

**Microbats:**

For both cave-dwelling species, the subject site is foraging habitat only. There is potential foraging habitat for all microbat species, with the presence of a dam and trees. Native treed areas will not be significantly impacted by the development and the dam will remain in situ.

Although all *Pinus radiata* is proposed to be removed, given the low numbers of microbat records in the vicinity and the isolated nature of vegetation on site, it is very unlikely that the development will have an adverse effect on threatened species or ecological communities.

**(b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:***

- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***
- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction***

No EECs are present on site. Tableland Grassy Box-Gum Woodland, commensurate with EEC White Box Yellow Box Blakely's Red Gum Woodland, has been mapped offsite to the southwest. Retention of vegetation in the west of the subject land and mitigation of offsite impacts during the development phase will mean impacts on this EEC are unlikely.

**(c) *in relation to the habitat of a threatened species or ecological community:***

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and***

The proposed development will be mostly located on grassland at the edge of woodland vegetation, with some small encroachment (approximately 0.29ha total, including 0.12ha native vegetation) into the disturbed woodland edge. There is potential for an additional two trees near the batter in the north of the development to be impacted. This is unlikely to significantly impact upon any threatened species or ecological community. Other vegetation to be removed is non-native (*Pinus radiata*) and is unlikely to provide habitat for potential threatened species.



One hollow-bearing tree is proposed for removal. It is recommended that this hollow be salvaged where possible and be reinstalled in a suitable location, or be replaced with a nestbox in retained habitat if not possible.

- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity,**

Development is proposed to occur mostly on disturbed grassland and in the area currently dominated by *Pinus radiata* (approximately 0.31ha). Nearby woodland is already isolated from other areas of habitat and development is unlikely to increase fragmentation, particularly since any removal of vegetation from this community will occur at the already disturbed edge.

- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality**

As outlined above, the habitat present is not considered of significance for the long term survival of any threatened species or EEC in this locality.

- (d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)**

No area of outstanding biodiversity value is present.

- (e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.**

The development has potential to contribute to the following KTPs:

- Anthropogenic climate change

The development as proposed will contribute in a small way to the processes causing Anthropogenic Climate Change via the removal of vegetation which acts as a carbon sink. It is not considered the contribution to this KTP in this instance is of a notable magnitude.

- Infection of frogs by amphibian chytrid causing the disease chytridiomycosis

There is some potential for chytrid fungus to be introduced to the site during development works.

- Infection of native plants by *Phytophthora* and Myrtle Rust



There is some potential for the above plant diseases to be introduced on site during development works.

- Invasion of native plant communities by exotic perennial grasses

Multiple exotic grasses are already present on the subject site. Development has some potential to preference growth of these exotic grasses over native species.



## 12.0 EPBC Act Assessment

A search was conducted on 10 January 2019 of Matters of National Environmental Significance (MNES) as relevant to the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act). The following MNES are considered in this assessment.

### **World Heritage Properties:**

The site is not a World Heritage area, and is not in close proximity to any such area.

### **National Heritage Places:**

The site is not a National Heritage Place, and does not contain any matters of national heritage.

### **Wetlands of International Significance (declared Ramsar wetlands):**

The site is not proximate to any Wetlands of International Significance.

### **Great Barrier Reef Marine Park:**

The site is not part of, or within close proximity to, the Great Barrier Reef Marine Park.

### **Commonwealth Marine Areas:**

The site is not part of, or within close proximity to, any Commonwealth Marine Area.

### **Threatened Ecological Communities:**

No Threatened Ecological Communities listed within the EPBC Act have been recorded on site during fieldwork.

### **Threatened Species:**

Regent Honeyeater has been recorded within 10km of the subject site. The proposed development will only directly impact grassland, and suitable habitat is not present in the study area. It is unlikely that this species will be impacted by the development.

### **Migratory Species:**

A number of EPBC listed migratory species have some potential to visit the site on an irregular basis. However, it is not considered that the development of this land as proposed is likely to significantly affect the availability of potential habitat for such mobile species, or disrupt migratory patterns.

### **EPBC Act Assessment Conclusion:**

Consideration of the EPBC Act revealed that impacts on Matters of National Environmental Significance are considered unlikely to occur.



## 13.0 Recommendations

The following general recommendations are made for consideration to minimise localised impacts on biodiversity in general as a result of the development of the site:

- Vegetation to be retained should be identified and fenced off prior to any development works taking place in adjacent areas. When protecting trees, preference should be given to large healthy trees with habitat features including hollows;
- If hollow-bearing trees cannot be retained, hollows should be salvaged where possible, or replaced in a 1:1 ratio with nestboxes in retained vegetation;
- Vegetation to be retained should be considered in landscape management to maintain the rural character of the area, particularly in such a way as enhances its amenity and biodiversity values;
- Clearing of any vegetation on site should be undertaken from the roadside towards vegetation retained offsite, to ensure impacts on native fauna are minimised as far as practical. Where trees are removed, preference for retention should be given to habitat trees;
- Site hygiene practices should be implemented during the development phase to avoid the spread of pathogens, including chytrid, *Phytophthora* and myrtle rust, as well as spread of weed seed;
- Best practice erosion and sedimentation controls should be put in place to limit offsite movement of materials into the surrounding areas.



## 14.0 References

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## **Appendix A – Flora Species List**



# AEP

## FLORA SPECIES LIST

The following list includes all species of vascular plants observed on site during fieldwork. It should be noted that such a list cannot be considered comprehensive, but rather indicative of the flora present on the site. It can take many years of flora surveys to record all of the plant species occurring within any area, especially plant species that are only apparent in some seasons such as Orchids.

A number of species cannot always be accurately identified during a brief survey, generally due to a lack of suitable flowering and/or fruiting material. Any such species are identified as accurately as possible, and are indicated in the list as thus:

- specimens that could only be identified to genus level are indicated by the generic name followed by the abbreviation “sp.”, indicating an unidentified species of that genus;
- specimens for which identification of the genus was uncertain are indicated by a question mark (“?”) placed in front of the generic, which is followed by the abbreviation “sp.” and;
- specimens that could be accurately identified to genus level, but could be identified to species level with only a degree of certainty are indicated by a (“?”) placed in front of the epithet.

Authorities for the scientific names are not provided in the list. These follow the references outlined below.

Harden, G. (ed) (2000). *Flora of New South Wales, Volume 1*. Revised edition. UNSW, Kensington, NSW.

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Names of families and higher taxa follow a modified Cronquist System (1981).

Introduced species are indicated by an asterisk “\*”.

Threatened species listed under the *Biodiversity Conservation Act 2016* (BC Act) or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are indicated in **bold**.



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Family Name	Scientific Name	Common Name
Asparagaceae	<i>Asparagus officinalis</i> *	Asparagus
Asteraceae	<i>Hypochaeris radicata</i> *	Flatweed
Asteraceae	<i>Lactuca sp.</i> *	Wild Lettuce
Asteraceae	<i>Onopordum acanthium</i> subsp. <i>acanthium</i> *	Scotch Thistle
Asteraceae	<i>Taraxacum officinale</i> *	Dandelion
Boraginaceae	<i>Echium plantagineum</i> *	Paterson's Curse
Chenopodiaceae	<i>Einadia nutans</i>	Climbing Saltbush
Clusiaceae	<i>Hypericum perforatum</i> *	St Johns Wort
Fabaceae	<i>Hardenbergia violacea</i>	False Sarsaparilla
Fabaceae	<i>Acacia decurrens</i>	Black Wattle
Gentianaceae	<i>Centaurium tenuiflorum</i> *	Branched Centaury, Slender centaury
Juncaceae	<i>Juncus continuous</i>	-
Lomandraceae	<i>Lomandra confertifolia</i>	Mat-rush
Loranthaceae	<i>Muellerina eucalyptoides</i>	Mistletoe
Malaceae	<i>Crataegus monogyna</i> *	Hawthorn
Malaceae	<i>Pyracantha sp.</i> *	
Malvaceae	<i>Modiola caroliniana</i> *	Red-flowered Mallow
Myrtaceae	<i>Eucalyptus bridgesiana</i>	Apple Box
Myrtaceae	<i>Eucalyptus cinerea</i>	Argyle Apple
Myrtaceae	<i>Eucalyptus macrorhyncha</i>	Red Stringybark
Myrtaceae	<i>Eucalyptus mannifera</i>	Brittle Gum
Myrtaceae	<i>Eucalyptus rossii</i>	Inland Scribbly Gum
Myrtaceae	<i>Eucalyptus sieberi</i>	Silvertop Ash
Myrtaceae	<i>Leptospermum polygalifolium</i>	Tantoon
Oxalidaceae	<i>Oxalis perrenans</i>	Yellow-flowered Wood Sorrel
Pinaceae	<i>Pinus radiata</i> *	Radiata or Monterey Pine
Plantaginaceae	<i>Plantago varia</i>	-
Poaceae	<i>Agrostis bettyae</i>	
Poaceae	<i>Avena barbata</i> *	Bearded Oats
Poaceae	<i>Cynodon dactylon</i>	Common Couch
Poaceae	<i>Eragrostis parviflora</i>	Weeping Lovegrass
Poaceae	<i>Hemarthria uncinata</i>	Matgrass
Poaceae	<i>Hordeum leporineum</i> *	Barley Grass
Poaceae	<i>Paspalum dilatatum</i> *	Paspalum
Poaceae	<i>Pennisetum clandestinum</i> *	Kikuyu
Poaceae	<i>Poa sieberiana</i>	Tussock Grass



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Family Name	Scientific Name	Common Name
Poaceae	<i>Setaria pumila</i> *	Pale Pigeon Grass
Polygonaceae	<i>Acetosella vulgaris</i> *	Sheep Sorrel
Polygonaceae	<i>Rumex brownii</i>	Swamp Dock
Pteridaceae	<i>Cheilanthes sieberi</i>	Rock Fern
Rosaceae	<i>Prunus sp.*</i> (Cultivar)	-
Rosaceae	<i>Rosa sp. (cultivar)*</i>	Rose
Rosaceae	<i>Rubus fruticosus sp. agg.*</i>	Blackberry complex
Solanaceae	<i>Lycium ferocissimum</i> *	African Boxthorn
Solanaceae	<i>Solanum nigrum</i> *	Black Nightshade



## **Appendix B – Expected Fauna Species List**



## EXPECTED FAUNA SPECIES LIST

The following list includes fauna species that could be reasonably expected to occur on the study site at some point, given site attributes and location.

“•”-species observed or indicated by scats, tracks etc. on, over or near the site during recent surveys by AEP (2018).

\* - Introduced species

? - Unconfirmed record, anecdotal records etc.

A - NSW Atlas of Wildlife record of threatened species for the site.

Threatened species listed under the *Biodiversity Conservation Act 2016* (BC Act) or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are indicated in **bold font**.



Family Name	Scientific Name	Common Name
<b>Amphibians</b>		
Myobatrachidae	<i>Crinia signifera</i>	Common Eastern Froglet
Myobatrachidae	<i>Limnodynastes dumerilii</i>	Eastern Banjo Frog
Myobatrachidae	• <i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog
Myobatrachidae	<i>Uperoleia laevigata</i>	Smooth Toadlet
Hylidae	<i>Litoria dentata</i>	Bleating Tree Frog
Hylidae	<i>Litoria fallax</i>	Eastern Dwarf Tree Frog
Hylidae	<i>Litoria peronii</i>	Peron's Tree Frog
Hylidae	<i>Litoria phyllochroa</i>	Leaf-green Tree Frog
Hylidae	<i>Litoria tyleri</i>	Tyler's Tree Frog
<b>Reptiles</b>		
Chelidae	<i>Chelodina longicollis</i>	Eastern Snake-necked Turtle
Gekkonidae	<i>Diplodactylus vittatus</i>	Wood Gecko
Scincidae	• <i>Lampropholis delicata</i>	Dark-flecked Garden Sunskink
Agamidae	<i>Amphibolurus muricatus</i>	Jacky Lizard
Typhlopidae	<i>Anilius proximus</i>	Proximus Blind Snake
Elapidae	<i>Parasuta dwyeri</i>	Dwyer's Snake
Elapidae	<i>Pseudonaja textilis</i>	Eastern Brown Snake
<b>Birds</b>		
Phasianidae	<i>Coturnix pectoralis</i>	Stubble Quail
Anatidae	<i>Anas castanea</i>	Chestnut Teal
Anatidae	<i>Anas gracilis</i>	Grey Teal
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck
Anatidae	<i>Aythya australis</i>	Hardhead
Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck
Anatidae	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck
Anatidae	<i>Tadorna tadornoides</i>	Australian Shelduck
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe
Columbidae	<i>Columba livia</i> *	Rock Dove
Columbidae	• <i>Ocyphaps lophotes</i>	Crested Pigeon
Columbidae	<i>Streptopelia chinensis</i> *	Spotted Turtle-Dove
Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian Darter
Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant



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Family Name	Scientific Name	Common Name
Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied Cormorant
Ardeidae	<i>Ardea intermedia</i>	Intermediate Egret
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron
Threskiornithidae	<i>Threskiornis molucca</i>	Australian White Ibis
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis
Accipitridae	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk
Accipitridae	<i>Accipiter fasciatus</i>	Brown Goshawk
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle
Accipitridae	<i>Circus approximans</i>	Swamp Harrier
Accipitridae	<i>Elanus axillaris</i>	Black-shouldered Kite
<b>Accipitridae</b>	<b><i>Hieraaetus morphnoides</i></b>	<b>Little Eagle</b>
Falconidae	<i>Falco berigora</i>	Brown Falcon
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel
Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon
Rallidae	<i>Fulica atra</i>	Eurasian Coot
Rallidae	<i>Gallinula tenebrosa</i>	Dusky Moorhen
Rallidae	<i>Porphyrio porphyrio</i>	Purple Swamphen
Rallidae	<i>Porzana fluminea</i>	Australian Spotted Crake
Charadriidae	<i>Euseyornis melanops</i>	Black-fronted Dotterel
Charadriidae	• <i>Vanellus miles</i>	Masked Lapwing
Cacatuidae	• <i>Cacatua galerita</i>	Sulphur-crested Cockatoo
Cacatuidae	<i>Cacatua sanguinea</i>	Little Corella
Cacatuidae	<i>Cacatua tenuirostris</i>	Long-billed Corella
<b>Cacatuidae</b>	<b><i>Callocephalon fimbriatum</i></b>	<b>Gang-gang Cockatoo</b>
Cacatuidae	• <i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo
Cacatuidae	<i>Eolophus roseicapillus</i>	Galah
Psittacidae	• <i>Platycercus elegans</i>	Crimson Rosella
Psittacidae	<i>Platycercus eximius</i>	Eastern Rosella
Psittacidae	<i>Psephotus haematonotus</i>	Red-rumped Parrot
Psittacidae	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet
Cuculidae	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo
Cuculidae	<i>Cacomantis variolosus</i>	Brush Cuckoo
Cuculidae	<i>Chalcites basalus</i>	Horsfield's Bronze-Cuckoo
Strigidae	<i>Ninox novaeseelandiae</i>	Southern Boobook
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra



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Family Name	Scientific Name	Common Name
Alcedinidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher
Climacteridae	<i>Cormobates leucophaea</i>	White-throated Treecreeper
Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren
Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill
Acanthizidae	<i>Acanthiza lineata</i>	Striated Thornbill
Acanthizidae	<i>Acanthiza nana</i>	Yellow Thornbill
Acanthizidae	<i>Acanthiza pusilla</i>	Brown Thornbill
Acanthizidae	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill
Acanthizidae	<i>Gerygone olivacea</i>	White-throated Gerygone
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren
Acanthizidae	• <i>Smicronis brevirostris</i>	Weebill
Pardalotidae	<i>Pardalotus punctatus</i>	Spotted Pardalote
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote
Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird
Meliphagidae	<i>Anthochaera chrysoptera</i>	Little Wattlebird
Meliphagidae	<i>Caligavis chrysops</i>	Yellow-faced Honeyeater
Meliphagidae	• <i>Manorina melanocephala</i>	Noisy Miner
Meliphagidae	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater
Meliphagidae	<i>Nesoptilotis leucotis</i>	White-eared Honeyeater
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird
Meliphagidae	<i>Ptilotula fuscus</i>	Fuscous Honeyeater
Meliphagidae	<i>Ptilotula ornatus</i>	Yellow-plumed Honeyeater
Meliphagidae	<i>Ptilotula penicillatus</i>	White-plumed Honeyeater
Psophodidae	<i>Cinclosoma punctatum</i>	Spotted Quail-thrush
<b>Neosittidae</b>	<b><i>Daphoenositta chrysoptera</i></b>	<b>Varied Sittella</b>
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike
Campephagidae	<i>Coracina tenuirostris</i>	Cicadabird
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole
<b>Artamidae</b>	<b><i>Artamus cyanopterus cyanopterus</i></b>	<b>Dusky Woodswallow</b>
Artamidae	• <i>Cracticus tibicen</i>	Australian Magpie
Artamidae	• <i>Cracticus torquatus</i>	Grey Butcherbird
Artamidae	• <i>Strepera graculina</i>	Pied Currawong



Family Name		Scientific Name	Common Name
Rhipiduridae		<i>Rhipidura albiscapa</i>	Grey Fantail
Rhipiduridae	•	<i>Rhipidura leucophrys</i>	Willie Wagtail
Corvidae		<i>Corvus coronoides</i>	Australian Raven
Corvidae	•	<i>Corvus mellori</i>	Little Raven
Monarchidae	•	<i>Grallina cyanoleuca</i>	Magpie-lark
Monarchidae		<i>Myiagra rubecula</i>	Leaden Flycatcher
Corcoracidae		<i>Corcorax melanorhamphos</i>	White-winged Chough
Petroicidae		<i>Eopsaltria australis</i>	Eastern Yellow Robin
<b>Petroicidae</b>		<b><i>Petroica boodang</i></b>	<b>Scarlet Robin</b>
Megaluridae		<i>Cincloramphus mathewsi</i>	Rufous Songlark
Timaliidae	•	<i>Zosterops lateralis</i>	Silvereye
Hirundinidae		<i>Hirundo neoxena</i>	Welcome Swallow
Turdidae		<i>Turdus merula*</i>	Eurasian Blackbird
Sturnidae	•	<i>Sturnus tristis*</i>	Common Myna
Sturnidae		<i>Sturnus vulgaris*</i>	Common Starling
Nectariniidae		<i>Dicaeum hirundinaceum</i>	Mistletoebird
Estrildidae		<i>Neochmia temporalis</i>	Red-browed Finch
Estrildidae		<i>Taeniopygia bichenovii</i>	Double-barred Finch
<b>Mammals</b>			
Ornithorhynchidae		<i>Ornithorhynchus anatinus</i>	Platypus
Tachyglossidae		<i>Tachyglossus aculeatus</i>	Short-beaked Echidna
Vombatidae		<i>Vombatus ursinus</i>	Common Wombat
Pseudocheiridae		<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum
Phalangeridae		<i>Trichosurus vulpecula</i>	Common Brushtail Possum
Macropodidae	•	<i>Macropus giganteus</i>	Eastern Grey Kangaroo
Macropodidae		<i>Macropus robustus</i>	Common Wallaroo
Macropodidae		<i>Macropus rufogriseus</i>	Red-necked Wallaby
Macropodidae		<i>Wallabia bicolor</i>	Swamp Wallaby
<b>Emballonuridae</b>		<b><i>Saccolaimus flaviventris</i></b>	<b>Yellow-bellied Sheath-tail-bat</b>
Molossidae		<i>Austronomus australis</i>	White-striped Freetail-bat
Molossidae		<i>Mormopterus ridei</i>	Eastern Free-tailed Bat
Vespertilionidae		<i>Chalinolobus gouldii</i>	Gould's Wattled Bat
Vespertilionidae		<i>Chalinolobus morio</i>	Chocolate Wattled Bat
<b>Vespertilionidae</b>		<b><i>Falsistrellus tasmaniensis</i></b>	<b>Eastern False Pipistrelle</b>
<b>Vespertilionidae</b>		<b><i>Miniopterus schreibersii oceanensis</i></b>	<b>Eastern Bentwing-bat</b>
Vespertilionidae		<i>Vespadelus darlingtoni</i>	Large Forest Bat



# AEP

Family Name		Scientific Name	Common Name
Vespertilionidae		<i>Vespadelus regulus</i>	Southern Forest Bat
Vespertilionidae		<i>Vespadelus vulturnus</i>	Little Forest Bat
Muridae		<i>Rattus rattus</i> *	Black Rat
Canidae		<i>Canis lupus familiaris</i> *	Dog
Canidae		<i>Vulpes vulpes</i> *	Fox
Leporidae		<i>Lepus capensis</i> *	Brown Hare
Leporidae	•	<i>Oryctolagus cuniculus</i> *	Rabbit
Equidae	•	<i>Equus caballus</i> *	Horse
Suidae		<i>Sus scrofa</i> *	Pig
Bovidae		<i>Bos taurus</i> *	European cattle
Bovidae		<i>Ovis aries</i> *	Sheep (feral)



## **Appendix C – Habitat Tree Data**



## HABITAT TREE CENSUS AND PROPOSAL IMPACTS

A total of 3 hollow-bearing trees have been identified within the study area and none of these occur within the area of the proposed development.

ID	Species	DBH (mm)	Hollows	Comments
STAG1		500		
HBT1	<i>Eucalyptus rossii</i>	2000	1 X M	Split in end of branch
HBT2	<i>E. rossii</i>	700 + 1000	2 X M	Two trunks
STAG2		1500		
STAG3		300		
STAG4		400		
STAG5		600		
STAG6		1000		
BEES	<i>E. macrorhyncha</i>	1500	1 X S	Hollow currently occupied by European Honeybees

### Table Key

DBH - Diameter at breast height

S - Small (<8cm)

M - Medium (8-15cm)

L - Large (>15cm)



## **Appendix D – Site Photographs**



# AEP



**View of development site from Common Street entrance**



**Dam in south of development site**



## **Appendix E – Author CVs**

# FRANCES O'BRIEN

## Curriculum Vitae

*Frances is an Ecologist with AEP. For the past 10 years, she has been involved in conservation land management, bush regeneration, wildlife rescue and rehabilitation, environmental sustainability, and public interest environmental law.*

### **Personal Details**

Full Name: Frances O'Brien  
Email: [frances@andersonep.com.au](mailto:frances@andersonep.com.au)  
Phone Mobile: 0420 898 606

### **Qualifications**

- Master of Environmental Law, University of Sydney, New South Wales (2017)
- Graduate Diploma of Legal Practice, Australian National University, Australian Capital Territory (2016)
- Bachelor of Environment (Climate Science) with Bachelor of Laws, Macquarie University, NSW (2013)

### **Relevant Further Education & Training**

- NSW WHS General Construction Induction (White Card)
- NSW Class C Driver's Licence
- Bush Regeneration Training
- Wildlife Rescue and Care (Hunter Wildlife Rescue) with additional Snake training
- Wildlife Rescue and Care (Sydney Metropolitan Wildlife Services) with additional Possum and Echidna training
- Advanced Plant Identification (University of New South Wales)
- Senior First Aid Certificate

### **Fields of Special Competence**

- Land conservation management
- Environmental law and policy
- Climate impacts
- Site rehabilitation
- Botanical surveys

### **Professional Affiliations / Memberships (past / present)**

- Hunter Intrepid Landcare (Group Facilitator)
- Hunter Wildlife Rescue
- Wahroonga Waterways Landcare (Group Coordinator for 3 years)
- Sydney Metropolitan Wildlife Services
- Lane Cove National Park Bushcare

- Ku-ring-gai Municipal Council Bushcare
- Young Lawyers NSW

### **Relevant Employment History**

<b>2018 – present</b>	<b>Ecologist</b> Anderson Environment & Planning, Newcastle
<b>2014 – 2017</b>	<b>Environmental Officer</b> Seventh-day Adventist Aged Care (Greater Sydney) Ltd, Sydney
<b>2014</b>	<b>Environmental Journalist</b> <i>The Australian Bulletin</i> (online), Sydney
<b>2012 – 2013</b>	<b>Indigenous Tutoring Assistance Scheme Environmental Tutor</b> Warawara, Department of Indigenous Studies, Macquarie University, Sydney
<b>2012 – 2013</b>	<b>Research Assistant</b> Centre for International and Environmental Law, Macquarie University, Sydney
<b>2012</b>	<b>Scientist</b> Forestry Division, Department of Agriculture, Fisheries and Forestry, Canberra
<b>2011</b>	<b>Scientist</b> Climate Impacts, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra

# CRAIG ANDERSON

## Curriculum Vitae

*An environmental professional with over 20 years experience providing high level ecological services, advice, strategic direction and management for sectors such as land development, infrastructure, conservation, government, legal, mining & quarrying.*

### Personal Details

Full Name: Craig John Anderson  
Date of Birth: 5 November 1971  
Postal Address: PO Box 210, ADAMSTOWN NSW 2289  
Email: craig@andersonep.com.au  
Phone Mobile: 0418 681 581

### Qualifications

- Bachelor of Applied Science (Environmental Assessment & Management) University of Newcastle, New South Wales (1994).
- Completing a Graduate Diploma in Archaeological Heritage through University of New England (one subject to complete).

### Licencing

- NSW Scientific Investigation Licence SL101313
- NSW Animal Research Authority
- NSW Accredited Biobanking Assessor No. 150
- NSW Biodiversity Accredited Assessor BAAS: 17002

### Further Education & Training (select summary)

- Biobank and Biocertification Assessors Training Course / BAAS Fast-track Accreditation Course
- Animal Ethics Training (University of Newcastle / NSW DPI)
- RFS / PIA NSW Consulting Planners Bushfire Training
- Bush Regeneration Training
- OH&S Induction Training / Green Card
- NSW Driver's Licence: Car (Class "C"). Experienced 4WD operator.
- Occupational Health & Safety Training, including legal compliance requirements of Officers (Standard 11 & S1,S2,S3).
- + various other vocational environmental and computer based training sessions.

### **Fields of Special Competence**

- Production and peer review of detailed environmental impact assessment documentation. Author and / or Manager of hundreds of ecological / environmental / bushfire / historical heritage / archaeological heritage / strategic & statutory planning documents over nearly 25 years of environmental work
- Biobanking & Biodiversity Offset Commissions – initial scoping and feasibility, BAM impact assessments and BDAR reporting, biobank calculations, Stewardship site creation
- Detailed ecological field survey, covering all aspects of terrestrial and aquatic flora and fauna
- Expert witness legal representation
- Ecological Management Planning, ranging from individual species to full ecosystem management
- Project Management and delivery of complex projects, including projects worth more than \$100M
- Project Management (including areas outside environmental sphere)
- Environmental Due Diligence processes for both asset procurement and divestment
- Management and co-ordination of teams producing EIA documentation
- Identification of strategic approval pathways and key project risk evaluation and management
- Extensive experience in conflict resolution, impact mediation and outcome negotiation on large scale and contentious projects
- Environmental peer review and ecological compliance auditing
- Project advocacy and representation with all levels of stakeholders
- Detailed knowledge of land and infrastructure development processes

### **Professional Affiliations / Memberships (past / present)**

- Hunter Bird Observers Club (HBOC). Current member of Records Appraisal Committee, previous elected Committee Member.
- Ecological Consultants Association of NSW (ECA). Current member. Involved in the initial formulation of the Association. Served two terms as an elected Councillor.
- Society for Growing Australian Plants (SGAP).
- Hunter Coal Environment Group (HCEG).
- NSW Minerals Council (NSWMC), including Executive Committee Meetings representation.
- Queensland Resources Council (QRC).
- Bird Observers Club of Australia (BOCA).
- Urban Development Institute of Australia (UDIA).
- Planning Institute of Australia (PIA).
- Australasian Bat Society (ABS).
- Frog and Tadpole Study Group (FATS).

- Society of Frogs and Reptiles (SOFAR).
- Hunter Heritage Network (HHN).

### **Employment History**

<b>2013-present</b>	<b>Director / Principal Consultant</b> Anderson Environment & Planning, Environment & Planning Consultants, Newcastle
<b>2012-present</b>	<b>Director</b> Habitat Indoor / Outdoor Living, Furniture, Homewares & Design, Newcastle
<b>2010-2012</b>	<b>General Manager Sustainable Development</b> Cockatoo Coal Ltd, Coal Mining Company, Newcastle / Sydney / Brisbane
<b>2009 – 2010</b>	<b>Independent Environmental Expert</b> Donaldson Conservation Trust
<b>2010</b>	<b>Principal - Environment</b> RPS, Development Consultants, Newcastle
<b>2006 – 2009</b>	<b>Manager Environment Group</b> RPS HSO, Development Consultants, Newcastle (Company sold to UK listed Company RPS in Nov 2006)
<b>2001 – 2006</b>	<b>Manager Environment Group / Director</b> Harper Somers O’Sullivan, Development Consultants, Newcastle. (Company Director & shareholder as of July 2003)
<b>2000 – 2001</b>	<b>Senior Ecologist &amp; NSW Projects Manager</b> Wildthing Environmental Consultants, Salt Ash.
<b>1996 – 1999</b>	<b>Ecologist</b> Wildthing Environmental Consultants, Salt Ash.
<b>1995 – 1996</b>	<b>Ecologist / Environmental Officer</b> Pulver Cooper & Blackley, Engineers & Surveyors, Newcastle.
<b>1995</b>	<b>Environmental Officer / Cadastral Survey Assistant</b> Kel Nagle Cooper & Associates, Golf Course Design & Construction Newcastle.