Biodiversity Assessment Report

27 Lang Drive, Bolwarra Heights

Prepared for

SNL Building Constructions Pty Ltd

V1 / August 2023

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EXECUTIVE SUMMARY

MJD Environmental has been engaged by SNL Building Constructions Pty Ltd to prepare a Biodiversity Assessment Report (BAR) for the proposed subdivision at Lot 1 DP 1156433 27 Lang Drive, Bolwarra Heights NSW, hereafter referred to as the 'study area' (Refer to **Figure 1**).

The objective of the assessment was to examine the likelihood of the proposal having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Biodiversity Conservation Act 2016* (BC Act). This assessment recognises the relevant requirements of the *EP&A Act 1979* as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*. Preliminary assessment was also made with regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

At of the time of the assessment, 30th of May 2023, the study area was not mapped on the *Biodiversity Values Map* (BVM), which is one of the triggers for determining whether the Biodiversity Offsets Scheme (BOS) applies to a proposed development. The study area has a minimum lot size (MLS) of 500 m^2 and is zoned as R5 Large Lot Residential, with the proposed development anticipated to impact 0.03 ha of native vegetation, and up to 8.02 ha of planted and disturbed vegetation. As the total area of cleared native vegetation is expected to be less than 0.25 ha and impacts to any threatened entities are not considered significant, this proposal does not require assessment under the Biodiversity Assessment Method (BAM) and the BOS offset scheme does not apply.

Prior to the proposal design being finalised, BAM field assessments were carried out to determine the overall potential impacts on native vegetation area, and as such BAM plot data has been used to inform this report.

Field surveys carried out as part of the biodiversity assessment identified one Plant Community Type (PCT) as occurring within the subject land:

- *PCT 3433 – Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest*

It was determined that the example of this PCT within the study area is commensurate with associated Threatened Ecological Communities (TEC): BC Act listed Endangered (E) *Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions.*

Flora

No threatened flora species were detected during field surveys.

Furthermore, no flora species were deemed likely to occur within the study area based on a desktop assessment.

Fauna

Pomatostomus temporalis (Grey-crowned Babbler – BC Act listed Vulnerable), was detected during the field surveys. In addition to this species, there is potential for the following 11 species to utilise the study area as the vegetation present broadly represents suitable foraging and/or breeding habitat:

- *Daphoenositta chrysoptera* – Varied Sittella
- *Glossopsitta pusilla* – Little Lorikeet
- *Haliaeetus leucogaster* – White-bellied Sea-Eagle
- *Lathamus discolor* – Swift Parrot
- *Micronomus norfolkensis* - Eastern Coastal Free-tailed Bat
- *Myotis macropus* - Southern Myotis
- *Ninox connivens* – Barking Owl
- *Ninox strenua* – Powerful Owl
- *Pteropus poliocephalus* – Grey-headed Flying-fox

- *Saccolaimus flaviventris* - Yellow-bellied Sheathtail-bat
- *Tyto novaehollandiae* – Masked Owl

For each of the 12 BC Act listed threatened species, a Test of Significance was conducted, as per Section 7.3 of the *BC Act 2016* (see **Appendix 6** for full details). These assessments concluded that while the removal of native vegetation on study area totalling 0.03 ha contributes marginally to habitat loss, the impacts are unlikely to interfere with the recovery of any of the 12 listed threatened species at a regional scale.

Other legislative considerations include assessments under the State Environment Planning Policy (SEPP) (Biodiversity & Conservation) (2021), which included formal targeted surveys of *Phascolarctos cinereus,* which was not observed within the study area.

Additionally, *Lathamus discolor, Hirundapus caudacutus,* and *Pteropus poliocephalus* are also listed under the EPBC Act and were determined to have a low likelihood of occurring on the study area based on habitat attributes and distribution. EPBC Act guidelines for significant impact were applied to these species and it was determined that the proposal will not have a significant impact on any of these species. Therefore, a referral of the project to the Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW) for these matters is not required.

Minimising impacts to the biodiversity values within the study area has been considered throughout the planning process. Although the development footprint encompasses most of the study area, this site was selected due to its current land use as it primarily encompasses highly modified exotic pasture, which contains low biodiversity value resulting from the heavy management consistent with past land use history. Moreover, the proposal design has been amended to minimise the potential impacts on the biodiversity values that have been assessed within the study area. Such adjustments include adjusting the front setbacks of each subdivided lot to 15 m, as well as, retaining the majority of the mature hollow bearing trees associated with the remnant woodland vegetation (VZ 1), with only a single habitat tree is being removed. Additionally, areas associated with the low-lying wet area are to be avoided and restored as per **Appendix 9**.

In conclusion, the assessments described in this BAR have determined that the proposal was unlikely to have a significant impact on the threatened entities assessed. The analysis of biodiversity impact is strictly limited to the boundaries of the development footprint mapped and described herein as the subject land, verifiable by the attached data package. Any change to the scope of work may require re-assessment.

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GLOSSARY OF TERMS AND ABBREVIATIONS

Term/ Abbreviation	Meaning
BAM	Biodiversity Assessment Method
BC Act	Biodiversity Conservation Act 2016
BOS	Biodiversity Offset Scheme
Council	Maitland City Council
DCCEEW	Federal Department of Climate Change, Energy, the Environment and Water
DoEE	Commonwealth Department of the Environment and Energy
DPIE	NSW Department of Planning, Industry and Environment
DPI Water	NSW Department of Primary Industries – Water
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ha	hectare
LGA	Local Government Area
LMCC	Maitland City Council
OEH	NSW Office of Environment and Heritage [*former*]
VMP	Vegetation Management Plan

1 Introduction

MJD Environmental has been engaged by SNL Building Constructions Pty Ltd to prepare a Biodiversity Assessment Report (BAR) to accompany a Development Application (DA) to be submitted to Maitland City Council (MCC) for the proposed subdivision of Lot 1 DP 1156433 27 Lang Drive, Bolwarra Heights NSW, hereafter referred to as the 'study area'.

1.1 Description of Proposal

The intention of the proposal involves the subdivision of the 8.89 ha lot into a 14-lot residential subdivision for the purpose of sale. The proposal will include the construction of a through road connecting Hilldale Drive to Lang Drive and it is expected that a condition of consent for this DA will include the application of an appropriate vegetation management plan (VMP) that will revegetate and restore the low-lying wet area that bisects the western section of the study area. In **Section 1.1.1** below**,** a brief history of the planning process associated with the study area is outlined, with the current proposal design included in **Appendix 1.**

1.1.1 Proposal background

A development consent for the subdivision of the northwestern section of the study area was issued by Maitland City Council (MCC) in 1993 under DA 93-439, providing consent for the creation of four rural residential lots. On 3rd of August 2006, a Section 93 approval was granted, which amended this proposal resulting in minor alterations to the size and shape of the lots.

A second development application (DA 06-2652) was granted by MCC on the 15th of December 2006, providing consent for the creation of an additional 7 rural residential lots which could be accessed via the approved road under DA 93-439. However, DA 06-2652 was not acted upon and subsequently the consent lapsed on the 15th of December 2011.

An additional proposal was lodged with MCC for a two-lot subdivision (Application Ref: PAN-163523), with Proposed Lot 1 containing all existing improvements such as dwellings, sheds etc and Proposed Lot 2 (currently vacant land) which contained land subject to DA 93-439 and land of the lapsed consent DA 06-2652.

1.2 Aims & Scope

The assessment aims to examine the likelihood of the proposed subdivision having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Biodiversity Conservation Act 2016* (BC Act). This assessment recognises the relevant requirements of the EP&A Act 1979 as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*. Preliminary assessment was also undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The scope of this flora and fauna assessment is to:

- Determine the appropriate assessment pathway under the NSW BC Act;
- Identify vascular plant species occurring within the study area, including any threatened species listed under the BC Act and/or EPBC Act;
- Identify and map the extent of vegetation communities within the study area, including any Threatened Ecological Communities (TEC) listed under the BC Act or EPBC Act;
- Identify any fauna species including threatened and migratory species, populations or their habitats, occurring within the study area and are known or likely to occur within 10 km of the study area (locality);
- Assess the potential of the proposed activity to have a significant impact on any threatened species, populations 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 survey work within the study area, consideration has been afforded to habitats within the study area in order to appreciate the broader environmental context. This includes assessment of potential direct and indirect impacts.

1.3 Site Particulars

Locality	The development proposal is located in Bolwarra Heights, NSW
Land Title	Lot 1 DP 1156433
LGA	Maitland City Council (MCC)
Area	Study Area (Lot) – 8.89 ha Subject Land (Impact Area) – 8.05 ha
Zoning	The study area is currently zoned R5 – Large Lot Residential (NSW Planning & Environment 2020).
Biodiversity Values Mapping (BVM)	The study area is not mapped on the BVM.
Minimum Lot Size	5000 m^2
Boundaries	The study area comprises of a single lot, situated within the centre of the suburb of Bolwarra Heights (Refer to **Figure 2**). The study area is zoned as R5 Large Lot Residential, with all adjoining lots to the north, south and west also represented by R5 zoning. Along the eastern boundary, across Lang Drive is RU1 Primary Production zoned land, whose vegetation consists of low-density paddock trees and an ephemeral creeklines which connects the study area to the wetland to the north during periods of inundation. The subject land encompasses the majority of the study area, with the proposed road connecting Hilldale Drive to Lang Drive representing the most significant impact (refer to **Figure 1**)

1.4 Qualifications & Licencing

This BAR was prepared by Nixon Jowett and Dr. Simone-Louise Yasui under the guidance of accredited BAM assessors Coral Pearce (BAAS#21024) and Matt Doherty (BAAS#17044).

The associated field assessment was carried out by Dr Simone-Louise Yasui, Alexander Jeffrey and Stephanie Sheehy, with map production conducted by Laidlaw Puha and Nixon Jowett of MJD Environmental.

Licencing

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101684 (Valid 31 March 2024).
- Animal Research Authority (Trim File No: 16/170(3)) issued by NSW Department of Primary Industries (Valid 8 February 2027).
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2024).

27 LANG DRIVE,
BOLWARRA HEIGHTS

FIGURE 1:
SITE LOCATION

Legend

- Subject Land
- Study Area
- Cadastral Boundary

Riparian Buffer

- 10 m
- 20 m
- 30 m

Watercourse

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream

N
W E
S

0 70 140 210 280

Metres

1:3500

MJD Environmental

Aerial: Nearmap (2023) | Data: MJD Environmental, GCA, NSW Spatial Services (2023) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 28/07/2023 | Version: 1 | Z:\22056 - 27 Lang Drive, Bolwarra Heights | This plan should not be relied upon for critical design dimension.

2 Biodiversity Assessment Pathway

The NSW Biodiversity reforms have delivered a new assessment pathway based on the understanding of the amount of clearing proposed, how the proposal will avoid and minimise impacts, and if required, provide a strategy to offset impacts in the form of biodiversity credits.

The following section provides guidance on the biodiversity assessment pathway selected for this project to reflect the amount of clearing associated with the proposal.

2.1 Assessment Methodology

The current biodiversity assessment pathway for proposed development activities requires determining the extent of native vegetation clearing with consideration of the minimum lot size (as outlined in the Local Environment Policy (LEP) for the local government area (LGA) and whether the proposal will have a significant impact on threatened species and/or threatened ecological communities.

To determine the biodiversity assessment pathway required for a proposed development activity, the Biodiversity Offset Scheme (BOS) threshold is used to determine whether the Biodiversity Assessment Method (BAM) is applied to assess the impacts of the proposal and calculate required biodiversity credits to ensure no net loss of biodiversity occurs in the locality.

The *Biodiversity Conservation Regulation 2017* outlines when clearing of native vegetation for a development exceeds the threshold, it will trigger entry into the BOS requiring assessment as per the BAM.

Thresholds for BOS entry is:

- Whether the amount of native vegetation being cleared exceeds a threshold area set out in section 7.2 (4); and/or
- Whether the impacts occur on an area mapped on the Biodiversity Values map published by the minister for the Environment.
- If impacts to any threatened entities are considered significant

In the cases where the extent of native vegetation clearing does not exceed the BOS entry threshold and the study area is not mapped on the Biodiversity Values Map, a Test of Significance (ToS) is required to be carried in accordance with Section 7.3 of the *Biodiversity Conservation Act 2016* (BC Act).

Using the Table in Clause 7.2 (4) of the *Biodiversity Conservation Regulation 2017*, The proposed development:

- Has a minimum lots size of 5000 m^2; and
- Native vegetation to be removed or modified covers an area of less than 0.25 ha.

The development proposal is below the 0.25 ha or more threshold of native vegetation clearing, and therefore does not trigger the BOS threshold.

The area which is subject to the proposed development is not mapped as an area of high biodiversity value on the NSW OEH Biodiversity Values Map (BVM).

Therefore, the BAM and BOS offset scheme does not apply to this proposal, and a Test of Significance Assessment was carried out in accordance with relevant requirements of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*

3 Methodology

Field surveys consisting of two days of floristic assessments and two nights of koala assessments were carried out within the study area on the 30th of May, and 17th – 19th of July 2023 by Dr Simone-Louise Yasui, Alexander Jeffrey, and Stephanie Sheehy. Prior to the proposal design being finalised, BAM field assessments were carried to determine the overall potential impacts on native vegetation area. As such, the field surveys were carried out in accordance with BAM 2020 with additional assessment methods to assist in gaining an overview of biodiversity values associated with the study area.

3.1 Desktop Assessment

A review of ecological information was undertaken to provide context and understanding of ecological values occurring on the site. Information reviewed included:

Online database searches involving a 10-km buffer around the site were undertaken from the:

- NSW BioNet Atlas (Accessed 24th July 2023); and
- EPBC Act Protected Matters Search (Accessed 09th June 2023).
- The searches provided a current list of potentially occurring threatened flora and fauna and migratory species under both the BC Act and EPBC Act.

3.2 Field Survey

Field surveys were undertaken on the 30th of May, and 17th – 19th of July 2023. The prevailing weather conditions during the survey are presented in a **Table 1** below and were retrieved from the closest weather station: Paterson (#061250).

Table 1 Prevailing Weather Conditions

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Wind (km/h)	RH (9am – 3pm%	Sunrise-Sunset
28th May 2023	4.7	16.7	0	NW39 - NE9	92 - 53	0645- 1656
29th May 2023	10.2	20.5	0	WNW43 - NW20	95 - 85	0645- 1655
30th May 2023	8	20.5	0	W13 - WNW14	66 - 36	0618 - 1721
17th July 2023	9.3	20.2	6	NNE2 - ENE13	97 - 61	0625 - 1732
18th July 2023	6.7	19.9	0.2	NE9 - ENE7	97 - 64	0652- 1705
19th July 2023	9	17.2	0	W13 - SSW9	51 - 27	0652- 1706

Sources: http://www.bom.gov.au/climate/dwo/IDCJDW0200.shtml

http://www.ga.gov.au/bin/geodesy/run/sunrisenset

3.2.1 Vegetation & Significant Flora Survey

A desktop analysis of vegetation within the study area and its surrounds were informed by large-scale vegetation mapping projects and aerial photography to determine potential Plant Community Types (PCT) occurring within the study area, they include:

- Preliminary consultation of the State Vegetation Type Map (DPIE 2020) to determine the broad categorisation of the study area;
- GIS analysis including - Aerial Photograph Interpretation (API) and consultation of topographic map (Scale 1:25,000) layers for the study area; and
- Department of Planning, Industry and Environment (DPIE) Vegetation Information System (OEH VIS) Classification Database.

Vegetation communities were determined within the study area based on the above-mentioned desktop information, coupled with field assessments of native vegetation.

The following methods where utilised within the study area:

- Broad vegetation identification, delineation and stratification into vegetation zones carried out by detailed random meander methods (Cropper 1993);
- Collection of four plots based full floristic data as per Section 4 of the BAM (2020), recording the following;
    - Identification of all flora species to genus where identification attributes were present;
    - Composition and structure attributes within 20x20 plot; and
    - function attributes within the 20X50 m plot.
- Collection of study area landscape attributes that included, landform, aspect, soil type, detailed descriptions of the vegetation condition, current land use and the current impacts.

Refer to **Section 4.2** and showing the vegetation survey results. A list of flora species detected during surveys is provided as **Appendix 2**.

3.2.2 Fauna Survey

A desktop assessment of the potential use of the study area by threatened fauna species (as listed under the BC Act and EPBC Act) identified from the vicinity was undertaken prior to the commencement of field surveys (Refer to **Section 4.1**).

Fauna habitat values were assessed during flora surveys. Native vegetation was recorded and significant terrestrial habitat features (hollow bearing trees, nests, rock outcrops, or termite terrariums) were recorded during surveys including six habitat trees.

Refer to **Section 4.3** for fauna survey results and **Figure 2** showing the location of all fauna surveys. A list of fauna species observed during the site surveys is provided as **Appendix 2**.

Koala Habitat Assessment Survey

In accordance with the SEPP (Biodiversity and Conservation) 2021 (previously SEPP [Koala Habitat Protection] 2021) the following field work was conducted:

- Spot Assessment Technique (SAT) survey for Koala presence following Philips and Gallaghan (2011) methodology on all Koala use trees within the proposed site works.
- One night of spotlighting following the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), 2011, *Survey Guidelines for Australia's Threatened Mammals.*

Secondary Indications and Incidental Observations

Opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of resident fauna were noted. Such indicators included:

- Distinctive scats left by mammals;
- Scratch marks made by various types of arboreal animals;
- Nests made by various guilds of birds;
- Feeding scars on Eucalyptus trees made by Gliders;
- Whitewash, regurgitation pellets and prey remains from Owls;
- Auditory recognition of bird and frog calls;
- Skeletal material of vertebrate fauna; and

- Searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, and diggings).

3.2.3 Habitat Survey

An assessment of the relative habitat value present within the study area was undertaken. This assessment focused primarily on the identification of specific habitat types and resources in the study area favoured by known threatened species from the locality. The assessment also considered the potential value of the study area (and surrounds) for all major guilds of native flora and fauna. Habitat assessment included:

- presence, size and types of tree hollows;
- presence of rocks, logs, caves, rocky outcrops, leaf litter, overhangs and crevices;
- vegetation complexity, structure and quality;
- presence of freshwater or estuarine aquatic habitats, noting permanency;
- connectivity to adjacent areas of habitat;
- extent and types of disturbance;
- presence of foraging opportunities such as flowering eucalypts, fruits, seeds or other nectar bearing native plants; and
- presence and abundance of various potential prey species.

Habitat assessment was based on the specific habitat requirements of each threatened fauna species with regard 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.

3.3 Limitations

Limitations associated with this biodiversity assessment report are presented herewith. The limitations have been considered specifically in relation to threatened species assessments, results and conclusions.

In these instances, a precautionary approach has been adopted; whereby ‘assumed presence’ of known and expected threatened species, populations and ecological communities has been made where relevant and scientifically justified to ensure a holistic assessment.

Seasonality & Conditions

Threatened flora species should be surveyed within their respective flowering periods to ensure accurate identification.

The flowering and fruiting plant species that attract some nomadic or migratory threatened species, often fruit or flower in cycles spanning several years. Furthermore, these resources might only be accessed in some areas during years when resources more accessible to threatened species fail. Consequently, threatened species may be absent from some areas where potential habitat exists for extended periods, and this might be the case for nomadic and opportunistic species.

Data Availability & Accuracy

The collated threatened flora and fauna species records provided by Bionet Species Sightings Search of NSW Wildlife are known to vary in accuracy and reliability. This is usually due to the reliability of information provided to the National Parks and Wildlife Service (NPWS) for collation and/or the need to protect specific threatened species locations. During the review of threatened species records sourced from OEH BioNet Atlas, consideration has been given to the date and accuracy of each threatened species record in addition to an assessment of habitat suitability within the study area.

Similarly, EPBC Protected Matters Searches provide a list of threatened species and communities that have been recorded within 10 km of the study area, or which have suitable habitat within the wider area, and are subject to the same inherent inaccuracy issues as the State derived databases.

In order to address these limitations in respect to data accuracy, threatened species records have only been used to provide a guide to the types of species that occur within the locality of the study area. Consequently, habitat assessment and the results of surveys conducted within the study area have been used to assess the likelihood of occurrence of threatened species, populations and ecological communities to occur therein.

27 LANG DRIVE,
BOLWARRA HEIGHTS

FIGURE 2:
SURVEY EFFORTS

Legend

- Subject Land
- Study Area
- Cadastral Boundary

Survey Efforts

- BAM Plot Transect
- Nocturnal Transect - 18/07/2023
- Nocturnal Transect - 19/07/2023
- BAM Plot
- Koala SAT
- Hollow Bearing Tree

N
W E
S

0 40 80 120 160

Metres

1:2000

MJD Environmental

Aerial: Nearmap (2023) | Data: MJD Environmental, GCA, NSW Spatial Services (2023) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 25/08/2023 | Version: 2 | Z:\22056 - 27 Lang Drive, Bolwarra Heights | This plan should not be relied upon for critical design dimension.

4 Results

4.1 Desktop Assessment

Using the NSW BioNet Atlas (Accessed 24th July 2023), and EPBC Act Protected Matters Search (Accessed 09th June 2023), a list of potentially occurring threatened species, populations and ecological communities from the locality (10 km radius) has been compiled (**Table 2**). A total of 130 entities have been recorded of which 23 threatened flora species, 58 fauna species, 27 ecological community, 17 migratory species and 5 marine species have either been detected or have the potential to occur within the locality.

Note: Included in **Table 2** below are the numbers of records (not the number of individuals) for each species within the locality taken from the NSW BioNet Atlas. The EPBC Act Protected Matters Search Tool (PMST) does not provide number of records within the locality. Therefore, the record count related only to those BC Act listed species that were detected within 10 km of the site. It is also noted that due to the terrestrial nature of the study area, pelagic marine species were not considered under this ecological assessment and have not been included in the list.

Table 2 Threatened Flora & Fauna Database Search Results.

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Notes & Source
Threatened Ecological Communities					
Central Hunter Grey Box—Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions		E	-	K	Community known to occur within area[1,]
Central Hunter Ironbark—Spotted Gum—Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions		E	-	K	Community known to occur within area[1,]
Central Hunter Valley eucalypt forest and woodland		-	CE	M	Community may occur within area[1,2]
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		E	-	K	Community known to occur within area[1,]
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland		-	E	K	Community known to occur within area[1,2]
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		E	-	K	Community known to occur within area[1,]
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions		E	-	K	Community known to occur within area[1,]
Hunter Valley Weeping Myall (Acacia pendula) Woodland		-	CE	M	Community may occur within area[2]
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions		E	-	K	Community known to occur within area[1]
Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion		V	-	K	Community known to occur within area[1,]

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Notes & Source
Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions		E	-	K	Community known to occur within area[1,]
Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion		CE	-	K	Community known to occur within area[1,]
Kurri Sand Swamp Woodland in the Sydney Basin Bioregion		E	-	K	Community known to occur within area[1,]
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		E	-	K	Community known to occur within area[1]
Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions		E	-	K	Community known to occur within area[1]
Lowland Rainforest of Subtropical Australia		-	CE	L	Community likely to occur within area[2]
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions		E	-	K	Community known to occur within area[1]
Quorrobolong Scribbly Gum Woodland in the Sydney Basin Bioregion		E	-	K	Community known to occur within area[1]
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria		-	CE	L	Community likely to occur within area[1,2]
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		E	-	K	Community known to occur within area[1]
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions		-	E	L	Community likely to occur within area[2]
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		E	-	K	Community known to occur within area[1]
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		E	-	K	Community known to occur within area[1]
Sydney Freshwater Wetlands in the Sydney Basin Bioregion		E	-	P	Community possible to occur within area[1]
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions		E	-	K	Community known to occur within area[1]
Warkworth Sands Woodland in the Sydney Basin Bioregion		E	-	P	Community possible to occur within area[1]
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		-	CE	L	Community likely to occur within area[2]
Flora					
Acacia bynoeana	Bynoe's Wattle, Tiny Wattle	E	V	L	Species or Species habitat likely to occur within area[2]

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Notes & Source
Arthraxon hispidus	Hairy-joint Grass	E	V	M	Species or Species habitat may occur within area[2]
Caladenia tessellata	Thick-lipped Spider-orchid, Daddy Long-legs	E	V	L	Species or Species habitat likely to occur within area[2]
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	M	Species or Species habitat may occur within area[2]
Cymbidium canaliculatum	*Cymbidium canaliculatum - endangered population*	E	-	3	Recorded within 10km of the Site[1]
Cynanchum elegans	White-flowered Wax Plant	E	E	L	Species or Species habitat likely to occur within area[2]
Dichanthium setosum	Bluegrass	V	V	L	Species or Species habitat likely to occur within area[2]
Eucalyptus camaldulensis	*Eucalyptus camaldulensis - endangered population*	E	-	5	Recorded within 10km of the Site[1]
Eucalyptus glaucina	Slaty Red Gum	V	V	112	Species or Species habitat known to occur within area[2]; Recorded within 10km of the Site[1]
Euphrasia arguta	null	CE	CE	M	Species or Species habitat may occur within area[2]
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	L	Species or Species habitat likely to occur within area[2]
Maundia triglochinoides	null	V	-	1	Recorded within 10km of the Site[1]
Persicaria elatior	Knotweed, Tall Knotweed	V	V	L	Species or Species habitat likely to occur within area[2]
Pomaderris brunnea	Rufous Pomaderris, Brown Pomaderris	E	V	M	Species or Species habitat may occur within area[2]
Prasophyllum sp. Wybong (C.Phelps ORG 5269)	a leek-orchid	-	CE	M	Species or Species habitat may occur within area[2]
Pterostylis gibbosa	Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood	E	E	1	Species or Species habitat may occur within area[2]; Recorded within 10km of the Site[1]
Rhizanthella slateri	Eastern Underground Orchid	V	E	M	Species or Species habitat may occur within area[2]
Rhodamnia rubescens	Scrub Turpentine, Brown Malletwood	E	CE	2	Species or Species habitat known to occur within area[2]; Recorded within 10km of the Site[1]
Rhodomyrtus psidioides	Native Guava	CE	-	3	Species or Species habitat known to occur within area[2]; Recorded within 10km of the Site[1]
Rutidosis heterogama	Heath Wrinklewort	V	V	1	Species or Species habitat known to occur within area[2]; Recorded within 10km of the Site[1]
Syzygium paniculatum	Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry	E	V	3	Species or Species habitat known to occur within area[2]; Recorded within 10km of the Site[1]
Tetratheca juncea	Black-eyed Susan	V	V	L	Species or Species habitat likely to occur within area[2]

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Notes & Source
Thesium australe	Austral Toadflax, Toadflax	V	V	L	Species or Species habitat likely to occur within area[2]
Birds					
Anseranas semipalmata	Magpie Goose	V	-	2	Recorded within 10km of the Site[1]
Anthochaera phrygia	Regent Honeyeater	CE	CE	3	Recorded within 10km of the Site[1]; Species or Species habitat known to occur within area[2]
Ardenna pacifica	Wedge-tailed Shearwater	-	-	11	Recorded within 10km of the Site[1]
Ardenna tenuirostris	Short-tailed Shearwater	-	-	3	Recorded within 10km of the Site[1]
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	3	Recorded within 10km of the Site[1]
Botaurus poiciloptilus	Australasian Bittern	E	E	K	Species or Species habitat known to occur within area
Calidris ferruginea	Curlew Sandpiper	E	CE	K	Species or Species habitat known to occur within area[2]
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	K	Species or Species habitat known to occur within area[2]
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	L	Species or Species habitat likely to occur within area[2]
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	V	V	M	Species or Species habitat may occur within area[2]
Chlidonias leucopterus	White-winged Tern, White-winged Black Tern	-	M	1	Recorded within 10km of the Site[1]
Chthonicola sagittata	Speckled Warbler	V	-	7	Recorded within 10km of the Site[1]
Climacteris picumnus victoriae	Brown Treecreeper	V	V	L	Species or Species habitat likely to occur within area[2]
Daphoenositta chrysoptera	Varied Sittella	V	-	4	Recorded within 10km of the Site[1]
Ephippiorhynchus asiaticus	Black-necked Stork	-	-	6	Recorded within 10km of the Site[1]
Epthianura albifrons	White-fronted Chat	V	-	1	Recorded within 10km of the Site[1]
Erythrotriorchis radiatus	Red Goshawk	CE	V	M	Species or Species habitat may occur within area[2]
Falco hypoleucos	Grey Falcon	E	-	L	Species or Species habitat likely to occur within area[2]
Glossopsitta pusilla	Little Lorikeet	V	-	20	Recorded within 10km of the Site[1]
Grantiella picta	Painted Honeyeater	V	V	L	Species or Species habitat likely to occur within area[2]
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	16	Recorded within 10km of the Site[1]
Hirundapus caudacutus	White-throated Needletail	-	V	3	Recorded within 10km of the Site[1]; Species or Species habitat known to occur within area[2]
Lathamus discolor	Swift Parrot	-	CE	3	Recorded within 10km of the Site[1]; Species or Species habitat known to occur within area[2]

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Notes & Source
Melanodryas cucullata cucullata	South-eastern Hooded Robin, Hooded Robin (south-eastern)	-	E	M	Species or Species habitat may occur within area[2]
Neophema chrysostoma	Blue-winged Parrot	-	V	M	Species or Species habitat may occur within area[2]
Neophema pulchella	Turpuoise Parrot	V	-	1	Recorded within 10km of the Site[1]
Ninox connivens	Barking Owl	V	-	1	Recorded within 10km of the Site[1]
Ninox strenua	Powerful Owl	V	-	6	Recorded within 10km of the Site[1]
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	-	CE	L	Species or Species habitat likely to occur within area
Oxyura australis	Blue-billed Duck	V	-	5	Recorded within 10km of the Site[1]
Pandion cristatus	Eastern Osprey	V	-	1	Recorded within 10km of the Site[1]
Pomatostomus temporalis temporalis	Grey-Crowned Babbler	V	-	58	Recorded within 10km of the Site[1]
Ptilinopus magnificus	Wompoo Fruit-Dove	V	-	1	Recorded within 10km of the Site[1]
Pycnoptilus floccosus	Pilotbird	-	V	M	Species or Species habitat may occur within area[2]
Rostratula australis	Australian Painted Snipe	E	E	K	Species or Species habitat known to occur within area[2]
Stagonopleura guttata	Diamond Firetail	V	V	K	Species or Species habitat known to occur within area[2]
Stictonetta naevosa	Freckled Duck	V	-	4	Recorded within 10km of the Site[1]
Tyto novaehollandiae	Masked Owl	V	-	1	Recorded within 10km of the Site[1]
Mammals					
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	K	Species or Species habitat known to occur within area[2]
Dasyurus maculatus	Spotted-tailed Quoll	V	E	11	Recorded within 10km of the Site[1]; Species or Species habitat known to occur within area[2]
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	9	Recorded within 10km of the Site[1]
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	39	Recorded within 10km of the Site[1]
Miniopterus australis	Little Bent-winged Bat	V	-	43	Recorded within 10km of the Site[1]
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	44	Recorded within 10km of the Site[1]
Myotis macropus	Southern Myotis	V	-	15	Recorded within 10km of the Site[1]
Notamacropus parma	Parma Wallaby	-	V	M	Species or Species habitat may occur within area[2]
Petauroides volans	Greater Glider	-	V	1	Recorded within 10km of the Site[1]
Petaurus australis australis	Yellow-bellied Glider (south-eastern)	V	-	L	Species or Species habitat likely to occur within area[2]
Petaurus norfolcensis	Squirrel Glider	V	-	47	Recorded within 10km of the Site[1]
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	M	Species or Species habitat may occur within area[2]

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Notes & Source
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	29	Recorded within 10km of the Site[1]
Phascolarctos cinereus	Koala	V	E	209	Recorded within 10km of the Site[1]; Species or Species habitat known to occur within area[2]
Potorous tridactylus tridactylus	Long-nosed Potoroo (northern)	V	V	M	Species or Species habitat may occur within area[2]
Pseudomys novaehollandiae	New Holland Mouse	-	V	8	Recorded within 10km of the Site[1]; Species or Species habitat likely to occur within area[2]
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	104	Recorded within 10km of the Site[1]; Species or Species habitat known to occur within area[2]
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	6	Recorded within 10km of the Site[1]
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	18	Recorded within 10km of the Site[1]
Vespadelus troughtoni	Eastern Cave Bat	V	-	3	Recorded within 10km of the Site[1]
Herpetofauna					
Delma impar	Striped Legless Lizard, Striped Snake-lizard	V	V	M	Species or Species habitat may occur within area[2]
Litoria aurea	Green and Golden Bell Frog	E	V	8	Recorded within 10km of the Site1; Species or Species habitat known to occur within area[2]
Mixophyes balbus	Stuttering Frog, Southern Barred Frog (in Victoria)	E	V	M	Species or Species habitat may occur within area[2]
Listed Migratory Species					
Migratory Terrestrial Birds					
Cuculus optatus	Oriental Cuckoo, Horsfield's Cuckoo	-	-	1	Recorded within 10km of the Site[1]
Monarcha melanopsis	Black-faced Monarch	-	-	K	Species or Species habitat known to occur within area[2]
Motacilla flava	Yellow Wagtail	-	-	L	Species or Species habitat likely to occur within area[2]
Myiagra cyanoleuca	Satin Flycatcher	-	-	K	Species or Species habitat known to occur within area[2]
Rhipidura rufifrons	Rufous Fantail	-	-	K	Species or Species habitat known to occur within area[2]
Symposiachrus trivirgatus	Spectacled Monarch	-	-	K	Species or Species habitat known to occur within area[2]
Migratory Wetland Birds					
Actitis hypoleucos	Common Sandpiper	-	-	K	Species or Species habitat known to occur within area[2]
Calidris acuminata	Sharp-tailed Sandpiper	-	-	7	Recorded within 10km of the Site[1]
Calidris melanotos	Pectoral Sandpiper	-	-	2	Recorded within 10km of the Site[1]
Calidris ruficollis	Red-necked Stint	-	-	1	Recorded within 10km of the Site[1]
Gallinago hardwickii	Latham's Snipe	-	-	2	Recorded within 10km of the Site[1]
Limosa lapponica	Bar-tailed Godwit	-	-	K	Species or Species habitat known to occur within area[2]
Pandion haliaetus	Osprey	-	-	K	Species or Species habitat known to occur within area[2]

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Notes & Source
Pluvialis squatarola	Grey Plover	-	-	1	Recorded within 10km of the Site[1]
Tringa glareola	Wood Sandpiper	-	-	3	Recorded within 10km of the Site[1]
Tringa nebularia	Common Greenshank; Greenshank	-	-	4	Recorded within 10km of the Site[1]
Tringa stagnatilis	Marsh Sandpiper	-	-	2	Recorded within 10km of the Site[1]
Listed Marine Species					
Birds					
Apus pacificus	Fork-tailed Swift	-	-	L	Species or Species habitat likely to occur within area[2]
Ardenna pacifica	Wedge-tailed Shearwater	-	-	11	Recorded within 10km of the Site[1]
Ardenna tenuirostris	Short-tailed Shearwater	-	-	3	Recorded within 10km of the Site[1]
Gelochelidon nilotica	Gull-billed Tern	-	-	2	Recorded within 10km of the Site[1]

Key:

V = Vulnerable
E = Endangered
M = Migratory
CE = Critically Endangered
A= Marine

K = Known where there are confirmed records, specimens or otherwise verified sightings in any CMA subregion overlapping the search area

P = Predicted where there is high expectation by relevant experts that a species is likely to be present in any CMA subregion overlapping the search area, based on known presence of suitable habitat and distribution with adjoining subregions

1 – NSW BioNet Atlas, Office of Environment and Heritage (Accessed 24-07-2023).
2 – Commonwealth Protected Matters Search Tool, Department of the Environment (Accessed 09-06-2023).

4.2 Flora Survey

4.2.1 Native Vegetation Extent

The study area is 8.89 ha in size and contains 0.56 ha of native vegetation, 7.48 ha of disturbed managed non-native vegetation, and 0.53 ha of planted vegetation at the time of survey. The extent of native vegetation has been interpreted using API and ground truthing during field survey works (Refer to **Figure 3**). The vegetation within the study area has been modified through past clearing and plantings, and present land management practices (i.e. mowing to maintain lawns). The current land use has resulted in the modification of native vegetation present, impacting the structure and floristic composition.

Identification of PCTs within the study area were determined using:

- Occurrence within the Hunter Subregion of the Sydney Basin Bioregion;
- Vegetation formation and class:
- landscape position;
- dominant species noted during field data collected from the full floristic plots/transects established in accordance.

On this basis, one PCT was identified within the study area:

PCT 3433: *Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest*

This vegetation community accounts for 0.56 ha of the total 8.58 ha of vegetation present within the study area and is delineated into a single vegetation zone (VZ – refer to **Figure 3**)**.** The delineation of the VZ condition was informed by management history, composition and structure of planted or remnant canopy, access roads or weed invasion.

A full summary of the vegetation zones by area is presented in **Section 4.2.2** below. Briefly, VZ1 has been delineated as PCT 3433 due to the presence of remnant canopy and native groundcover species. This VZ was found to be commensurate with the threatened ecological community (TEC), BC Act listed Endangered (E) *Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions* (refer to **Section 3.3.3** for TEC determination).

The remainder of the vegetation within the study area was delineated into two VZs, including VZ2 which encompasses the largest area within the study area, and represents disturbed modified non-native pasture which historically would have been derived from a similar PCT as VZ1. However, due to the prevalence of non-native vegetation and lack of associated vegetation structure, this VZ does not constitute an example of a known PCT. VZ3 encompasses planted native vegetation, which was assess under the of the BAM Streamlined assessment module planted vegetation (DPE, 2022), and was subsequently omitted from the area associated with native vegetation.

Note, prior to the proposal design being finalised, BAM field assessments were carried out to inform the PCT and VZ identification and to determine the overall potential impacts on native vegetation area. As such, BAM plot data is available for VZ1 and VZ2 and is presented in **Appendix 3.**

Twelve hollow-bearing trees were observed within study area during the field surveys, see **Figure 3** for locations and **Section 4.3** for a list of identified habitat features. The observed hollows ranged in size, ranging from 5cm to < 20 cm.

4.2.2 Vegetation Description

VZ1

PCT 3433: *Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest*	
Area within Development Area	0.56 ha
Vegetation Formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation Class	Hunter-Macleay Dry Sclerophyll Forests
Floristic Description	Given the disturbance history of the study area, the canopy layer is sparse within this VZ, and is represented by remnant canopy being comprised by mature to late-mature *Corymbia maculata* (Spotted Gum), with no other species present. The midstory is absent, likely due to grazing pressure and other historic and contemporary management practices that have depleted the soil seed bank. The groundcover of VZ1 includes a mix of native species, with *Digitaria didactyla* (Queensland Blue Couch) being the dominant grass. Other native grasses include *Cynodon dactylon* (Common Couch), *Eragrostis brownii* (Brown's Lovegrass), and *Sporobolus creber* (Slender Rat's Tail Grass). Native forbs include *Lobelia purpurascens* (Whiteroot), *Crassula sieberiana* (Australian Stonecrop), *Dichondra repens* (Kidney weed), *Haloragis heterophylla* (Variable Raspwort), with native graminoids such as *Cyperus polystachyos*, *Isolepis inundata (Club-rush),* and *Juncus usitatus.* Exotic grasses included the HTE *Axonopus fissifolius* (Narrow-leaved Carpet Grass) and *Paspalum distichum* (Water Couch). Other exotic forbs observed included Bidens spp., *Hypochaeris radicata* (Catsear), *Senecio madagascariensis* (Fireweed), *Trifolium repens* (White Clover), *Sida rhombifolia* (Paddy's Lucerne), *Oxalis stricta* (Common Yellow Woodsorrel), *Plantago lanceolata* (Lamb's Tongues), *Lysimachia arvensis* (Scarlet Pimpernel), and *Richardia humistrata.*
Condition	Woodland.
Structure	This VZ has been historically cleared, with only *C. maculata* being selectively retained. Further modified by agricultural practices, has resulted in the midstory being absent and the groundcover being primarily dominated by non-native grasses. The remnant canopy is represented by mature to late-mature aged cohort, with several hollows present. The groundcover is currently managed with periodic mowing/slashing resulting in a maintenance of exotic-dominance. Native canopy cover is ~10%, midstory cover is 0% and groundcover ~86% with a substantial cover of Exotic weeds (0.2% HTE).

PCT 3433: *Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest*	
Justification of assigning PCT	All PCTs within the Hunter subregion of the Sydney Basin IBRA bioregion were assessed, with the PCT determination being driven by the biogeophysical characteristics of the study area and broader landscape. Despite the heavy management, the vegetation within this community presents as a Dry Sclerophyll Forest (Shrub/grass) and Hunter Macleay Dry Sclerophyll Forests Class. PCTs within the IBRA subregion remaining for consideration included PCT 3244, 3250, 3315, 3431, 3433, 3435, 3436, 3444, and 3582, which was based on the observed vegetation formation and the presence of *C. maculata*, which was assessed as a key characteristic species given the mature age class observed. Given the overall disturbance history, few additional associated species were present to aid the delineation. Therefore, geographic distribution, landform, and climate conditions were primarily used to inform the PCT determination. PCT 3250 were ruled about as the mean annual rainfall within the locality was too low (<1000 mm). PCT 3315, 3431, 3435 and 3444 were excluded due to geographic constraints. PCT 3436 and 3582 were excluded due to the lack of closed canopy, with limited evidence of a shrub dominant midstory. Moreover, with PCT 3436, the soil characteristics did not match, as the soil presented more as loamy clay than sandy clay. The determination between PCT 3433 over 3244 was based the landform, which was more in line with undulating foothills than lowers slopes in escarpment foothills. As the groundcover composition and structure beneath the canopy in this VZ matches that of VZ3, the areas between canopy trees were associated with VZ3, with a drip-zone around each tree being associated with VZ1 and being determined through aerial imagery.
Status	This PCT is associated with one Threatened Ecological Community (TEC) under the BC Act being *Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions* which is listed as Endangered. The PCT has the characteristics associated with the diagnostic criteria for this TEC, and is therefore commensurate (refer to **Section 3.3.3**)

PCT 3433: *Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest*

B02

VZ2

Disturbed	
Area within Development Area	7.48 ha
Vegetation Formation	N/A
Vegetation Class	N/A
Floristic Description	This VZ is the dominant vegetation type found within the study area, however, it is not classified as being associated with a PCT (see below for the justification). This VZ has been subjected to extensive historic disturbance, including clearing, exotic sowing, and frequently slashing/mowing. In general, no canopy is present within this VZ, however, there is a small, wetter area in the western section of the study area where regenerating *Casuarina glauca* (River Oak) was observed. No midstory was observed across the entirety of this VZ, which is likely driven by grazing pressure and other historic and/or contemporary management practices that have depleted the soil seed bank. The groundcover is generally dominated by exotic grasses; however, native grasses were more abundant in some areas depending on relative slope position. Native *Digitaria didactyla* (Queensland Blue Couch) generally being more around upper slope areas, with *Sporobolus creber* (Slender Rat's Tail Grass), *Themeda triandra* (Kangaroo Grass), and grass-like species such as *Cyperus polystachyos* (-), and *Fimbristylis dichotoma* (Common Fringe-sedge) sporadically observed. Moving downslope, exotic grasses tended to become more abundant, however, in the small wetter area, *Microlaena stipoides* (Weeping Grass), and the grass-like native species *Eleocharis acuta* (-), *Eleocharis sphacelata* (Tall Spike Rush), and *Schoenoplectus validus* (-) were also observed. Overall forbs were less abundant within this VZ, however, the native forb *Haloragis heterophylla* (Rough Raspwort) was consistently observed in the mid to upper slopes, and *Aster subulatus* (Wild Aster), *Geranium solanderi* (Native Geranium), *Hydrocotyle hirta* (Hairy Pennywort), and *L. purpurascens* being observed is the low-lying areas. Of the exotic species present, *Axonopus fissifolius* (Narrow-leafed Carpet Grass), which was particularly abundant in some areas within the central section of the study area. Along the mid to upper slopes, *Senecio madagascarensis* (fireweed) was consistently, with *Briza maxima* (Quaking Grass), *Cyperus brevifolius* (-), *Plantago lanceolata* (Lamb's Tongues), and *Richardia humistrata* (-) observed less frequently. In the small, wetter section of this VZ were a greater number of exotic species including several grasses and grass-like species such as *C. brevifolius, Holcus lanatus* (Yorkshire Fog), *Juncus cognatus*, *Paspalum urvillei* (Vasey Grass), and *Setaria sphacelata* (South African Pigeon Grass), with forbs *H. radicata, Iris germanica (*Tall Bearded Iris), *L. arvensis, P. lanceolata, Rumex conglomeratus* (Clustered Dock), *Rumex crispus (*Curled Dock), *Trifolium pratense* (Red clover), and *V. bonariensis*. High threat exotics (HTEs) observed within this VZ include *Ageratina adenophora (Crofton Weed), A. fissifolius, Cyperus eragrostis (*Umbrella Sedge), *Paspalum dilatatum (*Paspalum), and *S. madagascariensis.*
Condition	Disturbed
Structure	This VZ has been subjected to a similar disturbance history as VZ1, including clearing and grazing. Further modified by agricultural practices, has resulted in the midstory being absent and the groundcover being primarily dominated by non-native grasses. The limited regenerating canopy, present in the low-lying wet area, is sparse and young, with no hollows present. Native canopy cover is 2% (driven by the small wet area), midstory cover is 0% and groundcover ~60% with a substantial cover of Exotic weeds (~22% HTE).

Disturbed	
Justification of assigning PCT	All PCTs within the Hunter subregion of the Sydney Basin IBRA bioregion were assessed, with the PCT determination being driven by the biogeophysical characteristics of the study area and broader landscape. The vegetation within this VZ is extensively modified due to historic clearance and pasture management, and therefore, floristic composition could not be relied upon to accurately determine the PCT. As such, the same characteristics that drove the PCT determination for VZ1 including geographic distribution, landform, and climate conditions were primarily used to inform the PCT determination. Following an assessment of the BAM plot data using PCT 3433, it was determined that due to the high level of modification, this VZ does not fit within a known PCT given that the low vegetation integrity score (<15). Although, native species are present within the groundcover layer, the composition of these species is insufficient to warrant a derived native grassland condition of PCT 3433. As such, it was concluded that due to the historic disturbance, which has resulted in lack of canopy vegetation, an absence of midstory vegetation, and exotic-dominated groundcover, this vegetation has been sufficiently modified to no longer represent a known PCT. With regards to the small, wetter area within the western section of the study area, it was noted that this vegetation exhibited some forested wetland attributes, including the presence of ephemeral drainage lines and small areas of inundation (<1 m wide), and included the presence of several wetland species such as regenerating *C. glauca,* with *Eleocharis acuta,* and *Eleocharis sphacelata*. However, these species were poorly represented in this area, consisting of low abundances in comparison to the non-native grasses that dominated the groundcover. Moreover, *C. glauca* is known to act as a colonizing species in wetter areas following disturbance events and given the lack of other swamp oak forest structural/species attributes it was concluded that this area also represented a similarly disturbed condition as the non-native grassland, and consequently, was batched in with this VZ.
Status	BC Act: N/A

Disturbed

B02

VZ3

Planted Vegetation	
Area within Development Area	0.54 ha
Vegetation Formation	N/A
Vegetation Class	N/A
Floristic Description	This VZ shares the same disturbance history of the study area, with the original vegetation being cleared, however, this area was subsequently replanted over time and has undergone some landscaping, including enclosing a garden area with a low ornamental rock wall. A variety of canopy species were planted in this area, including *Melaleuca quinquenervia* (Broad-leaved Paperbark), *Callistemon salignus* (Willow Bottlebrush), *Pinus radiata* (Radiata Pine), *Grevillia robusta* (Silky Oak), *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus tereticornis* (Forest Red Gum), *Cinnamomum camphora* (Camphor laurel), *Corymbia torelliana* (Cadaghi), and *Lophostemon confertus* (Brush Box). A few young *C maculata* were also present as was a stand of regenerating *Casuarina cunninghamiana* (River Oak). Midstory species were generally absent, but the groundcover was dense in this VZ and primarily dominated by common garden species, such as *Clivia miniata* (Bush Lily), *Strelitzia spp*. (Bird of Paradise) and *Tradescantia zebrina* (Silver Inch Plant).
Condition	Planted Vegetation
Structure	VZ3 was historically cleared and was subsequently subjected to landscaping. The canopy species present ranged between juvenile to semi-mature, with a sparse midstory, and dense groundcover.
Justification of assigning PCT	As this area shows clear evidence of being planted including occurring in straight lines and consisting of the same age class, as well as obvious landscaping. This area was assessed under the Streamlined assessment module planted vegetation (DPE, 2022). See **Appendix 4** for the full assessment
Status	BC Act: N/A
	EPBC Act: N/A

Planted Vegetation

Non-Native Vegetation

Non-native vegetation is present throughout the study area and is primarily represented by VZ2 and in parts of the groundcover associated with VZ3 (both described in the previous section). As such, no areas of non-native vegetation were isolated and mapped within the study area or associated subject land.

4.2.3 Threatened Ecological Communities

A single TEC was associated with PCT 3433 within the study area. Relevant guidelines were used to determine the designation of the listing for the community present within the study area.

BC Act listed: Endangered Ecological Community (EEC) - Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions

PCT 3433 is associated (equivalent) with the BC Act Listing. The EEC Final Determination (DPIE) was used to determine the assignment of the TEC. The following attributes find VZ1_woodland within the study area to be commensurate with the EEC:

- The study area is within the central Hunter Valley.
- The vegetation within VZ1 is consistent with an open forest vegetation formation.
- The tree layer within VZ1 contains *Corymbia maculata* (Spotted Gum)

27 LANG DRIVE,
BOLWARRA HEIGHTS

FIGURE 3:
VEGETATION

Legend

- Subject Land
- Study Area
- Cadastral Boundary
- Dam
- Road
- Structure

Plant Community Type & Vegetation Zone

- VZ1 – 3433_Woodland
- VZ2 – Disturbed
- VZ3 – Planted Vegetation

N
W E
S

0 40 80 120 160

Metres

1:2000

MJD Environmental

Aerial: Nearmap (2023) | Data: MJD Environmental, GCA, NSW Spatial Services (2023) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 25/08/2023 | Version: 2 | Z:\22056 - 27 Lang Drive, Bolwarra Heights | This plan should not be relied upon for critical design dimension.

4.3 Fauna Survey

No threatened fauna species were observed during the field surveys. A full list of the fauna species recorded incidentally within the study area is provided as **Appendix 2.**

Target fauna surveys for *Phascolarctos cinereus* (Koalas) were conducted within the study area. These target surveys included the following methods:

- The Scat Assessment Method (SAT) was applied across the study area, complete at a 30 Koala Use Tree searches at a maximum grid spacing of 250 m (as per Phillips and Callaghan 2011). Trees were inspected for primary observations (an individual) and secondary indications (scat, fur, belly rub tree).
- Additionally, spotlighting transects were undertaken in accordance with Koala Habitat Protection Guidelines (DPIE 2019b). Spotlighting was undertaken with the use of a Lightforce Enforcer 140 mm LED (376m @ 1 LUX) hand-held spotlight and head torch whilst traversing the study area. Areas of mature remnant vegetation were targeted, however, tracks around the study area were also spotlighted whilst entering and exiting the vegetation.

Refer to **Section 5.3.2** and **Appendix 8** for additional details regarding the results these surveying techniques.

4.3.1 Mammals

Arboreal

Trichosurus vulpecula (Common Brushtail Possums) was recorded within the study area. No threatened arboreal mammals were observed.

Terrestrial

No terrestrial species were observed during the field surveys.

4.3.2 Avifauna

One threatened avifauna species was observed during the site assessment, *Pomatostomus temporalis* (Grey-crowned Babbler – BC Act listed Vulnerable). Species common to open, disturbed landscapes and residential areas were observed during the site assessment, including *Cacatua sanguinea* (Little Corella), *Chenonetta jubata* (Australian Wood Duck), *Cisticola exilis* (Golden-headed Cisticola), *Coracina novaehollandiae (*Black-faced Cuckoo-shrike), *Cracticus nigrogularis* (Pied Butcherbird), *Dacelo novaeguineae (*Laughing Kookaburra), Egretta novaehollandiae (White-faced Heron), *Grallina cyanoleuca* (Magpie-lark), *Gymnorhina tibicen* (Australian Magpie), *Manorina melanocephala* (Noisy Miner), Ocyphaps lophotes (Crested Pigeon), *Pelecanus conspicillatus* (Australian Pelican), *Rhipidura leucophrys* (Willie Wagtail), *Trichoglossus haematodus* (Rainbow Lorikeet), and *Vanellus miles* (Masked Lapwing).

A list of fauna species observed during the field survey is provided as **Appendix 2**.

4.3.1 Herpetofauna

Common species to open rural landscapes and residential areas were observed during the field surveys, including *Litoria fallax* (Eastern Dwarf Tree Frog).

4.4 Habitat Survey

Over the duration of the biodiversity impact assessment, habitat features within the study area were identified in accordance with Section 6 of the BAM (2020). The following **Table 3** provides the survey schedule for habitat features.

Table 3 Habitat Survey

Habitat Feature	Survey Carried out	Presence/ Absence	Comment
Karst, caves, crevices, cliffs, rocks and other geological features of significance	30th May 2023	Absent	
Human-made structures	Throughout the duration of the site assessment	Present	Does not qualify as appropriate habitat as it was observed to be in good repair and in use.
Water bodies, water quality and hydrological processes	Throughout the duration of the site assessment	Present	Ephemeral pools form in depressions following rain and are associated with VZ2
Hollow bearing trees	30th May 2023	Present	Refer to **Figure 2**;
Winter flowering gum	30th May 2023	Present	Includes a small number of *Eucalyptus robusta*
Mistletoe (*Amyema spp.*)	Throughout the duration of the site assessment	Absent	
Fallen Timber and hollow logs	30th May 2023	Absent	
Stick nests	30th May 2023	Present	Small in size and not occupied at the time of assessment.

Connectivity

Broadly, habitat connectivity to the study area is poor due to the extensive agricultural land-use of the surrounding region, particularly to the east. To the west of the study area is fragmented vegetation, however, there is feasible connection between the study area to the Hunter River, particularly for highly mobile species. Additionally, there is an intact stand vegetation to the south of the study area within a R5 Large Lot Residential zoned area. As such, habitat connectivity of the study area within broader landscape is limited based on habitat fragmentation caused by agricultural and pastural land-use and residential developments. Therefore, the study area is unlikely to provide critical connectivity through the landscape and in its current state is isolated from continuous vegetation.

5 Impact Assessment

The following section provides an overview of the potential direct and indirect impacts associated with the proposal. This overview has been used to inform a likelihood of occurrence and potential for impacts to occur to threatened species, populations and ecological communities. In such instances, this has determined the need for further Test of Significance (5-part test).

5.1 Potential Impacts

Based on the ecological survey results over the site, the following direct and indirect impacts have been generated to inform impact assessment related to the proposal.

Direct Impacts

The ecological field assessment found that the proposal will remove/modify up to:

- 0.03 ha of Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest.

Flora

No threatened flora species were detected during field surveys conducted on the 30th of May and 17-19th of July 2023.

Fauna

Pomatostomus temporalis was detected during the site assessment, however, the proposal is not expected to significantly impact this species as they are a common woodland bird species that are highly mobile.

Habitat

Twelve (12) potential hollow-bearing trees were identified within the study area, with a single hollow-bearing tree will being removed as part of the proposed development.

Indirect Impacts

The proposal may result in the following indirect impacts associated with the construction of the proposed subdivision and formalised road access and associated infrastructure:

- Introduction and dispersal of exotic flora species from machinery and personnel.
- Potential for increased sediment flows during construction if erosion and nutrient control devices are not installed to industry best practice and maintained for the duration of construction / soil stabilisation works.
- Damage and or destruction to retained vegetation.
- Noise, air and light pollution disrupting the immediate surrounds as a result of machinery and construction activities.

Mitigation measures have been recommended in **Section 6** to ameliorate these indirect impacts.

5.2 Threatened Species & Communities Likelihood of Occurrence Assessment

Threatened flora and fauna species (listed under the BC Act and/or EPBC Act) that have been gazetted and recorded within a 10 km radius of the study area have been considered within the assessment contained in **Appendix 5**. Each species / community is considered for its likelihood to occur on the study area and potential for impact arising from the proposal. Where a potential for impact is considered, the entity has been nominated for further assessment under a Test of Significance (ToS) in **Appendix 6**.

'**Species / Community**' – Lists each threatened species / EEC known from the locality (10 km radius). The status and number of records along with source and notes for each threatened entity under the BC Act and the EPBC Act are also provided.

'**Habitat / Species Descriptions**' – for up-to-date threatened species profiles including habitat descriptions and other key ecological information reference is made to the following online resources:

- NSW OEH Threatened Species Profile Search - http://www.environment.nsw.gov.au/threatenedSpeciesApp/
- Commonwealth Biodiversity: Species Profile and Threats Database (SPRAT) - http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

'**Likelihood of Occurrence**' – Assesses the likelihood of each locally recorded species and EEC to occur within the study area, using knowledge of each species' habitat and lifecycle requirements and with regard the habitat types present within the study area, results of the literature review and database searches and field investigations. The location and number of records of the species (NSW Bionet Species Sightings Search were also considered in determining probability of occurrence.

'**Potential for Impact**' – Assesses the likelihood of impacts to each species / community that would result from the proposed development, considering direct and indirect short and long-term impacts.

Database searches were conducted of the NSW Bionet Atlas Species Sightings Search (24/07/2023) and Commonwealth Protected Matters Search Tool (24/07/2023).

'Test of Significance Species' – The following threatened species or threatened ecological communities assessed within the likelihood of occurrence table (**Appendix 5**) were considered to either occur or be impacted under this proposal, as such they were considered under the 5-Part Test of Significance (BC Act) (**Appendix 6**).

The following threatened entities have been considered:

Threatened Ecological Communities

Endangered Ecological Community (EEC) - Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions

Flora

No threatened flora species required a Test of Significance.

Fauna

Daphoenositta chrysoptera – Varied Sittella

Glossopsitta pusilla – Little Lorikeet

Haliaeetus leucogaster – White-bellied Sea-Eagle

Lathamus discolor – Swift Parrot

Micronomus norfolkensis - Eastern Coastal Free-tailed Bat

Myotis macropus - Southern Myotis

Ninox connivens – Barking Owl

Ninox strenua – Powerful Owl

Pomatostomus temporalis temporalis – Grey-crown Babbler

Pteropus poliocephalus – Grey-headed Flying-fox

Saccolaimus flaviventris - Yellow-bellied Sheathtail-bat

Tyto novaehollandiae – Masked Owl

Note: Pelagic marine species (bird, reptile, fish, mammal) recorded on the Protected Matters Search have not been listed or assessed herewith. Other Legislative Considerations

5.3 Other Legislative Considerations

5.3.1 Key Threatening Processes

A Key Threatening Process (KTP) is defined in the BC Act as a process that "adversely affects threatened species or ecological communities, or it could cause species or ecological communities that are not threatened to become threatened." They are listed under Schedule 4 of the BC Act and may adversely affect threatened species, populations or ecological communities or could cause species, populations or ecological communities that are not threatened to become threatened.

Seven (7) KTP's have the potential to operate within the study area and require consideration under the proposal:

1. Anthropogenic Climate Change
2. Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
3. Invasion of native plant communities by exotic perennial grasses
4. Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family *Myrtaceae*
5. Infection of native plants by *Phytophthora cinnamomi*
6. Clearing of native Vegetation
7. Loss of Hollow-bearing Trees

Anthropogenic Climate Change

Modification of the environment by humans is considered to contribute to Climate Change and as a result has been listed as a Key Threatening Process. Activities such as the construction processes which will occur as a result of proposed development are actions that can contribute to greenhouse gas emissions. These actions may indirectly impact upon known or potentially occurring threatened species as the distribution of these species is affected by climate.

The proposal seeks to disturb up to 0.03 ha of native vegetation associated with the PCT 3433. The potential contribution of the proposal to anthropogenic climate change is considered negligible. The loss of vegetation within the study area represents an extremely small decrease in carbon storage

potential, and such impacts from human activity would contribute only by small amounts and would cause little impact on locally occurring threatened species, populations, or ecological communities.

Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)

Potential habitat usage by this KTP were detected during surveys (potential rabbit warrens), with suitable foraging habitat occurring throughout the study area.

The proposal seeks to disturb up to 0.03 ha of PCT 3433. It is considered this KTP is likely to continue to operate in the locality, however the proposal is unlikely to generate additional significant foraging areas for this species and more likely to reduce foraging areas due to the development. As such the proposal is unlikely to contribute to an increase in abundance and activity of the European Rabbit.

Invasion of native plant communities by exotic perennial grasses

The study area is primarily encompassed by highly modified exotic pasture, which includes the HTE *Axonopus fissifolius* (Narrow-leafed Carpet Grass), and other exotic grasses such as *Briza maxima* (Quaking Grass) and *Paspalum dilatatum (*Paspalum). Exotic grasses associated with this KTP are likely to continue to operate in the locality, however the proposal is unlikely to generate additional significant habitat areas for these species, given the expected land management and landscaping that will be associated with residential dwellings expected to be constructed. Moreover, in the low-lying wet areas, the development is will be mitigating the occurrence of this KTP through a Vegetation Management Plan (VMP), which pending DA approval is expected to be part of the conditions of consent (for further details see **Appendix 8**).

Introduction and establishment of Exotic Rust Fungi of the order *Pucciniales pathogenic* on plants of the family *Myrtaceae*

The exotic rust pathogen of the order *Pucciniales* spores can be dispersed by wind, water-splash, on plant material including seed, on people and their clothing and equipment and has been known to infect plants of the family *Myrtaceae*. There was no evidence observed of Exotic rust fungus impact within the study area during the survey period. Given the proposal will increase vehicle/machinery movements within the study area during construction and operations, it is possible that contamination of the study area with the pathogen may occur. Due to this risk of contamination, it is considered the proposal has potential to contribute to this KTP, although only within an isolated, highly disturbed landscape. It is also noted that there are moderate levels of vehicle activity in the area surrounding the study area due to residential and agricultural properties. The increase in risk due to the development is comparatively minor when the existing levels of disturbance and vehicle activity are accounted for.

Infection of native plants by *Phytophthora cinnamomi*.

The soil born pathogen *Phytophthora cinnamomi* spreads in plant roots and has been known to infect several native plants. There was no evidence observed of *P. cinnamomi* impact within the study area during the survey period. Given the proposal will increase vehicle/machinery movements within the study area during construction and operations, it is possible that contamination of the study area with the pathogen may occur. Due to this risk of contamination, it is considered the proposal has potential to contribute to this KTP, although given the small scale of the proposal, this is considered a negligible risk.

Clearing of native vegetation

The KTP final determination lists nine factors that have the potential to impact species distribution or result in extinction. These factors are:

1) destruction of habitat resulting in loss of local populations of individual species;

2) fragmentation;

3) expansion of dryland salinity;

4) riparian zone degradation;

5) increased greenhouse gas emissions;

6) increased habitat for invasive species;

7) loss of leaf litter layer;

8) loss or disruption of ecological function; and

9) changes to soil biota.

The proposal seeks to disturb up to 0.03 ha of native vegetation. This loss of vegetation will represent a small loss of habitat for potential threatened species in the area. Habitat lost as a result of the proposal is unlikely to be of significance for the continued survival of threatened species in the locality.

The proposal will not further contribute to a loss of habitat connectivity. The study area is already fragmented due to past historic clearing, with the small amount of clearing associated with the proposal not expected to significantly impact connectivity to the broader landscape.

The proposal will not result in the expansion of dryland salinity owing to the small extent of vegetation to be cleared from the proposed development.

The study area does not contain a functioning watercourse, however, there is a low-lying wet area that will be rehabilitated using an appropriate vegetation management plan (VMP), which expected to be applied as a condition of consent for the proposal.

The proposal will have a minor impact on increasing greenhouse gas emissions and a loss of ground cover vegetation. However, this vegetation is primarily exotic.

There is little leaf litter present on the study area is minimal (see **Appendix 3** for BAM plot data), and is highly managed through historic farming and residential maintenance.

The proposal may have a minor impact on ecological function and soil biota.

On this basis, it is not considered the KTP will be increased in the locality such that a decline and/ or extinction will occur due to reduction in habitat availability from clearing.

Loss of Hollow-bearing Trees

Twelve potential hollow bearing trees have been identified within the development footprint. However, only one hollow-bearing tree is being removed as part of the proposal. Therefore, this will mitigate the effects to threatened species in the locality and the threatened ecological community that occurs within the study area.

5.3.2 SEPP (Biodiversity and Conservation) 2021

The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* commenced on 1 March 2022 and combines 11 separate SEPPs into one consolidated document. SEPP (Biodiversity and Conservation) 2021 replaces and repeals those consolidated SEPPs, which includes amongst others, both the SEPP (Koala Habitat protection) 2020 and SEPP (Koala Habitat protection) 2021. The Biodiversity and Conservation SEPP 2021 provides the existing provisions as separate chapters.

The principles of the Biodiversity and Conservation SEPP 2021 are unchanged from the previous Koala SEPP 2020 and 2021 and aim to:

- Encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

- Help reverse the decline of koala populations by ensuring koala habitat is properly considered during the development assessment process.

- Provide a process for councils to strategically manage koala habitat through the development of koala plans of management.

The Biodiversity and Conservation SEPP 2021 reflects the policy framework of previous Koala SEPP 2020 (Chapter 3) and 2021 (Chapter 4) for Local Government Areas (LGA) in NSW. At this stage:

- In nine of these LGAs – Metropolitan Sydney (Blue Mountains, Campbelltown, Hawkesbury, Ku-Ring-Gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast LGA – **Chapter 4** of the Biodiversity and Conservation SEPP 2021 applies to **all zones**.

- In all other identified LGAs, **Chapter 3** of the Biodiversity and Conservation SEPP 2021 **applies** to land zoned RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry.

The SEPP applies in accordance with *Part 4.2 Clause 4.9 – Development assessment process – no approved koala plan of management for land.*

(1) This clause applies to land to which this policy applies if the land –

a) Has an area of at least 1 hectare (including adjoining land within the same ownership, and

The lot in which the site occurs is >1ha.

b) Does not have an approved koala plan of management applying to the land.

MCC does not have an approved koala plan of management.

Additionally, tree species belonging to the koala use trees species listed in Schedule 3 for the relevant koala management area (Central Coast) occur within the subject land, and therefore, are assumed to be removed as part of future works. Four (4) Koala Use Trees Species were determined present within the study area including *Corymbia maculata* (Spotted Gum), *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus tereticornis* (Forest Red Gum), and *Melaleuca quinquenervia* (Broad-leaved Paperbark).

A Koala Assessment Report has been produced (refer to **Appendix 8**). A single SAT was undertaken over the study area within areas where these Schedule 2 trees occur with more than a 15% canopy cover and nocturnal spotlighting was conducted over two consecutive nights (refer to **Figure 2**). No individuals or secondary indications were observed during the survey.

5.3.3 Commonwealth EPBC Act

An EPBC Act Protected Matters Search (accessed 9-06-2023) was undertaken to generate a list of those Matters of National Environmental Significance (MNES) within 10 km of the site. An assessment of those MNES relevant to biodiversity has been undertaken in accordance with EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DoE, 2013). The Matters of National Environmental Significance protected under national environment law include:

- Listed threatened species and communities;
- Listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- World heritage properties;
- National heritage places;
- The Great Barrier Reef Marine Park;
- Nuclear actions; and
- A water resource, in relation to coal seam gas development and large coal mining development.

Listed Threatened Species and Communities

A total of 53 threatened species and eight threatened ecological communities listed under the EPBC Act have been recorded on the protected matters search at the time of assessment. A likelihood of occurrence assessment for these MNES has been completed in **Appendix 5**.

Threatened Species

A total of 19 threatened birds, ten mammals, three herpetofauna and 21 flora species were recorded on the protected matters search. Of these, three listed Vulnerable (V) and Critically Endangered (CE) species were considered to have the potential to utilise the habitats within the subject land, these are as follows:

- *Lathamus discolour* – Swift Parrot (CE)
- *Hirundapus caudacutus* – White-throated Needletail (V)
- *Pteropus poliocephalus* – Grey-headed Flying-fox (V)

The EPBC Act Test of Significance in **Appendix 7** concluded that the proposal is unlikely to impact the listed threatened species.

No Threatened Ecological Communities listed under the EPBC Act have been recorded within the Study Area.

Listed Migratory Species

The protected matters search nominated 14 migratory species or species habitat that may occur with the 10 km subject land buffer search area. No listed migratory species were observed within the study area during the site assessments. The assessment contained in **Appendix 5** concluded that, no habitat within the subject land or study area is critical to their survival. Therefore, it is unlikely that the proposal over the subject land will impact migratory species.

Wetlands of International Significance (declared Ramsar wetlands):

The study area is not located within 10 km of a wetland of international significance or declared Ramsar wetland. A wetland of international importance was nominated by the protected matters search:

- Hunter Estuary Wetlands

The Hunter Estuary Wetlands Ramsar site supports species that are nationally and internationally listed. Importantly the green and golden bell frog (*Litoria aurea*) listed as vulnerable under the EPBC Act 1999 have been found within the Kooragang component of the Ramsar site. The Australasian bittern (*Botaurus poiciloptilus*) listed as endangered on both the EPBC Act and the IUCN Red List (Version 2009.1) has been found at both components of the Ramsar site.

The Hunter Estuary Wetland Ramsar site supports 112 species of waterbirds and 45 species of migratory birds listed under international agreements, including the great egret (*Ardea alba*), cattle egret (*Ardea ibis*), terns (*Sterna* spp.), glossy ibis (*Plegadis falcinellus*) and white-breasted sea-eagle (*Haliaeetus leucogaster*).

These wetlands also provide refuge for waterbirds such as ducks and herons during periods of inland drought.

The Hunter Estuary Wetland Ramsar site regularly supports 1% of the population of the eastern curlew (*Numenius madagascariensis*) and the red-necked avocet (*Recurvirostra novaehollandiae*).

Commonwealth Marine Areas:

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

World Heritage Properties:

The site is not a World Heritage area and is not near any such area.

National Heritage Places:

The study area is not a National Heritage area and is not in close proximity to any such area.

Great Barrier Reef Marine Parks:

The study area is not part of or within close proximity to any Great Barrier Reef Marine Park.

Nuclear Actions:

The proposal over the study area is not and does not form part of a nuclear action.

Water Resources in relation to Coal Mining and CSG:

The proposal over the study area is related to commercial development and as such is not or does not form part of a coal mining and/or CSG proposal.

Summary

In summary, the proposed action is unlikely to have an impact to MNES assessed herewith based on the assessment criteria set out in relevant Commonwealth policies and advices as at the time of this assessment.

6 Recommendations

The following recommendations have been generated with due consideration of the proposed disturbance of up to 0.03 ha of native vegetation, identified as of PCT 3433 and 8.05 ha of planted and disturbed vegetation. The intent is to minimise the effect of clearing and potential for any indirect impacts to occur.

General Mitigation Measures for the Construction Phase

The following mitigation measures have been provided for implementation to ensure best practice environmental management throughout the construction phase, including appropriate location and management of construction materials:

- All contractors will be specifically advised of the designated work area. The following activities are not to occur outside of designated work areas to minimise environmental impacts:
- Storage and mixing of materials;
- Liquid disposal;
- Machinery repairs and/or refuelling;
- Combustion of any material; and
- Any filling or excavation including trenching, topsoil skimming and/or surface excavation.
- All construction vehicles/machinery are to use the designated access from main roads. Speeds will be limited to reduce the potential of fauna strike and to reduce dust generation;
- Plant and machinery would be cleaned of any foreign soil and seed prior to being transported to the site to prevent the potential spread of weeds and *Phytophthora cinnamomi*;
- If machinery is transported from an area of confirmed infection of Phytophthora cinnamomi to the site, stringent wash down must be completed before leaving the area, removing all soil and vegetative material from cabins, trays, and under carriages;
- All liquids (fuel, oil, cleaning agents, etc.) will be stored appropriately and disposed of at suitably licensed facilities. Spill management procedures will be implemented as required;
- Rubbish will be collected and removed from the site; and
- During the creation of access tracks, erosion or sediment measures will be considered and installed as required.

Erosion and Sedimentation Control

Erosion and sediment control measures shall be implemented in accordance with the approved Sediment and Erosion control plan to be prepared prior to commencement of civil works on site. In general, erosion and sediment control measures include:

- Identification of potential erosion areas;
- Installation and maintenance of flow, erosion, sediment and nutrient control within the site during construction ahead of pavement and kerb establishment;
- Separation of ‘dirty’ construction water from the ‘clean’ natural overland flow water;
- Coordinated work practices aimed at minimising land disturbance;
- Minimise vegetation disturbance to surrounding retained vegetation; and
- Routine site inspections of drains, channels, sediment control structures and water quality.

Ensure the extent of clearing is clearly marked in the field prior to the commencement of vegetation clearing. Ensure that only the minimum vegetation clearing required is undertaken.

Pre-clearance works

The following recommendations are provided to mitigate potential impacts on all biodiversity values within the site with particular focus on any species, population or ecological community listed under the BC Act and/or EPBC Act:

- The extent of vegetation clearing is to be clearly identified on construction plans.
- Clearing limits should be demarcated with highly visible flicker tape to ensure clearing does not extend beyond the required area.

Weed Control

- Control the establishment of weeds on the development site which could spread into adjacent native vegetation or affect watercourses.

Post-approval and compliance works

It is expected that areas associated with the low-lying ephemeral creekline are to be avoided, with an appropriate vegetation management plan (VMP) being applied as a condition of consent for the proposal (refer to **Appendix 9** for further information).

7 Conclusion

MJD Environmental has been engaged by SNL Building Constructions Pty Ltd to prepare a Biodiversity Assessment Report (BAR) to accompany a Development Application (DA) to be submitted to Maitland City Council (MCC) for the proposed subdivision of Lot 1 DP 1156433 27 Lang Drive, Bolwarra Heights NSW.

The assessment aimed to examine the likelihood of the proposed subdivision having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Biodiversity Conservation Act 2016* (BC Act). This assessment recognises the relevant requirements of the EP&A Act 1979 as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*. Preliminary assessment was also undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An appraisal of the study area to determine the appropriate assessment pathway under the BC Act determined that the proposal does not trigger a Biodiversity Offset Scheme (BOS) entry threshold and on this basis, a Test of Significance (5-part test) was conducted in accordance with Section 7.3 of the BC Act.

Field surveys found that the proposal will remove/modify up to:

- 0.03 ha of PCT 3433 *Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest;* and
- 8.05 ha of planted and disturbed vegetation that is not associated with the PCT.

Flora

No threatened flora species were detected during field surveys.

Fauna

Pomatostomus temporalis (Grey-crowned Babbler – BC Act listed Vulnerable), was detected during the field surveys. In addition to this species, there is potential for the following 11 species to utilise the study area as the vegetation present broadly represents suitable foraging and/or breeding habitat:

- *Daphoenositta chrysoptera* – Varied Sittella
- *Glossopsitta pusilla* – Little Lorikeet
- *Haliaeetus leucogaster* – White-bellied Sea-Eagle
- *Lathamus discolor* – Swift Parrot
- *Micronomus norfolkensis* - Eastern Coastal Free-tailed Bat
- *Myotis macropus* - Southern Myotis
- *Ninox connivens* – Barking Owl
- *Ninox strenua* – Powerful Owl
- *Pteropus poliocephalus* – Grey-headed Flying-fox
- *Saccolaimus flaviventris* - Yellow-bellied Sheathtail-bat
- *Tyto novaehollandiae* – Masked Owl

For each of the 12 BC Act listed threatened species, a Test of Significance was conducted, as per Section 7.3 of the *BC Act 2016* (see **Appendix 6** for full details). These assessments concluded that while the removal of native vegetation on study area totalling 0.03 ha contributes marginally to habitat loss, the impacts are unlikely to interfere with the recovery of any of the 12 listed threatened species at a regional scale.

Other legislative considerations include assessments under the State Environment Planning Policy (SEPP) (Biodiversity & Conservation) (2021), which included formal targeted surveys of *Phascolarctos cinereus,* which was not observed within the study area.

Additionally, *Lathamus discolor, Hirundapus caudacutus,* and *Pteropus poliocephalus* are also listed under the EPBC Act and were determined to have a low likelihood of occurring on the study area based on habitat attributes and distribution. EPBC Act guidelines for significant impact were applied to these species and it was determined that the proposal will not have a significant impact on any of these species. Therefore, a referral of the project to the Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW) for these matters is not required.

Minimising impacts to the biodiversity values within the study area has been considered throughout the planning process. Although the development footprint encompasses most of the study area, this site was selected due to its current land use as it primarily encompasses highly modified exotic pasture, which contains low biodiversity value resulting from the heavy management consistent with past land use history. Moreover, the proposal design has been amended to minimise the potential impacts on the biodiversity values that have been assessed within the study area. Such adjustments include adjusting the front setbacks of each subdivided lot to 15 m, as well as, retaining the majority of the mature hollow bearing trees associated with the remnant woodland vegetation (VZ 1), with only a single habitat tree is being removed. Additionally, areas associated with the low-lying wet area are to be avoided and restored as per **Appendix 9**.

In conclusion, the assessments conducted have determined that the proposal was unlikely to have a significant impact on the threatened entities assessed. The analysis of biodiversity impact is strictly limited to the boundaries of the development footprint mapped and described herein as the subject land, verifiable by the attached data package. Any change to the scope of work may require re-assessment.

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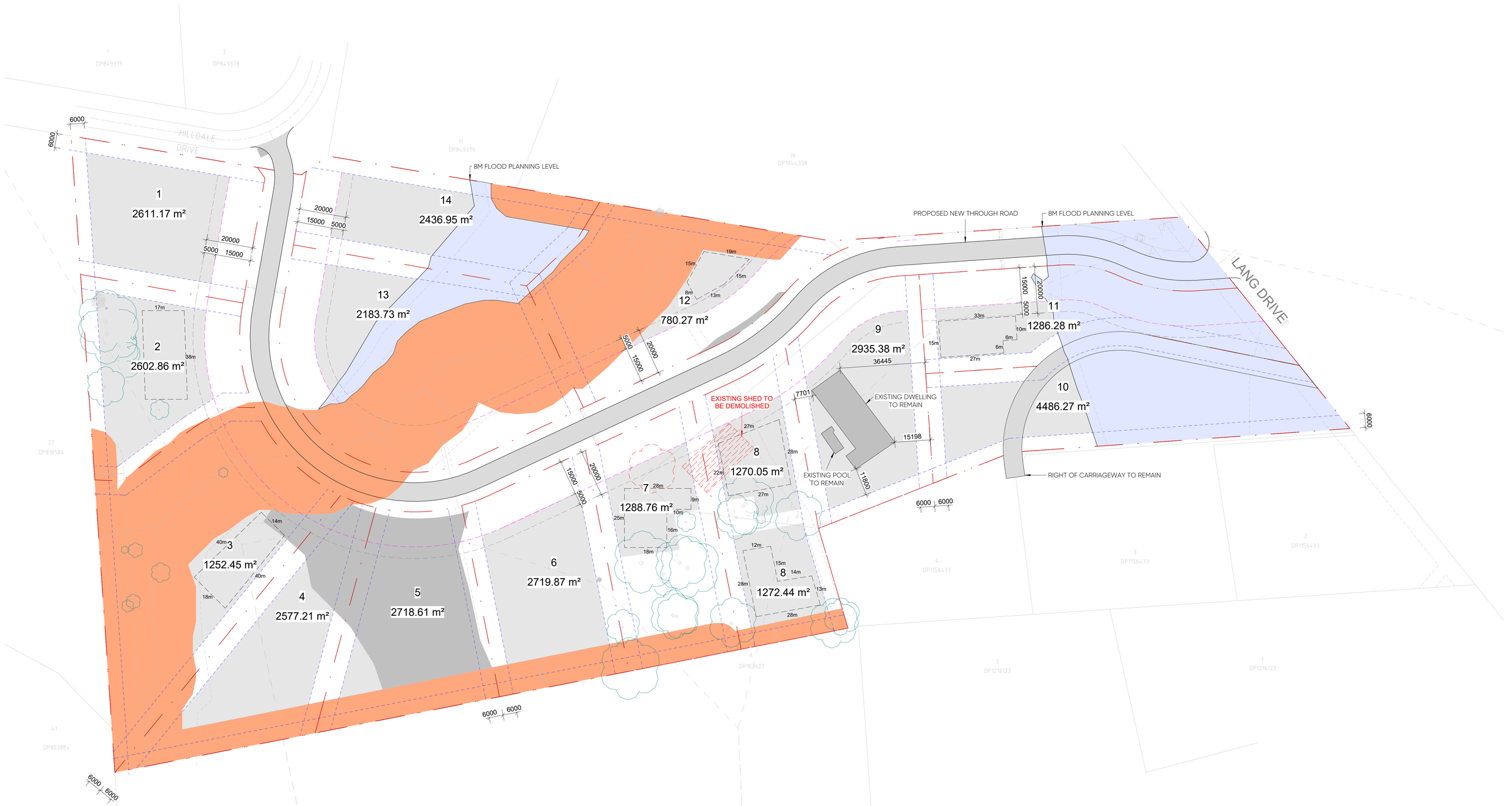
Appendix 1 Plan of Proposal



ROOMS BY NAME

- APZ
- BUILDABLE AREA
- FLOOD ZONE

- 6M SIDE AND REAR SETBACK
- BOUNDARY
- PROPOSED 15M SETBACK
- DCP 20M SETBACK
- POTENTIAL BUILDING FOOTPRINT

GENERAL NOTES:

- ALL NEW WORK IS TO COMPLY WITH THE CURRENT AUSTRALIAN STANDARDS AT TIME OF CONSTURCTION
- BRACING, TIE DOWN, DRAINAGE & BEAMS TO STRUCTURAL ENGINEERS DESIGN
- ALL NEW STORMWATER DRAINAGE TO BE CONNECTED TO EXISITNG SYSTEM, UNLESS NOTED OTHERWISE BY SUITABLY QUALIFIED CIVIL ENGINEER
- SELECTED TERMITE SYSTEM TO COMPLY WITH AS 3660.1-2000 TO BE PROVIDED TO ALL NEW BUILDING WORK & IS TO BE INSTALLED TO MANUFACTURESES DETAILS WITH ANNUAL TREATMENTS AS REQUIRED
- LEVELS ARE TO BE CONFIRMED ONSITE PRIOR TO CONSTRUCTION
- SITE IS TO BE SETOUT BY A REGISTERED SURVEYOR
- ALL DIMENSIONS & LEVELS TO BE CONFIRMED ONSITE BY BUILDER PRIOR TO START OF WORK
- THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTS
- WORK TO FIGURED DIMENSIONS ONLY. DO NOT SCALE
- SMOKE DETECTORS TO BE HARDWIRED TO BCA REQUIREMENTS
SEDIMENTATION FENCING TO BE ERECTED AND IN PLACE AT CONSTRUCTION STAGE

SNL BUILDING

Rev	Date	Description	Issued
1	11/08/2023	FOR INFORMATION	NH

0 2000 4000 6000 8000 10000 mm

SCALE 1:200

PROJECT:
LANG DRIVE

CLIENT:

ADDRESS:
27 LANG DRIVE, BOLWARRA HEIGHTS

SHEET NAME
BUILDABLE AREA AND SITE CONSTRAINTS

SHEET NUMBER
SK - 0001

REV
1

Appendix 2 Flora & Fauna Species List

Flora							
Family	**Scientific Name**	**Common Name**	**Exotic**	**B01**	**B02**	**B03**	**B04**
Araliaceae	*Hydrocotyle hirta*	Hairy Pennywort					x
Asteraceae	*Ageratina adenophora*	Crofton Weed	*HTE				x
Asteraceae	*Aster subulatus*	Wild Aster					x
Asteraceae	*Bidens spp.*		*HTE		x		
Asteraceae	*Hypochaeris radicata*	Catsear	*		x	x	x
Asteraceae	*Hypochaeris spp.*	A Catsear	*	x			
Asteraceae	*Senecio madagascariensis*	Fireweed	*HTE	x	x	x	x
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	*				x
Campanulaceae	*Lobelia purpurascens*	whiteroot			x		x
Casuarinaceae	*Casuarina cunninghamiana*	River Oak					
Casuarinaceae	*Casuarina glauca*	Swamp Oak					x
Convolvulaceae	*Dichondra repens*	Kidney Weed			x		
Crassulaceae	*Crassula sieberiana*	Australian Stonecrop			x		
Cyperaceae	*Cyperus brevifolius*		*	x		x	x
Cyperaceae	*Cyperus eragrostis*	Umbrella Sedge	*HTE				x
Cyperaceae	*Cyperus polystachyos*			x	x	x	
Cyperaceae	*Eleocharis acuta*						x
Cyperaceae	*Eleocharis sphacelata*	Tall Spike Rush					x
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge		x		x	
Cyperaceae	*Isolepis inundata*	Club-rush			x		
Cyperaceae	*Schoenoplectus validus*						x
Fabaceae - Faboideae	*Trifolium pratense*	Red Clover	*				x
Fabaceae - Faboideae	*Trifolium repens*	White Clover	*		x		
Geraniaceae	*Geranium solanderi*	Native Geranium					x
Haloragaceae	*Haloragis heterophylla*	Variable Raspwort		x			
Iridaceae	*Iris germanica*	Tall Bearded Iris	*				x
Juncaceae	*Juncus cognatus*		*			x	x
Juncaceae	*Juncus usitatus*				x		
Lamiaceae	*Mentha pulegium*	Pennyroyal	*			x	
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	*				
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	*		x		
Myrtaceae	*Callistemon salignus*	Willow Bottlebrush					
Myrtaceae	*Corymbia maculata*	Spotted Gum			x		
Myrtaceae	*Corymbia torelliana*	Cadaghi					
Myrtaceae	*Eucalyptus punctata*	Grey Gum					
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany					
Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum					
Myrtaceae	*Lophostemon confertus*	Brush Box					
Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree					
Oxalidaceae	*Oxalis stricta*	Common Yellow Woodsorrel	*		x		
Pinaceae	*Pinus radiata*	Radiata Pine	*				
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*	x	x	x	x
Poaceae	*Axonopus fissifolius*	Narrow-leafed Carpet Grass	*HTE	x	x	x	x
Poaceae	*Briza maxima*	Quaking Grass	*	x			
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	*				
Poaceae	*Cynodon dactylon*	Common Couch			x	x	
Poaceae	*Digitaria didactyla*	Queensland Blue Couch		x	x	x	
Poaceae	*Ehrharta erecta*	Panic Veldtgrass	*				
Poaceae	*Eragrostis brownii*	Brown's Lovegrass			x	x	
Poaceae	*Holcus lanatus*	Yorkshire Fog	*				x

Poaceae	*Microlaena stipoides*	Weeping Grass					x
Poaceae	*Paspalum dilatatum*	Paspalum	*HTE				x
Poaceae	*Paspalum distichum*	Water Couch			x		
Poaceae	*Paspalum urvillei*	Vasey Grass	*				x
Poaceae	*Setaria sphacelata*	South African Pigeon Grass	*				x
Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass		x	x	x	
Poaceae	*Themeda triandra*			x		x	
Polygonaceae	*Rumex conglomeratus*	Clustered Dock	*				x
Polygonaceae	*Rumex crispus*	Curled Dock	*				x
Primulaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*		x		x
Proteaceae	*Grevillea robusta*	Silky Oak					
Rubiaceae	*Richardia humistrata*		*	x	x	x	
Verbenaceae	*Verbena bonariensis*	Purpletop	*				x

* = non-native species

Fauna List			
Birds		**BC Act**	**EPBC Act**
Anser anser domesticus	Domestic Goose	-	-
Ardea intermedia	Intermediate Egret	-	-
Cacatua sanguinea	Little Corella	-	-
Chenonetta jubata	Australian Wood Duck	-	-
Cisticola exilis	Golden-headed Cisticola	-	-
Coracina novaehollandiae	Black-faced cuckooshrike	-	-
Cracticus nigrogularis	Pied Butcherbird	-	-
Dacelo novaeguineae	Laughing kookaburra	-	-
Egretta novaehollandiae	White-faced Heron	-	-
Eolophus roseicapilla	Galah	-	-
Grallina cyanoleuca	Magpie-lark	-	-
Gymnorhina tibicen	Australian magpie	-	-
Litoria fallax	Eastern Dwarf Tree Frog	-	-
Manorina melanocephala	Noisy Miner	-	-
Ocyphaps lophotes	Crested Pigeon	-	-
Pelecanus conspicillatus	Australian Pelican	-	-
Platycercus eximius	Eastern Rosella	-	-
Pomatostomus temporalis	Grey-crowned Babbler	V	-
Rhipidura leucophrys	Willie Wagtail	-	-
Trichoglossus haematodus	Rainbow lorikeet	-	-
Trichosurus vulpecula	Brushtail Possum	-	-
Tyto javanica	Eastern Barn Owl	-	-
Vanellus miles	Masked lapwing	-	-

* = non-native species

(V) = listed as Vulnerable under the BC & EPBC Ac

Appendix 3 BAM Plot Data

	Plot Info							Composition						Structure (%)						Function									
VZ	Plot	PCT	Condition Class	Zone	Easting	Northing	Bearing	Tree	Shrub	Grass	Forbs	Ferns	Other	Tree	Shrub	Grass	Forbs	Ferns	Other	Lge Tree	Hollows	Litter Cover (%)	Logs	Tree Stem 5-9	Tree Stem 10-19	Tree Stem 20-29	Tree Stem 30-49	Tree Stem 50-79	Tree Regen	HTE (%)
2	B01	3433	Disturbed	56	367610	6381928	109	0	0	5	1	0	0	0.0	0.0	84.1	0.1	0.0	0.0	0	0	4.8	0.0	0	0	0	0	0	0	10.2
1	B02	3433	Woodland	56	367790	6381780	69	1	0	8	3	0	0	10.0	0.0	85.5	0.3	0.0	0.0	1	2	3.6	0.0	0	0	0	0	1	0	0.2
2	B03	3433	Disturbed	56	367728.89	6381820.53	200	0	0	7	0	0	0	0.0	0.0	89.7	0.1	0.0	0.0	0	0	1.2	0.0	0	0	0	0	0	0	9.0
2	B04	3975	Disturbed	56	367570.58	6381794.69	48	1	0	4	3	0	0	5.0	0.0	2.7	1.2	0.0	0.0	0	0	11.6	0.0	1	0	0	1	0	0	47.3

Appendix 4 Native Planted Vegetation – BAM Appendix D Module

As described in Section **4.2.2**, planted native vegetation is present within the study area within VZ 3. Prior to the proposal design being finalised, BAM field assessments were carried out to determine the overall potential impacts on native vegetation area. Therefore, the planted vegetation observed within the study area was assessed in accordance with the BAM (2020), Appendix D: Streamlined assessment module – Planted native vegetation.

1. **Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal?**
   - No. Planted native vegetation within the study area is represent by a suite of canopy species that are of a younger age cohort than the remnant canopy associated with VZ1. Best fit PCTs that this VZ was compared to include PCT 3433 which is the dominant vegetation community within the study area. However, the vegetation nominated as planted is not associated or diagnostic of any PCT in which the remnant vegetation in the study area would co-occur in the IBRA subregion (Sydney Basin – Hunter)
2. **Is the planted native vegetation:**
   a. **planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.)**
      - No, the plantings pre-date conservation legislation that could feasibly apply to revegetation activity, including those listed in Section 11.9 (2 a-j) of BAM 2020.
   b. **the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat?**
      - No, the plantings do not represent any local plant communities or habitat or forage for threatened species.
3. **Is the planted/translocated native vegetation individuals of a threatened species or other native species planted/translocated for the purpose of providing threatened species habitat under one of the following:**
   a. **a species recovery project**
   b. **Saving our Species project**
   c. **other types of government funded restoration project**
   d. **condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat**
   e. **legal obligation as part of a condition or ruling of court. This includes regulatory directed or ordered remedial plantings (e.g. Remediation Order for clearing without consent issued under the BC Act or the Native Vegetation Act)**
   f. **ecological rehabilitation to re-establish a PCT or TEC that was, or is carried out under a mine operations plan, or**
   g. **approved vegetation management plan (e.g. as required as part of a Controlled Activity Approval for works on waterfront land under the NSW Water Management Act 2000)?**
      - No, see above question 2a. None of the planted native vegetation is a listed threatened species in NSW. Plantings are amenity plantings consisting of exotic and native canopy trees selected from regions distant from the subject site, for aesthetic purposes.
      - No mine operations pertain to the study area.
      - The study area has never been subject to a vegetation management plan (VMP). Note, pending DA approval a VMP is expected to be part of the conditions of consent (see **Appendix 9** for additional details), however, this VMP is not associated with the current area of planted vegetation.
4. **Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration without a legal obligation to secure or provide for management of the native vegetation?**

- No, the planted native vegetation, which does not include individuals of a threatened flora species, was not undertaken as part of revegetation, environmental rehabilitation or restoration.

5. Is the native vegetation planted for functional, aesthetic, horticultural or plantation forestry purposes?

- Yes, the native vegetation was planted for aesthetic reasons as this vegetation is associated with roadside vegetation and a garden at the front of the existing residential dwelling. As such, assessment under D.2 was applied for the planted native vegetation.

D.2 Assessment of planted native vegetation for threatened species habitat

Planted native vegetation described in the BAR has been assessed in accordance with the Streamlined assessment module planted native vegetation (DPE, 2022). The BAM (2020) allows streamlined modules for planted native vegetation satisfying condition D.2, however this assessment is already within Small Area streamlined assessment. The BAM (2020) does not require that planted native vegetation be assessed for Biodiversity Values as per Sections 4 and 5, however assessment of potential habitat has been assessed by field survey concurrent with the assessment of all land within the study area. Regardless of all other outcomes, avoid and minimise (BAM Chapter 7), prescribed impacts (BAM Chapter 6), and any SAII (BAM Section 9.1) must be considered.

Planted native vegetation within the study area was examined on 30th of May 2023 and was found to contain potential habitat for threatened fauna species such as *Lathamus discolor* (Swift Parrot) or *Phascolarctos cinereus* (Koala) in the form of winter and spring flowering eucalyptus trees, including *Eucalyptus robusta* (Swamp Mahogany), and *Eucalyptus tereticornis* (Forest Red Gum). One hollow was observed in the planted vegetation behind the existing residential dwelling; however, no activity was observed during nocturnal surveys conducted on the 18th-19th of July 2023, nor will this tree be impacted by the proposal. Sticknests were observed in the study area but not within the planted native vegetation, with no other direct or secondary indications of threatened species utilisation of habitat provided by planted native vegetation was observed during field surveys.

Planted vegetation may provide seasonal forage in the form of blossom, seed or fruit, or attract secondary food sources such as insects, however given the highly fragmented nature of all the vegetation within the study area, and the disturbance history this area and the broader landscape, it is unlikely that the planted native vegetation in the study area constitutes a significant resource for threatened species in the locality. Moreover, it is expected that the majority of the planted vegetation surrounding the existing residential dwelling will be retained, minimising the overall prescribed biodiversity impact.

Appendix 5 Likelihood of Occurrence and Impact Assessment

Scientific Name	BC Act	EPBC Act	No. of Records	Habitat Description	Likelihood of Occurrence	Potential Impacts	ToS Required
Threatened Ecological Communities							
Central Hunter Grey Box—Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	E	-	K	Central Hunter Grey Box-Ironbark Woodland occurs in the Central Hunter Valley between about Singleton and Muswellbrook. It is known to occur in the Cessnock, Singleton and Muswellbrook LGAs but may occur elsewhere within the Sydney Basin Bioregion.	Not recorded in study area.	Low	No
Central Hunter Ironbark—Spotted Gum—Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	E	-	K	Central Hunter Ironbark-Spotted Gum-Grey Box Forest occurs in the central Hunter Valley mainly between Maitland and Muswellbrook. It has been recorded from Singleton, Cessnock and Muswellbrook LGAs but may occur elsewhere within the North Coast and Sydney Basin Bioregions.	The study area occurs within the distribution of this TEC as it occurs within the Sydney Basin IBRA Bioregion. Although the remnant woodland is comprised of *C. maculata*, the other diagnostic canopy species (*Eucalyptus crebra, and Eucalyptus moluccana)* are absent, as are the characteristic species within the midstory and groundcover. Though their absence is likely driven by the heavy disturbance that has occurred within the study area and surrounding area, it was determined that the vegetation within the study area is not commensurate with this TEC.	Low	No
Central Hunter Valley eucalypt forest and woodland	-	CE	M	Within the Sydney Basin Bioregion the ecological community occurs mainly in the Hunter Valley IBRA subregion. It also occurs in subregions adjacent to the Hunter Valley IBRA subregion; for example, in the Goulburn Valley in the Kerrabee IBRA subregion and in the Hunter Thrust Zone in the Upper Hunter IBRA subregion. The Central Hunter Valley eucalypt forest and woodland ecological community generally occurs on soils derived from the Permian sedimentary bedrock found on the valley floors and on lower hillslopes and low ridges. The Permian derived soils are dominated by soloths, solodics, yellow podzolics, with limited areas of brown clays and red clays.	After comparison against the Key Diagnostic Characteristics (Section 1.5.1 - Approved conservation Advice), it was determined that this TEC does not occur within the study area. Although the study area occurs within the Hunter River Catchment, and occurs on a lower hillslope, the observed community occurs on an alluvial flat, and the associated woodland does not account for 10% or more of the canopy cover. As such, the TEC is does not occur within the study area and no impact is likely.	Low	No

Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	This community occurs in the intertidal zone along the NSW coast.	Not recorded in study area.	Low	No
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	-	E	K	The ecological community is associated with forested palustrine wetlands, or swamp forests, found in the temperate to subtropical coastal valleys of Australia's east coast, and occurs between the Great Dividing Range and the coastline from near Gladstone in Queensland, through to the south coast of New South Wales.	Not recorded in study area.	Low	No
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	This community is known from along the majority of the NSW coast.Associated with coastal areas subject to periodic flooding and in which standing fresh water persists for at least part of the year in most years. Typically occurs on silts, muds or humic loams in low-lying parts of floodplains, alluvial flats, depressions, drainage lines, backswamps, lagoons and lakes but may also occur in backbarrier landforms where floodplains adjoin coastal sandplains. Generally occur below 20 m elevation on level areas.	Not recorded in study area.	Low	No
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	E	-	K	Hunter Floodplain Red Gum Woodland has been recorded from the local government areas of Maitland, Mid-Western, Muswellbrook, Singleton, and Upper Hunter but may occur elsewhere within the NSW North Coast and Sydney Basin Bioregions. Mapped occurrences include few remnants greater than 10 hectares and many small remnants less than 10 hectares, indicating severe fragmentation. Within the Central Hunter Valley geographic distribution is estimated to have been reduced by more than 90% of its pre-European extent. Hunter Floodplain Red Gum Woodland generally occurs on floodplains and floodplain rises.	Not recorded in study area.	Low	No
Hunter Valley Weeping Myall (Acacia pendula) Woodland	-	CE	M	The ecological community occurs within the Hunter Valley region of NSW, which encompasses the northern part of the Sydney Basin IBRA bioregion and the southern part of the NSW North Coast bioregion.The known stands of the ecological community occur between the localities of Warkworth and Wybong, including a well-documented patch at Jerrys Plains cemetery. The ecological community lies on the floor of the Hunter Valley, at elevations of 60 to 150 metres above sea level	Not recorded in study area.	Low	No

Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	E	-	K	Occurs between Muswellbrook, Beresfield, Mulbring and Cessnock in the Lower Hunter in the Sydney Basin and North Coast bioregions. It has been recorded from the Maitland, Cessnock, Port Stephens, Muswellbrook and Singleton LGAs, but may occur elsewhere in these bioregions. Probably less than 500 hectares of this community remains.	Not recorded in study area.	Low	No
Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion	V	-	K	Hunter Valley Footslopes Slaty Gum Woodland mainly occurs on the southern side of the Hunter Valley from near Bulga to the Bylong/Goulburn River National Park area. It occurs on colluvial soils on exposed footslopes associated with the interface between Triassic Narrabeen sandstones and Permian sediments. Hunter Valley Footslopes Slaty Gum Woodland is known to occur in Singleton, Muswellbrook and Upper Hunter LGAs, and may occur in the Mid-western Regional LGA. It tends to occur in relatively hot and dry parts of the landscape.	Not recorded in study area.	Low	No
Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions	E	-	K	Hunter Valley Vine Thicket has a highly restricted geographic distribution in the central Hunter Valley. The community occurs mostly as patches of less than 10 ha, with a few larger patches exceeding 100 ha. Approximately 85% of the pre-European distribution of the community remains. The largest occurrence is at Brushy Hill adjacent to Glenbawn Dam, north east of Scone. The only stand known to occur in a conservation reserve is at Mt Dangar within the Goulburn River National Park. Hunter Valley Vine Thicket has been recorded from the local government areas of Muswellbrook, Singleton, and Upper Hunter but may occur elsewhere within the Sydney Basin Bioregion and NSW North Coast Bioregion. Important site characteristics include low precipitation and high levels of solar radiation. This semi-arid soil environment will have selected the more xerophytic species from the available regional assemblage of rainforest species. Hunter Valley Vine Thicket mainly occurs on rocky slopes on Carboniferous sediments and volcanics, occasionally with limestone.	Not recorded in study area.	Low	No

Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion	CE	-	K	Hunter Valley Weeping Myall Woodland of the Sydney Basin bioregion is currently known from parts of the Muswellbrook and Singleton Local Government Areas, but may occur elsewhere in the bioregion. It may also occur in the Upper Hunter Local Government Area within the Brigalow Belt South bioregion, although its presence has not yet been confirmed there. This community is associated with heavy clay soils on depositional landforms in the south-western part of the Hunter River valley floor. It is of conservation significance because it represents a disjunct coastal example of vegetation that is found principally on the western slopes of Great Dividing Range. Taxa such as Acacia pendula, A. homalopyhlla-A. melvillei complex, Geijera parviflora, Enchylaena tomentosa, Maireana microphylla and Ptilotus semilanatus are typical of the inland flora of southeastern Australia.	Not recorded in study area.	Low	No
Kurri Sand Swamp Woodland in the Sydney Basin Bioregion	E	-	K	Kurri Sand Swamp Woodland is a low woodland or heathland, generally with a low open canopy rarely exceeding 15 m in height and a shrubby understorey. Known to occur in the Kurri Kurri–Cessnock area of the Cessnock LGA in the lower Hunter Valley, but it may occur elsewhere. Occurs on soils developed on poorly-drained Tertiary sand deposits that blanket Permian sediments.	Not recorded in study area.	Low	No
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	Littoral Rainforest occurs only on the coast and is found at locations in the NSW North Coast Bioregion, Sydney Basin Bioregion and South East Corner Bioregion. Littoral Rainforest is very rare and occurs in many small stands. Occurs on sand dunes and on soil derived from underlying rocks. Stands on headlands exposed to strong wind-action may take the form of dense, wind-pruned thickets. Most stands occur within two kilometres of the sea, though are occasionally found further inland within reach of the maritime influence.	Not recorded in study area.	Low	No
Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	E	-	K	Restricted to a range of approximately 65 km by 35 km centred on the Cessnock - Beresfield area in the Central and Lower Hunter Valley. Within this range, the community was once widespread. A fragmented core of the community still occurs between Cessnock and Beresfield. Remnants occur within the Local Government Areas of Cessnock, Maitland, Singleton, Lake Macquarie, Newcastle and Port Stephens but may also occur elsewhere within the bioregion	Is present within the study area, see **Section 4.2.3** for determination	High	Yes

Lowland Rainforest of Subtropical Australia	-	CE	L	The ecological community primarily occurs from Maryborough in Queensland to the Clarence River (near Grafton) in New South Wales (NSW). The ecological community also includes isolated areas between the Clarence River and Hunter River such as the Bellinger and Hastings valleys. The ecological community occurs in the following Interim Biogeographic Regionalisation for Australia Version 6.1 (IBRA) Bioregions: South Eastern Queensland Bioregion and NSW North Coast Bioregion. The ecological community occurs on basalt and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia. It also occurs occasionally on enriched rhyolitic soils and basaltically enriched metasediments. Lowland Rainforest mostly occurs in areas <300 m above sea level. Aspect can result in the ecological community being found at >300 m altitude on north-facing slopes, but typically 300 m defines the extent of the lowlands. In addition, Lowland Rainforest typically occurs in areas with high annual rainfall (>1300 mm).	Not recorded in study area.	Low	No
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E	-	K	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions is an ecological community of subtropical rainforest and some related, structurally complex forms of dry rainforest.	Not recorded in study area.	Low	No
Quorrobolong Scribbly Gum Woodland in the Sydney Basin Bioregion	E	-	K	Currently known from only a small area between Quorrobolong and Mulbring in the Cessnock local government area, but may also occur elsewhere within the Hunter Valley. The current known extent is about 70 hectares; the pre-European extent is estimated to have been only 160 hectares, reflecting the limited area of the sand deposit on which it occurs. Not known to occur within any conservation reserves. Occupies gentle slopes and rises on a residual sand deposit overlying the Permian clay sediments of the Hunter Valley floor.	Not recorded in study area.	Low	No
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	-	CE	L	The River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria is found in the South East Corner (SEC) and Sydney Basin (SYB) IBRA bioregions. This encompasses the area from around Sale on the south-east coast of Victoria to around Raymond Terrace, just north of Newcastle on the New South Wales east coast.	After comparison against the Key Diagnostic Characteristics (Section 5.1.1 - Approved Conservation Advice), it was determined that this TEC does not occur within the study area. Although the study area occurs within the associated IBRA bioregion, catchment, elevation and soil formation, the canopy does not account for 20% of the canopy coverage. As such, the TEC is does not occur within the study area and no impact is likely.	Low	No

River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	This community is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include Eucalyptus tereticornis (forest red gum), E. amplifolia (cabbage gum), Angophora floribunda (rough-barked apple) and A. subvelutina (broad-leaved apple). Eucalyptus baueriana (blue box), E. botryoides (bangalay) and E. elata (river peppermint) may be common south from Sydney, E. ovata (swamp gum) occurs on the far south coast, E. saligna (Sydney blue gum) and E. grandis (flooded gum) may occur north of Sydney, while E. benthamii is restricted to the Hawkesbury floodplain.	Not recorded in study area.	Low	No
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	-	E	L	This ecological community is found on alluvial landforms, including floodplains, the riparian zones of parent rivers and other order tributaries, alluvial flats, floodplain/alluvial terraces and periodically flooded depressions. It generally occurs below 50 m above sea-level (ASL), although it can occur up to 250 m ASL. The ecological community generally occurs on alluvial soils, with more limited occurrences on in-situ soils within localised depressions, that may be at least occasionally saturated, water-logged, or inundated.	Not recorded in study area.	Low	No
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	The Swamp Oak EEC ranges along the coast of NSW and partially inland in the Hunter to Wollongong region, from Tweed Heads to Bega Valley. Associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Generally, occurs below 20 m (rarely above 10 m) elevation.	Not recorded in study area.	Low	No
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	The Swamp Sclerophyll Forest EEC ranges along the coast of NSW, from Tweed Heads to Shoalhaven. Associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Generally occurs below 20 m (though sometimes up to 50 m) elevation.	Not recorded in study area.	Low	No

Sydney Freshwater Wetlands in the Sydney Basin Bioregion	E	-	P	Occurs on sand dunes and low-nutrient sandplains along coastal areas in the Sydney Basin bioregion. It is known from the Lake Macquarie, Wyong, Gosford, Pittwater, Warringah, Woollahra, Waverley, Botany, Rockdale, Randwick, Sutherland and Wollongong local government areas, but is likely to occur elsewhere within the bioregion. Largely restricted to freshwater swamps in swales and depressions on sand dunes and low nutrient sandplains such as those of the Warriewood and Tuggerah soil landscapes. Swampy areas on alluvium with a saline influence do not fall within this community.	Not recorded in study area.	Low	No
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	Themeda Grassland on seacliffs and coastal headlands is found on a range of substrates in the NSW North Coast, Sydney Basin and South East Corner bioregions. Stands on sandstone are infrequent and small. Larger stands are found on old sand dunes above cliffs, as for example at Cape Banks and Henry Head in Botany Bay National Park, and on metasedimentary headlands, as for example at McCauleys Headland in Coffs Coast Regional Park, Look-at-me-now Headland, Dammerels Head and Bare Bluff in Moonee Beach Nature Reserve and Wilson's Headland in Yuraygir National Park. The community is found on a range of substrates, although stands on sandstone are infrequent and small.	Not recorded in study area.	Low	No
Warkworth Sands Woodland in the Sydney Basin Bioregion	E	-	P	Warkworth Sands Woodland is a low woodland occurring on aeolian sand deposits,confined to a small area near Warkworth, about 15 km south-west of Singleton in the Hunter Valley. Only approximately 800 hectares of Warkworth Sands Woodland remains, none of which occurs within a conservation reserve	Not recorded in study area.	Low	No
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	-	CE	L	The Box – Gum Grassy Woodland and Derived Grassland ecological community occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria (Beadle 1981). It occurs in the Brigalow Belt South, Nandewar, New England Tableland, South Eastern Queensland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South Western Slopes, Victorian Midlands and Riverina Bioregions (Environment Australia 2000).	Not recorded in study area.	Low	No

Key: V = Vulnerable, E = Endangered, and CE = Critically Endangered

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Habitat Description	Likelihood of Occurrence	Potential Impacts	ToS Required
Flora								
Acacia bynoeana	Bynoe's Wattle, Tiny Wattle	E	V	L	Bynoe's wattle is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. The species is currently known from about 30 locations in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include *Corymbia gummifera* (Red Bloodwood), *Eucalyptus haemastoma* (Scribbly Gum), *Eucalyptus parramattensis* (Parramatta Red Gum), *Banksia serrata* (Saw Banksia) and *Angophora bakeri* (Narrow-leaved Apple).	No OEH BioNet records exist within a 10 km search area of the study area. The species is associated with vegetation communities present within the study area (PCT 3433), however, no *Acacia spp*. were identified within the study area. Moreover, none of the associated canopy species are present within the study area, and therefore it is unlikely that this species will utilise the study area and no further assessment is required for the species.	Low	No
Arthraxon hispidus	Hairy-joint Grass	E	V	M	Occurs over a wide area in south-east Queensland, and on the northern tablelands and north coast of NSW, but is never common. Moisture and shade-loving grass, found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps.	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area, nor do the known and predicted distribution of this species overlap this region. Therefore, is unlikely that this species will utilise the study area and no further assessment is required for the species.	Low	No
Caladenia tessellata	Thick-lipped Spider-orchid, Daddy Long-legs	E	V	L	The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. The single leaf regrows each year.	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area, no does the known or predicted distribution of this species overlap the study area. Although parts of the study area present as grassy woodlands, these areas don't occur on sandy soils, with this species preferring habitats closer to the coast (ie. heathland or open forest with a heathy or sedgy groundcover). As such, it is unlikely that this species will utilise the study area and no further assessment is required.	Low	No

Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	M	The Leafless Tongue Orchid has been recorded from as far north as Gibraltar Range National Park south into Victoria around the coast as far as Orbost. It has been recorded from a number of National Parks along the east coast of NSW. Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by *Eucalyptus sclerophylla* (Scribbly Gum), *E. sieberi* (Silvertop Ash), *Corymbia gummifera* (Red Bloodwood) and *Allocasuarina littoralis* (Black Sheoak); appears to prefer open areas in the understorey of this community and is often found in association with the *C. subulata* (Large Tongue Orchid) and the *C. erecta* (Tartan Tongue Orchid).	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the predicted distribution of this species overlaps the study area, none of the associated canopy species are present within the study area, and therefore it is unlikely that this species will utilise the study area and no further assessment is required for the species.	Low	No
Cymbidium canaliculatum	*Cymbidium canaliculatum - endangered population*	E	-	3	Typically grows in the hollows, fissures, trunks and forks of trees in dry sclerophyll forest or woodland, where its host trees typically occur on Permian Sediments of the Hunter Valley floor. It usually occurs singly or as a single clump, which can form large colonies on trees, between two and six metres from the ground. Commonly found in *Eucalyptus albens* (White Box) dominated woodlands (including those dominated by the intergrade *E. albens-moluccana*), much of which may constitute the endangered ecological community (EEC) 'White Box Yellow Box Blakely's Red Gum Woodland'. It has been found, less commonly, to grow on *E. dawsonii* (Slaty Box), *E. crebra* (Narrow-leaved Ironbark), *E. moluccana* (Grey Box), *Angophora floribunda* (Rough-barked Apple), *Acacia salicina* (Cooba) and on some other species, including dead stags. It is also known to use man-made structures, such as fence posts and wooden bridges as its host.	Three OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the known distribution of this species overlaps the study area and marginal habitat in the form of a dry sclerophyll forest are present within the study area, it is unlikely that the species will utilise this area as no associated species are present. As such it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No

Cynanchum elegans	White-flowered Wax Plant	E	E	L	Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. The species has been recorded as far west as Merriwa in the upper Hunter River valley. The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest. Other associated vegetation types include littoral rainforest; *Leptospermum laevigatum* (Coastal Tea-tree) – *Banksia integrifolia subsp. integrifolia* (Coastal Banksia) coastal scrub; *Eucalyptus tereticornis* (Forest Red Gum) aligned open forest and woodland; *Corymbia maculata* (Spotted Gum) aligned open forest and woodland; and *Melaleuca armillaris* (Bracelet Honeymyrtle) scrub to open scrub.	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the known distribution of this species overlaps the study area and *C. maculata* is present, this area does not represent a transition zone between dry subtropical rainforest and sclerophyll forest/woodland communities, and therefore it is unlikely that this species will utilise the study area, with no further assessment is required for the species.	Low	No
Dichanthium setosum	Bluegrass	V	V	L	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched).	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area, nor does the known or predicted distribution of this species overlap the study area. Moreover, none of the associated canopy or groundcover species are present within the study area, and therefore it is unlikely that this species will utilise the study area and no further assessment is required for the species.	Low	No
Eucalyptus camaldulensis	*Eucalyptus camaldulensis - endangered population*	E	-	5	The Hunter population occurs from the west at Bylong, south of Merriwa, to the east at Hinton, on the bank of the Hunter River, in the Port Stephens local government area. It has been recorded in the local government areas of Lithgow, Maitland, Mid-Western Regional, Muswellbrook, Port Stephens, Singleton and Upper Hunter. May occur with *Eucalyptus tereticornis, Eucalyptus melliodora, Casuarina cunninghamiana subsp. cunninghamiana* and *Angophora floribunda*	Five OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although a known population of this species occurs in the associated LGA, no individuals were observed within the study area. As such it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No

Eucalyptus glaucina	Slaty Red Gum	V	V	112	Found only on the north coast of NSW and in separate districts: near Casino where it can be locally common, and farther south, from Taree to Broke, west of Maitland. Grows in grassy woodland and dry eucalypt forest. Grows on deep, moderately fertile and well-watered soils.	112 OEH BioNet records exist within a 10 km search area of the study area, with 110 of the records occurring in 2019 along Webbers Creek Road 9.5 km north of the study area. These records may be historic records associated with the Paterson Local Area Plan and likely represent a local population that is unlikely to be associated with the study area or surrounding locality. The species is associated with vegetation communities present within the study area (PCT 3433), however, was not observed during the site assessment. As such, it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No
Euphrasia arguta	null	CE	CE	M	The current known populations are located in the Nundle State Forest in eucalypt forest with a mixed grass and shrub understorey (D Binns pers. comm. February 2009). This area is located at the junction of the New England Tableland, NSW North Coast, and Nandewar Bioregions. There are no known occurrences of Euphrasia arguta in a conservation reserve. The majority of E. arguta plants are located in Nundle State Forest. A small part of the largest population of E. arguta is located on private land that is adjacent to the State Forest. The land is currently used for rough grazing by sheep or cattle.	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area, nor does the known or predicted distribution of this species overlap the study area. Given that the known populations of this species are a substantial distance from the study area, and as this species was not observed during the site assessment it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	L	Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Sydney region occurrences are usually on Tertiary sands and alluvium, and soils derived from the Mittagong Formation. Soil landscapes include Lucas Heights or Berkshire Park. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. In Sydney it has been recorded from Shale Sandstone Transition Forest and in the Hunter in Kurri Sand Swamp Woodland. However, other communities occupied include *Corymbia maculata - Angophora costata* open forest in the Dooralong area, in Sydney Sandstone Ridgetop Woodland at Wedderburn and in Cooks River / Castlereagh Ironbark Forest at Kemps Creek.	No OEH BioNet records exist within a 10 km search area of the study area. The species is associated with vegetation communities present within the study area (PCT 3433). Although the known distribution of this species overlaps the study area, this area is over 10 km away from the known populations in Cessnock and Kurri Kurri. Moreover, this species not observed during the site assessment. As such, it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No

Maundia triglochinoides	null	V	-	1	Restricted to coastal NSW and extending into southern Queensland. The current southern limit is Wyong; former sites around Sydney are now extinct. Grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients. Flowering occurs during warmer months. Associated with wetland species e.g. *Triglochin procerum*.	One OEH BioNet record exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the known distribution of this species overlaps the study area and marginal habitat in the form of shallow depressions in the low-lying area within the western section of the study area, it is unlikely that the species will utilise this area as it is heavily dominated by non-native speices and the standing water observed was shallow (<30 cm deep). As such it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No
Persicaria elatior	Knotweed, Tall Knotweed	V	V	L	In northern NSW it is known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). The species also occurs in Queensland. This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the known distribution of this species overlaps the study area and marginal habitat in the form of a low-lying wet area is present within the study area, it is unlikely that the species will utilise this area as no associated species are present. Moreover, this species was not observed during the site assessment it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No
Pomaderris brunnea	Rufous Pomaderris, Brown Pomaderris	E	V	M	Brown Pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria. Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines. The species has been found in association with *Eucalyptus amplifolia, Angophora floribunda, Acacia parramattensis, Bursaria spinosa* and *Kunzea ambigua.*	No OEH BioNet records exist within a 10 km search area of the subject land. The species is not associated with vegetation communities present within the study area, nor does the known or predicted distribution of this species overlap the study area. Moreover, no suitable habitat in the form of a moist woodland or forest is present within the study area. Given that this species was not observed during the site assessment it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No

Prasophyllum sp. Wybong (C.Phelps ORG 5269)	a leek-orchid	-	CE	M	*Prasophyllum sp. Wybong (*C. Phelps ORG 5269) is a terrestrial orchid known from seven populations in open eucalypt woodland and grassland in New South Wales. The species' area of occupancy is estimated to be 1.5 km^2 with an estimated population size based on surveys in 2006 of 460 mature individuals	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the predicted distribution of this species overlaps the study area and marginal habitat in the form of a grassy woodland are present within the study area, it is unlikely that the species will utilise this area undergoes frequent disturbance. Moreover, this species was not observed during the site assessment it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No
Pterostylis gibbosa	Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood	E	E	1	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra). It is apparently extinct in western Sydney which is the area where it was first collected (1803). All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Illawarra region, the species grows in woodland dominated by *Eucalyptus tereticornis* (Forest Red Gum), *E. longifolia* (Woollybutt) and *Melaleuca decora* (White Feather Honey-myrtle). Near Nowra, the species grows in an open forest of *Corymbia maculata* (Spotted Gum), *Eucalyptus tereticornis* and *E. paniculata* (Grey Ironbark). In the Hunter region, the species grows in open woodland dominated by *E. crebra* (Narrow-leaved Ironbark), *Eucalyptus tereticornis* and *Callitris endlicheri* (Black Cypress Pine). The Illawarra Greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an underground tuber in late summer, followed by the flower stem in winter. After a spring flowering, the plant begins to die back and seed capsules form (if pollination has taken place). As with many other greenhoods, male fungus gnats are believed to be the pollinator. The Illawarra Greenhood can survive occasional burning and grazing because of its capacity to reshoot from an underground tuber.	One OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the known distribution of this species overlaps the study area and marginal habitat in the form of a grassy woodland are present within the study area, it is unlikely that the species will utilise this area as no associated species are present. As such it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No

Rhizanthella slateri	Eastern Underground Orchid	V	E	M	The Eastern Underground Orchid occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood, and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest.	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area, nor does the known or predicted distribution of this species overlap the study area. Although the ecology of this species is poorly known, it appears to associate with moister forest habitats which are not present within the study area, as such it is unlikely that this species will utilise the study area and no further assessment is required for the species.	Low	No
Rhodamnia rubescens	Scrub Turpentine, Brown Malletwood	E	CE	2	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of *R. rubescens* typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Two OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the known distribution of this species overlaps the study area, no suitable moist habitat is present within the study area. As such it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No
Rhodomyrtus psidioides	Native Guava	CE	-	3	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	Three OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the known distribution of this species overlaps the study area, no suitable moist habitat is present within the study area. As such it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No
Rutidosis heterogama	Heath Wrinklewort	V	V	1	Recorded from near Cessnock to Kurri Kurri with an outlying occurrence at Howes Valley. On the Central Coast it is located north from Wyong to Newcastle. There are north coast populations between Wooli and Evans Head in Yuraygir and Bundjalung National Parks. It also occurs on the New England Tablelands from Torrington and Ashford south to Wandsworth south-west of Glen Innes. Grows in heath on sandy soils and moist areas in open forest and has been recorded along disturbed roadsides.	One OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the known distribution of this species overlaps the study area, no suitable moist habitat with sandy soil is present within the study area. As such it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No

Syzygium paniculatum	Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry	E	V	3	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Three OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the distribution of where the species habitat may occur overlaps the study area, no suitable moist habitat is present within the study area. As such it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No
Tetratheca juncea	Black-eyed Susan	V	V	L	Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. It is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest. The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape. While some studies show the species has a preference for cooler southerly aspects, it has been found on slopes with a variety of aspects. It generally prefers well-drained sites below 200m elevation and annual rainfall between 1000 - 1200mm. The preferred substrates are sandy skeletal soil on sandstone, sandy-loam soils, low nutrients; and clayey soil from conglomerates, pH neutral.	No OEH BioNet records exist within a 10 km search area of the study area. The species is associated with vegetation communities present within the study area (PCT 3433), and the known distribution of this species overlaps the study area. Although marginal habitat in the form of a grassy woodland are present within the study area, it is unlikely that the species will utilise this area undergoes frequent disturbance. Moreover, no associated canopy species (*Angophora costata, Corymbia gummifera, Eucalyptus haemastoma,* or *E. capitellata*) are present within the study area, as such it is unlikely that this species is utilising the study area and no further assessment is required.	Low	No
Thesium australe	Austral Toadflax, Toadflax	V	V	L	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Although originally described from material collected in the SW Sydney area, populations have not been seen in a long time. It may persist in some areas in the broader region. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	No OEH BioNet records exist within a 10 km search area of the study area. The species is not associated with vegetation communities present within the study area. Although the known distribution of this species overlaps the study area and marginal habitat in the form of grassland or grassy woodland vegetation communities are present within the study area, it is unlikely that the species will utilise this area undergoes frequent disturbance. Although Themeda triandra is present within the study area in isolated patches, given the lack of records and associated with the vegetation communities present, it is unlikely that this species is utilising the study area, therefore, no further assessment is required.	Low	No

Birds								
Anseranas semipalmata	Magpie Goose	V	-	2	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	The species is not associated with vegetation present in the study area (PCT 3433). Although there are two OEH BioNet records of the species within 10 km of the study area, appropriate habitat is not present. Therefore, it is unlikely that this species will utilise the study area and no further assessment is required.	Low	No
Anthochaera phrygia	Regent Honeyeater	CE	CE	3	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Range is between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar.	The species is associated with vegetation present in the study area (PCT 3433) and the distribution of its habitat is likely to occur in this area. Mistletoe species are present within the study area and there are three OEH BioNet records within 10 km of the study area with all records occurring in 2018. However, the density of mistletoe within the study area is not high enough to support this species and the study area is not located within the Important Areas Mapping for the species. Therefore, further assessment is not required.	Low	No
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	3	The Dusky Woodswallow is a woodland dependant bird. It is found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests. Common habitat requirements are an open understorey with sparse eucalypt saplings, acacias and other shrubs, including heath. The ground cover may consist of grasses, sedges or open ground, often with coarse woody debris. Birds are also often observed in farm land, road sides and golf courses, usually at the edges of forest or woodland or wind breaks with dead timber.	The species is associated with vegetation present in the study area (PCT 3433) and there are three OEH BioNet records of the species within 10 km of the study area. Marginal habitat in the form of with open woodlands are present in the study area, however, it lacks the associated midstory vegetation and woody debris. Therefore, it is unlikely that the species would utilise the study area and no further assessment is required	Low	No

Botaurus poiciloptilus	Australasian Bittern	E	E	K	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the Study Area. The distribution of this species is known to occur within the study area however, this species requires permanent freshwater wetlands which is not present on in this Study Area. No further assessment is required.	Low	No
Calidris ferruginea	Curlew Sandpiper	E	CE	K	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one year old birds remain in Australia rather than migrating north. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the Study Area. This species requires a coastal environments, inhabiting Intertidal mudflats and large bodies of water, which are not present within the Study Area. No further assessment is required.	Low	No

Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	K	The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.	The species is associated with vegetation present in the study area (PCT 3433), and the distribution of its habitat is likely to occur in this area, however, there are no OEH BioNet records of this species within a 10 km search radius. Within the subject land is marginal roosting and foraging habitat, which is represented by the woodland and planted native vegetation present within the study area (VZ2 and VZ3). Comprising the woodland vegetation are several individuals of *Corymbia maculata*, which have large hollows that can provide roosting habitat. Foraging habitat is present in the form of planted native trees, however, this habitat is of marginal quality as the study area lacks midstory species and therefore the diversity of food resources is limited. Moreover, the study area is found at a low elevation (between 5-20 m ASL), which is less likely to be utilised by this species as it is adapted to cooler habitats and more common at higher elevations. As such, while the study area represents marginal habitat for this species it is unlikely to utilise this area given the low elevation. Therefore, no further assessment is required.	Low	No

Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	L	The Glossy Black-Cockatoo is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta*, and *A. gymnathera.* Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.	The species is associated with vegetation present in the study area (PCT 3433), and the distribution of its habitat is likely to occur in this area. However, there are no OEH BioNet records of this species within a 10 km search radius. Although *Casuarina spp*. and hollow bearing trees are present in the study area, the casuarinas provide minimal foraging habitat. Therefore, it is unlikely that this species will utilise the study area, and no further assessment is required.	Low	No
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	V	V	M	In Australia, the Greater Sand Plover occurs in coastal areas in all states. n the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons, and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the study area. This species requires a coastal environment, inhabiting littoral, and estuarine habitats, which is not present in the study area. No further assessment is required.	Low	No
Chthonicola sagittata	Speckled Warbler	V	-	7	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	The species is associated with vegetation present in the study area (PCT 3433), and there are seven OEH BioNet records within 10 km of the study area. Suitable habitat in the form of a eucalypt dominated grassy community is present within the study area, however, the groundcover is primarily dominated with non-native species and no shrub layer is present. As this habitat is in marginal condition for this species, it is unlikely to utilise the study area, and no further assessment is required.	Low	No

Climacteris picumnus victoriae	Brown Treecreeper	V	V	L	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of the species runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. The eastern subspecies lives in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging.	The species is associated with vegetation present in the study area (PCT 3433), and the distribution of its habitat is likely to occur in this area, however there are no OEH BioNet records of this species within a 10 km search radius of the study area. Although hollowing bearing trees, which may provide nesting habitat for this species were present on site, this species inhabits eucalypt woodlands and coastal areas which are not present within the study area. Therefore, no further assessment is required.	Low	No
Daphoenositta chrysoptera	Varied Sittella	V	-	4	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	The species is associated with vegetation present in the study area (PCT 3433), and there are four OEH BioNet records within 10 km of the study area. Suitable habitat in the form of eucalypt woodlands dominated by *Corymbia maculate* is present within the study area. As there is potential for this species to utilise the study area, further assessment is required	Moderate	Yes
Ephippiorhynchus asiaticus	Black-necked Stork	-	-	6	In Australia, Black-necked Storks are widespread in coastal and subcoastal northern and eastern Australia, as far south as central NSW (although vagrants may occur further south or inland, well away from breeding areas). In NSW, the species becomes increasingly uncommon south of the Clarence Valley, and rarely occurs south of Sydney. Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly contribute the greatest biomass to their diet, but they feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers, crickets and crayfish).	The species is associated with vegetation present in the study area (PCT 3433), and there are six OEH BioNet records of this species within a 10 km search radius of the study area. However, this species exhibits a habitat constraint, which requires land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation. The study area is not within 40 m of any freshwater or estuarine wetlands; therefore, it is unlikely the species would utilise the study area. No further assessment required	Low	No

Epthianura albifrons	White-fronted Chat	V	-	1	The distribution of the White-fronted Chat extends across the southern half of Australia, from the southernmost areas of Queensland to southern Tasmania and across to Western Australia as far north as Carnarvon (Barrett et al. 2003). Found mostly in temperate to arid climates and very rarely seen in sub-tropical areas, the White-fronted Chat occupies foothills and lowlands below 1000 m above sea level (North 1904; Higgins et al. 2001; Barrett et al. 2003). In New South Wales the White-fronted Chat occurs mostly in the southern half of the state, occurring in damp open habitats along the coast, and near waterways in the western part of the state (Higgins et al. 2001). Along the coastline, White-fronted Chats are found predominantly in saltmarsh vegetation although they are also observed in open grasslands and sometimes in low shrubs bordering wetland areas. These birds are unlikely to fly over urbanised areas.	The species is not associated with vegetation present in the study area (PCT 3433), and there is only a single OEH BioNet record of this species within a 10 km search radius of the study area. No suitably damp or coastal habitat is present within the study area, and therefore, it is unlikely that this species would utilise the study area. No further assessment required	Low	No
Erythrotriorchis radiatus	Red Goshawk	CE	V	M	The Red Goshawk occurs from the north-west to north-east coast of Australia. The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. In NSW favoured habitat is mixed subtropical rainforest and Melaleuca forest along coastal rivers, often in rugged terrain.	The species is not associated with vegetation present in the study area (PCT 3433), nor are there any OEH BioNet records of the species within 10 km of the Study Area. Additionally, the known and predicted distribution of this species does not overlap the study area. Although in the adjacent property to the north is a permanent body of water, and while there were stick nests present within the study area, these were small and not occupied by larger raptors. Moreover, this species prefers sub-tropical rainforests and permanent bodies of water, which are not present with the Study Area. Therefore, no further assessment is required.	Low	No
Falco hypoleucos	Grey Falcon	E	-	L	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there and OEH BioNet records of the species within 10 km of the Study Area. The distribution for this species chiefly inhabits the Murray-Darling Basin and therefore no further assessment is required.	Low	No

Glossopsitta pusilla	Little Lorikeet	V	-	20	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.	The species is associated with vegetation present in the study area (PCT 3433) and there are 20 OEH BioNet records within a 10 km radius of the study area. Suitable foraging and breeding habitat on study area is present. Although the Species was not observed during the field surveys, due to the generalist and mobile nature of the species further assessment is required.	Moderate	Yes
Grantiella picta	Painted Honeyeater	V	V	L	The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the Study Area. Mistletoe is present with the Study Area however the density of Mistletoe is not high enough to support this species. Furthermore, the distribution borders the study area and therefore no further assessment is required.	Low	No
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	16	The White-bellied Sea-Eagle is distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea and sewage ponds). Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land.	The species is associated with vegetation present in the study area (PCT 3433) and there are 20 OEH BioNet records within a 10 km radius of the study area. Suitable woodland habitat is present within the study area, which is less than 2 km from a permanent waterbody. Stick nests were also observed within the study area, although they were unlikely to be large enough to support this species. As suitable breeding habitat is present within the study area, and suitable foraging habitat within proximity to the study area it is possible that this species may utilise the study area. Therefore, further assessment is required.	Moderate	Yes

Hirundapus caudacutus	White-throated Needletail	-	V	3	The White-throated Needletail is widespread in across the coast of eastern and south-eastern Australia, and Tasmania. White-throated Needletails only occur as vagrants in the Northern Territory and in Western Australia. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable (Cramp 1985), but there are, nevertheless, certain preferences exhibited by the species. They are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland.	This species utilises a variety of habitats when not aerial and is associated with the vegetation community present (PCT 3433) and the distribution of its habitat is likely to occur in this area, therefore there is suitable habitat present within the subject land. There are two OEH BioNet records from 2005 and 2003 approximately 8 kms south-west of the study area. However, given the chiefly aerial nature of the species, it is the species may utilise the subject land, and therefore further assessment is required.	Moderate	Yes
Lathamus discolor	Swift Parrot	-	CE	3	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as *Eucalyptus robusta* (Swamp Mahogany), *Corymbia maculata* (Spotted Gum), *Corymbia gummifera* (Red Bloodwood), *Eucalyptus sideroxylon* (Mugga Ironbark), and *Eucalyptus albens* (White Box). Commonly used lerp infested trees include *Eucalyptus microcarpa* (Inland Grey Box), *Eucalyptus moluccana* (Grey Box) and *Eucalyptus pilularis* (Blackbutt). Return to some foraging sites on a cyclic basis depending on food availability. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by *Eucalyptus globulus* (Tasmanian Blue Gum).	The species is not associated with the vegetation present in the study area (PCT 3433), nor is the study area located on NSW DPIE Mapped Important Areas for the species. However, the distribution of its habitat is likely to occur in this study area and there are three OEH BioNet records of the species that occur within a 10 km radius of the study area. Two of the records from 2000 and 2010 are located 8.5 km south-east for the study area, with the remaining one record from 2017 located 8 km south-west of the study area. As the Study Area contains suitable foraging habitat in the form winter flowering *Corymbia maculata*, further assessment is required.	Moderate	Yes

Melanodryas cucullata cucullata	South-eastern Hooded Robin, Hooded Robin (south-eastern)	-	E	M	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the study area. Furthermore, this species requires structurally diverse habitats which is not present within the Study Area. No further assessment is required.	Low	No
Neophema chrysostoma	Blue-winged Parrot	-	V	M	Blue-winged Parrots are nomadic, moving to different areas depending on the availability of grasses and herbs. Habitat includes woodlands, coastal heaths and grasslands.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the subject land. However, the distribution for this species' habitat may occur within the study area, and although they are present in a degraded state grasslands are present.	Low	No
Neophema pulchella	Turpuoise Parrot	V	-	1	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Although this species can occur in disturbed and altered areas, due to the lack of coastal associated habitat and lack of BioNet records, it is unlikely that the species utilises the study area. No further assessment required.	Low	No
Ninox connivens	Barking Owl	V	-	1	The Barking Owl is found throughout continental Australia except for the central arid regions and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains (especially the Pilliga) and in some northeast coastal and escarpment forests. Sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species.	The species is associated with vegetation present in the study area (PCT 3433). Although there is only a single OEH BioNet record of the species within 10 km of the study area, suitable breeding habitat in the form of mature hollow bearing trees are present within the study area. Although this species was not detected during nocturnal surveys, *Tyto javanica* (Eastern Barn Owl) was observed flying through the study area, indicating that habitat utilisation for a similar species. As such, there is potential for this species to utilise the study area and further assessment is required.	Moderate	Yes

Ninox strenua	Powerful Owl	V	-	6	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the eastern side of the Great Dividing Range, from south-eastern Queensland to Victoria. The Powerful Owl is found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understoreys, especially along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. Needs old growth trees to nest.	The species is associated with vegetation present in the study area (PCT 3433). There are six OEH BioNet record of the species within 10 km of the study area, and suitable breeding habitat in the form of mature hollow bearing trees are present within the study area. Although this species was not detected during nocturnal surveys, *Tyto javanica* (Eastern Barn Owl) was observed flying through the study area, indicating that habitat utilisation for a similar species. As such, there is potential for this species to utilise the study area and further assessment is required.	Moderate	Yes
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	-	CE	L	Within Australia, the Eastern Curlew has a primarily coastal distribution. The species is found in all states and rarely inland. The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the study area. This species requires a coastal environment, inhabiting sheltered coasts, intertidal areas and estuarine habitats, which are not present in the study area. No further assessment is required.	Low	No
Oxyura australis	Blue-billed Duck	V	-	5	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached.	The species is not associated with vegetation present in the study area (PCT 3433). Although there are five OEH BioNet records of the species within 10 km of the study area, no suitable wetland or swamp habitat is present within the study area. Therefore, it is unlikely that this species would utilise the study area, and no further assessment is required.	Low	No
Pandion cristatus	Eastern Osprey	V	-	1	Eastern Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs, with a few records from inland NSW. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes.	The species is associated with vegetation present in the study area (PCT 3433) and although there is only a single 20 OEH BioNet record within a 10 km radius of the study area, suitable woodland habitat is present within the study area, which is less than 2 km from a permanent waterbody. However, as the species prefers coastal areas, it is unlikely to utilise the study area, and therefore, no further assessment is required.	Low	No

Pomatostomus temporalis temporalis	Grey-Crowned Babbler	V	-	58	The eastern subspecies (temporalis occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. This subspecies also occurs in the Trans-Fly Region in southern New Guinea. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions.	The species is associated with vegetation present in the study area (PCT 3433) and there are 58 OEH BioNet records within a 10 km radius of the study area. This species utilises the study area as it was observed during the field surveys. Therefore, further assessment is required	Moderate	Yes
Ptilinopus magnificus	Wompoo Fruit-Dove	V	-	1	Occurs along the coast and coastal ranges from the Hunter River in NSW to Cape York Peninsula. It is rare south of Coffs Harbour. Three subspecies are recognised, with the most southerly in NSW and south-eastern Queensland. It used to occur in the Illawarra, though there are no recent records. Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests.	The species is not associated with vegetation present in the study area (PCT 3433) and there is only a single OEH BioNet record of the species within 10 km of the study area. No suitable mesic habitat is present within the study area, and therefore, it is unlikely that this species would utilise the study area. No further assessment is required.	Low	No
Pycnoptilus floccosus	Pilotbird	-	V	M	Pilotbirds are endemic to south-east Australia. Upland Pilotbirds occur above 600 m in the Brindabella Ranges in the Australian Capital Territory, and in the Snowy Mountains in New South Wales and north-east Victoria, where Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the study area. There distribution of this species may occur within the study area, however, this species is strictly terrestrial inhabiting dense forests with heavy undergrowth. Therefore, this study area does not provide appropriate habitat and no further assessment is required.	Low	No

Rostratula australis	Australian Painted Snipe	E	E	K	Most records of the Australian Painted Snipe are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the study area. The known distribution of this species overlaps the study area and marginal habitat in the form of a wet creekline is present. However, at the time of the site assessment this habitat is limited, with only small areas along the creekline remaining wet, with no substantial wetland vegetation present. As such, it is unlikely that the species will utilise the study area, particularly when more appropriate habitat is available in the adjacent lot to the north. As such, no further assessment is required.	Low	No
Stagonopleura guttata	Diamond Firetail	V	V	K	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Cental and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	The species is associated with vegetation present in the study area (PCT 3433), and the distribution of its habitat can occur in this area, however, there are no OEH Bionet records of this species within a 10 km search radius. Moreover, although this species can utilise a variety of habitats, including lightly wooded farmland, the study area is characterised by extensively managed woodlands and pasture which is unlikely to support the species foraging habits. Therefore, it is unlikely the species will utilise the subject land no further assessment is required.	Low	No

Stictonetta naevosa	Freckled Duck	V	-	4	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	The species is not associated with vegetation present in the study area (PCT 3433). Although there are five OEH BioNet records of the species within 10 km of the study area, no suitable wetland or swamp habitat is present within the study area. Therefore, it is unlikely that this species would utilise the study area, and no further assessment is required.	Low	No
Tyto novaehollandiae	Masked Owl	V	-	1	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	The species is associated with vegetation present in the study area (PCT 3433). Although there is only a single OEH BioNet record of the species within 10 km of the study area, suitable breeding habitat in the form of mature hollow bearing trees are present within the study area. Although this species was not detected during nocturnal surveys, *Tyto javanica* (Eastern Barn Owl) was observed flying through the study area, indicating that habitat utilisation for a similar species. As such, there is potential for this species to utilise the study area and further assessment is required.	Moderate	Yes
Mammals								
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	K	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies.	The species is associated with vegetation present in the study area (PCT 3433), and the distribution of its habitat is likely to occur in this area, however, there are no OEH Bionet records of this species within a 10 km search radius. Furthermore, there is no suitable habitat within the Study Area and therefore no further assessment is needed.	Low	No

Dasyurus maculatus	Spotted-tailed Quoll	V	E	11	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.	The species is associated with vegetation present in the study area (PCT 3433), and the distribution of its habitat is likely to occur in this area, however, there are no OEH Bionet records of this species within a 10 km search radius. The species uses a variety of habitats and there is marginally suitable woodland habitat present within the study area. However, given that the area is highly disturbed and there is no suitable fallen timber or rock outcrops, it is unlikely to utilise the study area. No further assessment is required.	Low	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	9	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally, roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	The species is associated with vegetation present in the study area (PCT 3433), and there are nine OEH Bionet records of this species within a 10 km search radius of the study area. Suitable roosting habitat in the form of mature hollow-bearing trees are present within the study area, however, the vegetation is classified as a dry sclerophyll forest, with no moister habitat present within the study area. Given the lack of preferred moist habitat, it is unlikely that this species would utilise the study area, and no further assessment is required	Low	No
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	39	The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.	The species is associated with vegetation present in the study area (PCT 3433), and there are 39 OEH Bionet records of this species within a 10 km search radius of the study area. Suitable dry sclerophyll forest habitat is present within the study area, as are mature hollow bearing trees. Given the presence of suitable habitat, the species may utilise the study area and further assessment is required.	Moderate	Yes
Miniopterus australis	Little Bent-winged Bat	V	-	43	East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	No caves or old mines, culverts or derelict buildings are present on study area thus no suitable habitat for potential usage as a nursery or maternity breeding area. There are 43 BioNet records of the species within 10 km however no roosts were observed. No suitable breeding habitat occurs within the study area, and therefore no further assessment is required.	Low	No

Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	44	Large Bent-winged Bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.	No caves or old mines, culverts or derelict buildings are present in study area thus no suitable habitat for potential usage as a nursery or maternity breeding area. There are 44 BioNet records within 10 km, though no roosts were observed. No suitable breeding habitat occurs within study area; therefore, no further assessment is required.	Low	No
Myotis macropus	Southern Myotis	V	-	15	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	The species is associated with vegetation present in the study area (PCT 3433), and there are 15 OEH Bionet records of this species within a 10 km search radius of the study area. Suitable roosting habitat in the form of mature hollow bearing trees are present within the study area, with some marginal foraging habitat in the form of a small dam within the eastern section of the study area. Given the presence of suitable habitat, the species may utilise the study area and further assessment is required.	Moderate	Yes
Notamacropus parma	Parma Wallaby	-	V	M	In NSW, the Parma wallaby is patchily distributed along the Great Dividing Range. It is present in suitable forests scattered throughout the escarpment up to 1000 m above sea level. The optimum habitat for the Parma wallaby is wet sclerophyll forest with a thick, shrubby understorey and nearby grassy patches. The species also occurs in dry sclerophyll forest with a dense understorey and occasionally in rainforest	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the Study Area. Although the distribution this species habitat may occur overlaps the study area, the preferred moist eucalypt habitat is not present. As such, no further assessment is required.	Low	No
Petauroides volans	Greater Glider	-	V	1	The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. Roosts in tree hollows and is more common in areas abundant in tree hollows.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there OEH BioNet records of the species within 10km of the study area. Although the known distribution of this species overlaps the study area, this species is known to occupy higher elevation more commonly, montane habitats. Given that the study area is low-lying and lacks the moist eucalypt habitat preferred by this species it is unlikely that it will utilise the study area, despite the presence of suitable hollow bearing trees. No further assessment is required.	Low	No

Petaurus australis australis	Yellow-bellied Glider (south-eastern)	V	-	L	In NSW, it predominantly occurs in forests along the eastern coast, from the NSW-Qld border to the NSW-Vic border. However, the distribution also extends inland to the western slopes of the Great Dividing Range in parts of NSW and Qld. It occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests	The species is associated with the vegetation present within the study area (PCT 3433), however, there are no OEH Bionet records within 10 km of the study area. The study area is within a known range for the species and there is marginal nesting habitat in the form of mature hollow bearing trees. However, the study area is quite fragmented and lacking nutrient rich soils. Therefore, it is unlikely to utilise the study area and no further assessment is required.	Low	No
Petaurus norfolcensis	Squirrel Glider	V	-	47	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstory.	The species is associated with the vegetation present within the study area (PCT 3433), and there are 47 OEH Bionet records of this species within a 10 km search radius of the study area. No suitable habitat is present within the study area given the extensive modification to the vegetation through past and current disturbance. Given that no midstory is present within the associated vegetation and the lack of canopy diversity, it is unlikely that this species would utilise the study area. Therefore, no further assessment is required.	Low	No
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	M	The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. However the distribution of the species across its original range has declined significantly in the west and south and has become more fragmented. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	The species is associated with the vegetation present within the subject land (PCT 3433). However, there are no OEH Bionet records within 10 km of the subject land, nor is there suitable habitat for the species within the subject land as there are no rocky escarpments, outcrops or cliffs. Therefore, it is unlikely the species will utilise the subject land and no further assessment is required.	Low	No
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	29	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest.	The species is associated with the vegetation present within the study area (PCT 3433), and there are 29 OEH Bionet records of this species within a 10 km search radius of the study area. Although dry sclerophyll forests are present within the study area, they lack the floristic and structural diversity preferred by this species. Therefore, it is unlikely that this species would utilise the study area and no further assessment is required.	Low	No

Phascolarctos cinereus	Koala	V	E	209	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests.	The species is associated with the vegetation present within the subject land (PCT 3433). There are 209 OEH Bionet records within 10 km of the subject land. There is suitable foraging habitat for the species, given the presence of mature *Corymbia maculata* within the subject land and *Eucalyptus fibrosa* just outside the boundary. There are also semi-mature *Eucalyptus tereticornis,* which are a preferred feed tree species. However, the species was not detected during targeted surveys (SAT and nocturnal spotlighting - see **Appendix 8**). Therefore, no further assessment is required for the species.	Low	No
Potorous tridactylus tridactylus	Long-nosed Potoroo (northern)	V	V	M	The Long-nosed Potoroo is restricted to the eastern coast of Australia. In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the Study Area. The distribution of this species may occur within the study area however it does not provide suitable habitat for this species as the species requires dense understory with occasional open areas. Therefore, no further assessment is required.	Low	No
Pseudomys novaehollandiae	New Holland Mouse	-	V	8	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, NSW and Queensland. The species is now largely restricted to the coast of central and northern NSW, with one inland occurrence near Parkes. The New Holland Mouse has been found from coastal areas and up to 100 km inland on sandstone country. The species has been recorded from sea level up to around 900 m above sea level. Soil type may be an important indicator of suitability of habitat for the New Holland Mouse, with deeper top soils and softer substrates being preferred for digging burrows (Wilson & Laidlaw 2003). In Victoria, the species has been recorded on deep siliceous podsols, sandy clay, loamy sands, sand dunes and coastal dunes. Due to the largely granivorous diet of the species, sites where the New Holland Mouse is found are often high in floristic diversity, especially leguminous perennials. The mouse is known to inhabit open heathland, open woodland with a heathland understorey and vegetated sand dunes.	The species is associated with the PCT present within the subject land (PCT 3433). However, there are no OEH Bionet records with 10 km of the subject land, nor is there suitable habitat for the species within the study area given that this species is generally associated with floristically diverse habitats. Therefore, the species is unlikely to utilise the subject land and no further assessment is required.	Low	No

Pteropus poliocephalus	Grey-headed Flying-fox	V	V	104	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	The species is associated with vegetation present in the study area (PCT 3433), and the distribution of its habitat is likely to occur in this area. There are no records of this species within the study area, however there 103 OEH Bionet records of this species within a 10 km search radius. These records range from 1999 - 2021, with the closest records approximately 6kms away in varying directions. Although there are currently no records within the study area, there are potential roosting sites and foraging resources in the form of *Corymbia Maculata*. Therefore, further assessment is required.	Low	No
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	6	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	The species is associated with vegetation present in the study area (PCT 3433), and there are 6 OEH Bionet records of this species within a 10 km search radius of the study area. Suitable roosting habitat in the form of mature hollow bearing trees are present within the study area. Given the presence of suitable habitat, the species may utilise the study area and further assessment is required.	Moderate	Yes
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	18	The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however, does not occur at altitudes above 500 m. Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.	The species is associated with vegetation present in the study area (PCT 3433), and there are 18 OEH Bionet records of this species within a 10 km search radius of the study area. Suitable roosting habitat in the form of mature hollow bearing trees is present within the study area, however, foraging habitat in the form of creeks and river corridors are absent. Despite the presence of roosting habitat, it is unlikely that this species would utilise the study area given the lack of foraging habitat. Therefore, no further assessment is required.	Low	No

Vespadelus troughtoni	Eastern Cave Bat	V	-	3	The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally found along cliff-lines in wet eucalypt forest and rainforest.	No caves or old mines, culverts or derelict buildings are present in the study area thus no suitable habitat for potential usage as a nursery or maternity breeding area. There are three BioNet records within 10 km, though no roost observations recorded. No suitable breeding habitat occurs within the study area; therefore, no further assessment is required.	Low	No
Herpetofauna								
Delma impar	Striped Legless Lizard, Striped Snake-lizard	V	V	M	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass Themeda australis, spear-grasses Austrostipa spp. and poa tussocks Poa spp., and occasionally wallaby grasses Austrodanthonia spp. Sometimes present in modified grasslands with a significant content of exotic grasses. Usually found where soils are predominantly basalt with a high clay content and a propensity for cracking. Favoured habitat typically contains little bare ground, with plant litter to a depth of approximately 3 cm.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the study area. Although the known distribution of the species overlaps the study area and contains marginally suitable habitat in the form of dense pasture, the study area lacks suitable ground litter. Therefore, no further assessment is required.	Low	No
Litoria aurea	Green and Golden Bell Frog	E	V	8	The Green and Golden Bell Frog main populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (Gambusia holbrooki), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	The species is associated with vegetation present in the study area (PCT 3433) and the distribution of its habitat is likely to occur in this area. However, there are only eight OEH Bionet records of this species within a 10 km radius of the subject land. These records occur to the southwest of the subject land and close to the proximity of the 10 km buffer. Furthermore, majority of the records are over 20 years old. There is suitable habitat in the form of an unsheltered waterbody, with diurnal sheltering sites and a grassy area nearby. However, the species is unlikely to utilise the site and therefore no further assessment is needed.	Low	No

Mixophyes balbus	Stuttering Frog, Southern Barred Frog (in Victoria)	E	V	M	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Stuttering Frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. It is the only Mixophyes species that occurs in south-east NSW and in recent surveys it has only been recorded at three locations south of Sydney, and Dorrigo being the stronghold.	The species is not associated with vegetation present in the study area (PCT 3433) nor are there any OEH BioNet records of the species within 10 km of the study area. This species requires flowing waterbodies, and therefore this study area does not have suitable habitat for this species. No further assessment is required.	Low	No
Listed Migratory Species								
Migratory Terrestrial Birds								
Cuculus optatus	Oriental Cuckoo, Horsfield's Cuckoo	-	-	1	This species migrates to the north and east coasts of Australia during the non-breeding season over winter. Mainly inhabiting forests, the Oriental cuckoo occurs in mixed, deciduous and coniferous forest. It is present at all levels of the forest canopy, and can be found at a range of elevations, occasionally being recorded in mountains as high up as 1,100 metres.	The species is not associated with the vegetation present within the study area (PCT 3433). There is one OEH BioNet record within 10 km of the study area. Being a migratory species, it is possible for the species to pass through the study area, however there is minimal suitable habitat for utilisation. Therefore, no further assessment is required.	Low	No
Monarcha melanopsis	Black-faced Monarch	-	-	K	The Black-faced Monarch is widespread in eastern Australia. In Queensland, it is widespread from the islands of the Torres Strait and on Cape York Peninsula, south along the coasts (occasionally including offshore islands) and the eastern slopes of the Great Divide, to the New South Wales border. In New South Wales and the Australian Capital Territory, the species occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park, Wombeyan Caves and Canberra. The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest.	The species is not associated with the vegetation present within the study area (PCT 3433), nor are there any OEH BioNet records within 10 km of the study area. The study area does not provide the suitable rainforest habitat, and therefore, it is unlikely the species will utilise the study area. No further assessment is required.	Low	No

Motacilla flava	Yellow Wagtail	-	-	L	Occurs throughout Australia. Can be found in a range of land uses including pastures, wetlands, shrublands, grasslands and man made environments. The yellow wagtail typically forages in damp grassland and on relatively bare open ground at edges of rivers, lakes and wetlands, but also feeds in dry grassland and in fields of cereal crops.	The species is not associated with the vegetation present within the study area (PCT 3433), nor are there any OEH BioNet records within 10 km of the study area. There is marginal suitable habitat in the form of dense modified pasture within the study area, however, due to the absence of records and heavily managed groundcover, which lacks open bare ground, it is unlikely the species will utilise the subject land and no further assessment is required.	Low	No
Myiagra cyanoleuca	Satin Flycatcher	-	-	K	The Satin Flycatcher is widespread in eastern Australia and vagrant to New Zealand (Blakers et al. 1984; Coates 1990a). In Queensland, it is widespread but scattered in the east, being recorded on passage on a few islands in the western Torres Strait. Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moister, taller forests than the Leaden Flycatcher, Myiagra rebecula, often occurring in gullies. They also occur in eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest.	The species is not associated with the vegetation present within the study area (PCT 3433), nor are there any OEH BioNet records within 10 km of the study area. There is minimal suitable habitat as the species prefers heavily vegetated gullies. Therefore, the species is unlikely to utilise the study area and no further assessment is required.	Low	No

Rhipidura rufifrons	Rufous Fantail	-	-	K	The Rufous Fantail occurs in coastal and near coastal districts of northern and eastern Australia. In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (Eucalyptus microcorys), Mountain Grey Gum (E. cypellocarpa), Narrow-leaved Peppermint (E. radiata), Mountain Ash (E. regnans), Alpine Ash (E. delegatensis), Blackbutt (E. pilularis) or Red Mahogany (E. resinifera); usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests; for example near Bega in south-east NSW, where they are recorded in temperate Lilly Pilly (Acmena smithi) rainforest, with Grey Myrtle (Backhousia myrtifolia), Sassafras (Doryphora sassafras) and Sweet Pittosporum (Pittosporum undulatum) subdominants. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including Spotted Gum (Eucalyptus maculata), Yellow Box (E. melliodora), ironbarks or stringybarks, often with a shrubby or heath understorey. They are also recorded from parks and gardens when on passage. In north and north-east Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine forests, semi-deciduous vine thickets or thickets of Paperbarks (Melaleuca spp.) (Higgins et al. 2006).	The species is not associated with the vegetation present within the study area (PCT 3433), nor are there any OEH BioNet records within 10 km of the study area. There is no suitable habitat for the species as it occupies rainforests, wet gullies and waterside vegetation. These components are not present within the study area. Therefore, the species is unlikely to utilise the study area and no further assessment is required.	Low	No
Symposiachrus trivirgatus	Spectacled Monarch	-	-	K	This species occurs around the coast of NSW. The Spectacled Monarch prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	The species is not associated with the vegetation present within the study area (PCT 3433), nor are there any OEH BioNet records within 10 km of the study area. There is no suitable habitat within the study area given that the species occupies rainforests, wet gullies, and waterside vegetation. Therefore, the species is unlikely to utilise the study area and no further assessment is required.	Low	No
Migratory Wetland Birds								

Actitis hypoleucos	Common Sandpiper	-	-	K	The Common Sandpiper is found along all coastlines of Australia and in many areas inland. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags.	The species is not associated with the vegetation present within the study area (PCT 3433), nor are there any OEH BioNet records within 10 km of the study area. There is no suitable habitat in the form of a wetland area, with more appropriately 200 m to the north. However, as the species is mostly found around muddy margins or rocky shores, it is unlikely the species will utilise the study area which is predominantly represented by modified pasture. Therefore, no further assessment is required.	Low	No
Calidris acuminata	Sharp-tailed Sandpiper	-	-	7	The Sharp-tailed Sandpiper spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands, and coastal areas with much beachcast seaweed. Sometimes they occur on rocky shores and rarely on exposed reefs.	The species is not associated with the vegetation present within the study area (PCT 3433). There are seven OEH BioNet records within 10 km of the subject land. Whilst there is marginal habitat within the study area in the form of a small pond and small area wet area associated with the ephemeral creekline, it is not a preferred-intact environment of the species. therefore, it is unlikely the species will utilise the study area and further assessment is required.	Low	No

Calidris melanotos	Pectoral Sandpiper	-	-	2	the Pectoral Sandpiper is widespread, but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	There are two OEH BioNet records within 10 km of the study area. The species is not associated with the vegetation present within the study area (PCT 3433), with no suitable habitat present as this species occupies habitats associated with shallow fresh to saline wetlands, estuaries, swamps and lake. However, more suitable habitats are present outside the subject land, particularly to the southeast where the records were obtained. Therefore, the species is unlikely to utilise the study area and no further assessment is required.	Low	No
Calidris ruficollis	Red-necked Stint	-	-	1	It is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The Red-necked Stint has been recorded in all coastal regions, and found inland in all states when conditions are suitable. In Australasia, the Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. They sometimes use flooded paddocks or damp grasslands. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation.	The species is not associated with the vegetation present within the study area (PCT 3433). There is one OEH BioNet record within 10 km of the study area. There is no suitable habitat within the study area as this species occupies habitats associated with sheltered inlets, bays, lagoons and estuaries with intertidal mudflats. Therefore, it is unlikely the species will utilise the study area and therefore no further assessment is required.	Low	No

Gallinago hardwickii	Latham's Snipe	-	-	2	Latham's Snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) . However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. The structure and composition of the vegetation that occurs around these wetlands is not important in determining the suitability of habitat (Naarding 1983).	The species is not associated with the vegetation present within the study area (PCT 3433). There are two OEH Bionet records within 10 km of the study area. There is minimal suitable habitat in the form of a wetland, however it is lacking the low, dense vegetation. The study area lacks coastal habitatat such as the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats. Therefore, it is unlikely the species will utilise the study area and no further assessment is required.	Low	No
Limosa lapponica	Bar-tailed Godwit	-	-	K	The Bar-tailed Godwit has been recorded in the coastal areas of all Australian states. The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas.	The species is not associated with the vegetation present within the study area (PCT 3433), nor are any OEH BioNet records within 10 km of the study area. There is no suitable habitat for the species as it occurs in coastal habitats containing large intertidal sandflats, banks, mudflats and estuaries, these components are not present within the study area. Therefore, it is unlikely to utilise the study area and no further assessment is required.	Low	No
Pandion haliaetus	Osprey	-	-	K	The breeding range of the Eastern Osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island. Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging.	The species is not associated with the vegetation present within the study area (PCT 3433), nor are any OEH BioNet records within 10 km of the study area. The study area is within 200 m of a large area of open water, which this species requires for foraging. Stick nests were observed in the study area, however, they were not large enough for this species and were unoccupied at the time of survey. As the study area itself lacks appropriate foraging habitat, it is unlikely that the species will utilise the study area and no further assessment is required.	Low	No

Pluvialis squatarola	Grey Plover	-	-	1	The Grey Plover has been recorded in all states, where it is found along the coasts. In non-breeding grounds in Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes.	The species is associated with the vegetation present within the study area (PCT 3433), and there is one OEH BioNet record within 10 km of the study area. However, there is no suitable habitat for the species as it typically occurs on sheltered embayments, estuaries and lagoons, which are not present within the study area. As such, it is unlikely the species will utilise the study area and no further assessment is required.	Low	No
Tringa glareola	Wood Sandpiper	-	-	3	There are records of this species east of the Great Divide, from Stratheden and Casino, south to Nowra and elsewhere, mostly from the Riverina, but also from the Upper and Lower Western Regions. The Wood Sandpiper iinhabits well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. The species arrives in Australia from August.	The species is not associated with the PCT present within the study area (PCT 3433). Although there are three OEH Bionet records within 10 km of the study area, the study area lacks suitable habitat for the species, which typically occurs in a variety of inland wetlands. Therefore, it is unlikely the species will utilise the study area and no further assessment is required.	Low	No
Tringa nebularia	Common Greenshank; Greenshank	-	-	4	The Common Greenshank does not breed in Australia, however, the species occurs in all types of wetlands across Australia. The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.	The species is not associated with the PCT present within the study area (PCT 3433). Although there are four OEH Bionet records within 10 km of the study area, the study area lacks suitable habitat for the species, which typically occurs in a variety of coastal and inland wetlands. Therefore, it is unlikely the species will utilise the study area and no further assessment is required.	Low	No
Tringa stagnatilis	Marsh Sandpiper	-	-	2	The Marsh Sandpiper is found on coastal and inland wetlands throughout Australia. The species is widespread in coastal Queensland, but few records exist north of Cooktown. It is recorded in all regions of NSW but especially the central and south coasts and (inland) on the western slopes of Great Divide and western plains. The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes.	The species is not associated with the PCT present within the study area (PCT 3433). Although there are two OEH Bionet records within 10 km of the study area, the study area lacks suitable habitat for the species, which typically occurs in a variety of coastal and inland wetlands. Therefore, it is unlikely the species will utilise the study area and no further assessment is required.	Low	No
Listed Marine Species								
Birds								

Apus pacificus	Fork-tailed Swift	-	-	L	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas, and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines	This species utilises a variety of habitats when not aerial and therefore there is suitable habitat present within the study area. This species is not associated with the vegetation community present (PCT 3433) nor are there any OEH BioNet records within 10 km of the study area. Despite the chiefly aerial nature of the species, it is unlikely that this this species is utilise the study area, and therefore no further assessment is required.	Low	No
Ardenna pacifica	Wedge-tailed Shearwater	-	-	11	The Wedge-tailed Shearwater breeds on the east and west coasts of Australia and on off-shore islands. The Wedge-tailed Shearwater breeds colonially and is rarely seen alone during this period. Small flocks are formed at the start of the breeding season and birds often gather in large flocks (up to 600 have been recorded in one flock) in areas where food is concentrated.	There are 11 OEH Bionet records within a 10 km radius of the study area boundary, however, there is no appropriate habitat present within the study area. Therefore, the species is unlikely to occur within the study area and therefore no further assessment is required.	Low	No
Ardenna tenuirostris	Short-tailed Shearwater	-	-	3	Short-tailed Shearwater has been identified as a conservation value in the South-west	There are three OEH Bionet records within a 10 km radius of the study area boundary, however, there is no appropriate habitat present within the study area. Therefore, the species is unlikely to occur within the study area and therefore no further assessment is required.	Low	No
Gelochelidon nilotica	Gull-billed Tern	-	M	2	Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean.	Although there are four OEH Bionet records within 10 km of the study area, the study area lacks suitable habitat for the species, which typically occurs in a variety of coastal and inland wetlands. Therefore, it is unlikely the species will utilise the study area and no further assessment is required.	Low	No

Key:

V = Vulnerable	M = Migratory	A= Marine
E = Endangered	CE = Critically Endangered	P=Protected

K = Known where there are confirmed records, specimens or otherwise verified sightings in any CMA subregion overlapping the search area

P = Predicted where there is high expectation by relevant experts that a species is likely to be present in any CMA subregion overlapping the search area, based on known presence of suitable habitat and distribution with adjoining subregions

1 – NSW BioNet Atlas, Office of Environment and Heritage (Accessed 09-09-2022).
2 – Commonwealth Protected Matters Search Tool, Department of the Environment (Accessed 9-06-2023)

Appendix 6 5-Part Test of Significance

Section 7.3 of the BC Act lists five factors that must be considered in the determination of whether proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats (threatened biota) listed under the BC Act. The '5-part test' is used to determine whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats and thus whether the Biodiversity Offset Scheme will apply to the proposed development in which case a Biodiversity Development Assessment will be required.

The significance of the impacts on those threatened species and EECs which have been recorded in the site or are likely to occur and are likely to utilise habitat to be potentially impacted by the proposal have been assessed.

The following threatened entities have been considered:

Flora

- No species required for a 5-Part Test of Significance.

Fauna

- *Daphoenositta chrysoptera* – Varied Sittella
- *Glossopsitta pusilla* – Little Lorikeet
- *Haliaeetus leucogaster* – White-bellied Sea-Eagle
- *Lathamus discolor – Swift Parrot*
- *Micronomus norfolkensis* - Eastern Coastal Free-tailed Bat
- *Myotis macropus* - Southern Myotis
- *Ninox connivens* – Barking Owl
- *Ninox strenua* – Powerful Owl
- *Pomatostomus temporalis temporalis – Grey-crown Babbler*
- *Pteropus poliocephalus* – Grey-headed Flying-fox
- *Saccolaimus flaviventris* - Yellow-bellied Sheathtail-bat
- *Tyto novaehollandiae* – Masked Owl

a) In the case of a threatened species, whether the proposed development or activity 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.

Fauna

Daphoenositta chrysoptera – Varied Sittella

No individuals of this species were detected within the study area during the survey effort. There are four records within the local area according to the OEH BioNet 10 km search radius. This species is widely distributed across NSW and is associated with eucalupt-dominated woodlands containing rough-barked species and mature smooth-barked gums with dead branches. Rough barked species are present within the planted vegetation and several late-mature *Corymbia maculata* are present within the study area. The proposal will result in the removal of a single *C. maculata* and much of the planted vegetation, which represents a small reduction in potential area of foraging habitat and thus will not lead to an adverse effect on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Glossopsitta pusilla – Little Lorikeet

No individuals of this species were detected within the study area during the survey effort. There are 20 records within the local area according to the OEH BioNet 10 km search radius. There is potential

for the species to occur within the study area close as the vegetation present includes suitable foraging habitat such as high nectar producing trees such as *Eucalyptus robusta* and *Eucalyptus tereticornis*, with several hollow bearing trees, primarily the 12 mature *Corymbia maculata*, that could be utilised for nesting. The proposal will result in the removal of a single *C. maculata* and much of the planted vegetation, which represents a small reduction in potential area of foraging habitat and thus will not lead to an adverse effect on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Haliaeetus leucogaster – White-bellied Sea-Eagle

No individuals of this species were detected within the study area during the survey effort. There are 16 records within the local area according to the OEH BioNet 10 km search radius. There is potential for the species to occur within the study area as the breeding habitat for this species includes large mature trees within 1 km of suitable wetland habitat to the north of the study area. Stick nests were observed within the study area; however, none were of suitable size for this species. As there is a lack of breeding habitat within the study area and given that the proposed works represent a small reduction in potential breeding habitat, it is unlikely that the proposal will lead to adverse effects on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Lathamus discolor – Swift Parrot

No individuals of this species were detected within the study area during the survey effort. There are three records within the local area according to the OEH Bionet 10 km search radius. Although the study area is not located within the NSW DPIE Important Areas Map for this species, it is identified as a Priority Management Area for this species. Moreover, there are several key foraging species are present including late-mature *Corymbia maculata*, and semi-mature *Eucalyptus tereticornis* and *Eucalyptus robusta*, increasing the likelihood that migrating individuals may utilise the study area for winter foraging. However, the proposal will only remove one mature *Corymbia maculata* and therefore foraging habitat will remain post-development. The removal of low-quality habitat for the species will not disrupt the breeding cycle of the species. In addition, breeding habitat does not occur in NSW. The proposal contributes to loss and marginally alters foraging habitat for the species, however, impacts from the proposal are not solely likely to interfere with the recovery of the species at a regional scale.

Micronomus norfolkensis - Eastern Coastal Free-tailed Bat

No individuals of this species were detected within the study area during the survey effort. There are 39 records within the local area according to the OEH BioNet 10 km search radius and there is suitable roosting habitat is present in the form of hollow bearing trees. However, given that this species regularly changes breeding sites (every few days), the removal of a single hollow bearing tree is unlikely to represent a significant impact on this species and unlikely to lead to adverse effects on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Myotis macropus - Southern Myotis

No individuals of this species were detected within the study area during the survey effort. There are 15 records within the local area according to the OEH BioNet 10 km search radius and there is suitable roosting habitat is present in the form of hollow bearing trees. There is a small dam within the eastern section of the study area, however, there is lack of waterways with pools of 3m wide or greater within the study area, which the species is dependent on for foraging. Although the dam likely connects to a waterway during periods of heavy inundation, no breeding/roosting habitat is immediately adjacent to this area, and therefore it is unlikely that this species will utilise the study area. Therefore, although the proposal will result in a small reduction in potential area of roosting habitat, it will not lead to an adverse effect on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Ninox connivens – Barking Owl

No individuals of this species were detected within the study area during the nocturnal survey effort. There is one record within the local area according to the OEH BioNet 10 km search radius and there is suitable roosting habitat is present in the form of 12 hollow bearing trees. The proposal will result in the removal of a single hollow bearing tree, which represents a small reduction in potential area of breeding habitat and thus will not lead to an adverse effect on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Ninox strenua – Powerful Owl

No individuals of this species were detected within the study area during the nocturnal survey effort. There are six records within the local area according to the OEH BioNet 10 km search radius and there is suitable roosting habitat is present in the form of 12 hollow bearing trees. The proposal will result in the removal of a single hollow bearing tree, which represents a small reduction in potential area of breeding habitat and thus will not lead to an adverse effect on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Pteropus poliocephalus – Grey-headed Flying-fox

No individuals of this species were detected within the site during the nocturnal survey efforts. There are 103 records within the local area according to the OEH Bionet 10 km search radius. The species is widely distributed throughout the landscape and no breeding colonies are located within the study area or within proximity to the study area.

The proposal will result in the removal of approximately 0.03 ha of potential foraging habitat, consisting of the removal of one mature canopy tree within the study area. The loss and / or modification is considered to have a negligible impact on the availability of local foraging resources for this species. On this basis, it is considered that the area of clearing represents a small reduction in potential area of foraging habitat is minor in scale for these species home range and would not lead to an adverse effect on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Pomatostomus temporalis temporalis – Grey-crown Babbler

A group of between 3-5 individuals of this species was observed in the study area within the planted vegetation behind the existing residential dwelling during the survey effort. Additionally, there are 58 records within the local area according to the OEH BioNet 10 km search radius. Although the proposed development will impact the planted vegetation associated with the sighting of this species, the majority of the remnant woodland trees will be retained throughout the study area, maintaining the habitat links utilised by this species for foraging. As such, despite the proposal removing suitable habitat, given the high mobility of this species, it is unlikely that these impacts will lead to an adverse effect on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Saccolaimus flaviventris - Yellow-bellied Sheathtail-bat

No individuals of this species were detected within the study area during the survey effort. There are six records within the local area according to the OEH BioNet 10 km search radius and there is potential suitable roosting habitat present within the study area in the form of hollow bearing trees. Although the roost requirements of this species are poorly known, it is likely that the removal of a single hollow bearing *C. maculata* will not lead to an adverse effect on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

Tyto novaehollandiae – Masked Owl

No individuals of this species were detected within the study area during the nocturnal survey effort. There is one record within the local area according to the OEH BioNet 10 km search radius and there is suitable roosting habitat is present in the form of 12 hollow bearing trees. The proposal will result in the removal of a single hollow bearing tree, which represents a small reduction in potential area of breeding habitat and thus will not lead to an adverse effect on the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

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.

There is one Endangered Ecological Community (EEC) recorded within the site. This is BC Act listed Endangered (E) *Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions.* Given the historically managed understorey of this study area, as well as the proposal only removing 0.03 ha associated with this EEC, it is unlikely to have an adverse effect on the extent of the community or substantially modify the community such that its local occurrence is likely to be placed at risk of extinction.

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;

The proposal will remove no more than:

0.03 ha of PCT 3433 which is associated with the TEC and 8.05 of planted and disturbed vegetation that is not associated with the TEC.

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; and

The study area is 8.89 ha in size and contains 0.56 ha of native vegetation, 7.48 ha of disturbed managed non-native vegetation, and 0.53 ha of planted vegetation at the time of survey. The development activity will remove one mature hollow-bearing tree. It will also restore the low-lying wet area within the study area and improve connectivity and decrease fragmentation.

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.

The habitat to be removed will not affect the long-term survival of the threatened ecological communities and threatened species considered under this 5-part. Furthermore, the rehabilitation of the riparian area will increase habitat for the threatened species that have been considered. The removal or modification of vegetation from the site that represents habitat exists in both moderately well intact state and areas of poor condition due to historic land-use patterns across the study area. The higher quality vegetation will largely remain and is considered to provide some reasonable habitat and opportunity for genetic exchange. However, it is unlikely impact from the proposal will threaten the long-term survival of the identified threatened species and threated ecological communities considering the small area to be impacted by the proposal.

d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value

No declared areas of outstanding biodiversity value occur within the study area.

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.

A Key Threatening Process (KTP) is listed under Schedule 4 of the BC Act. KTPs considered relevant to the proposal is described in **Section 5.3.1**. This assessment concluded that the proposal was unlikely to trigger KTPs currently not operating within the study area and/or not significantly contribute to or increase the activity of a KTP operating within the study area.

Appendix 7 EPBC Test of Significance

EPBC Listed Critically Endangered and Endangered Species

Lathamus discolor **(Swift Parrot)**	**Critically Endangered**
Significant Impact Guideline	Assessment
Lead to a long-term decrease in the size of a population	As per the National Recovery Plan, the Swift Parrots occur as a single, migratory population, and therefore individuals occurring within proximity to the study area are identified as a population. As such, populations are known to occur in the locality, as shown by the individuals that were recorded in 2000, 2010 and 2017. Although the study area is not located within the NSW DPIE Important Areas Map for this species, it is identified as a Priority Management Area for this species. Moreover, there are several key foraging species are present including late-mature *Corymbia maculata*, and semi-mature *Eucalyptus tereticornis* and *Eucalyptus robusta*, increasing the likelihood that migrating individuals may utilise the study area for winter foraging. As per the NSW Scientific Committee – final determination, the species is known to have declined in population from a population estimate in excess of 10000 pairs to less than 1000 (determination Gazetted 2000). Owing to the abundance of available habitat within the locality (as per mapped swift important areas) and limited resource demand of the single small-scale population (winter flowering trees), it is unlikely that impacts associated with the proposal will contribute to the decrease of the single population.
Reduce the area of occupancy of the species	Yes, see above.
Fragment an existing population into two or more populations	No. The proposal will marginally reduce the availability of winter foraging habitat; however, the associated fragmentation is unlikely to isolate the population into two or more populations at the regional scale due to the highly mobile nature of the species. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 11**).
Adversely affect habitat critical to the survival of a species	No. No habitat within the study area is considered critical to the survival of the species as it is not mapped within the NSW DPIE Important Area Map for this species. Of the habitat present, it is in marginal condition, having been subjected to heavy modification in the past and continued disturbance through the maintenance of the residential grounds. Moreover, the location of this patch within the broader agricultural and residential landscape provides marginal connectivity, and therefore, the viability of this habitat to support the survival of the species is minimal.
Disrupt the breeding cycle of a population	No. The removal of a single foraging tree for the species will not disrupt the breeding cycle of the species. In addition, breeding habitat does not occur in NSW.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Yes. The proposal will impact a single foraging tree for the species; however, this reduction and fragmentation of available habitat is unlikely to cause the species to decline at a regional scale (see above).

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposal would likely facilitate the movement of some pest species, such as rabbits (*Oryctolagus cuniculus*) which are likely to utilise the study area. This species is known to use road corridors while traversing landscapes; however, not to the extent that it would impact the species. The proposal may spread these weeds or contribute to the establishment of new weeds via movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. However, environmental safeguards for the management of biosecurity risks should be implemented to reduce these risks to a low level. However, environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level.
Introduce diseases that may cause the species to decline	The proposed development is not expected to contribute to the introduction of Psittacine Beak and Feather Disease (PBFD), given the highly mobile nature of the species. However, as part of the mitigation measures, all equipment and vehicles entering Site are cleaned of foreign soil and seed prior to entering the site, which should minimise the risk of introducing diseases that may cause the species to decline.
Interfere with the recovery of the species.	As per the National Recovery Plan, listed threats to the species are loss and alterations to foraging and nesting habitat (within both Tasmania and Mainland Australia), primarily through land clearing and practises such as forestry, developments, prevention of regeneration and alterations to fire regimes. Also noted impacts are from collisions associated with cars, and competition from other winter foragers aggressive honeyeater species. Psittacine beak and feather disease (PBFD) has the potential to impact the species due to the known limited genetic estimates of the functional population. The proposal contributes to loss and alters foraging habitat for the species, however, impacts from the proposal are not solely likely to interfere with the recovery of the species at a regional scale (see above).
Conclusion	Non-significant impact.

EPBC Listed Vulnerable Species

Hirundapus caudacutus	White-throated Needletail
Significant Impact Guideline	Assessment
Lead to a long-term decrease in the size of an important population of a species	There is no National Recovery Plan for this species, however, based on the Conservation Advice for this migratory species (DEE, 2019) there are several populations across Australia, with the important population being represented by the breeding population occurring within different parts of Asia. Therefore, if present within the subject land a population of this species, would not represent an important population of the species as it does not a) represent a source population for dispersal b) not a population required for maintaining genetic diversity c) the potential population is not near the limit of the species range. Therefore, it is unlikely the proposal, which will impact up to 0.03 ha of foraging and roosting habitat will lead to the long-term decrease of an important population.
Reduce the area of occupancy of an important population	No, see above.
Fragment an existing important population into two or more populations	No, see above.
Adversely affect habitat critical to the survival of a species	No, see above.
Disrupt the breeding cycle of an important population	No, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. The proposal will impact 0.03 ha of marginal habitat for this species; therefore the proposal will not modify, destroy, remove, isolate, or decrease habitat to the extent that the species is likely to decline at a regional scale.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	HTEs are present within the study area, and therefore the proposal may spread these weeds or contribute to the establishment of new weeds via movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. However, environmental safeguards for the management of biosecurity risks should be implemented to reduce these risks to a low level (refer to **Section 11**).
Interfere with the recovery of the species.	As per the Conservation Advice for this species, the proposed development will not significantly exacerbate the threats this species currently faces. The proposal is unlikely to impact the species recovery at a regional population scale.
Conclusion	Non-significant impact

***Pteropus poliocephalus* (Grey-headed Flying-Fox)**	**Vulnerable**
Significant Impact Guideline	Assessment
Lead to a long-term decrease in the size of an important population of a species	As per the National Recovery Plan, the Grey-headed Flying-fox is a single, mobile population with individuals distributed across Qld, NSW, Vic, SA, Tas, and the ACT. As such individuals occurring within proximity to the subject land are identified as an important population. Although, the subject land is identified as occurring within a Priority Management Area for this species, this area represents poor roosting habitat and marginal forging habitat. *Eucalyptus tereticornis* (Forest Red Gum), *Corymbia maculata* are the only known foraging species occurring within the subject land. As such, important populations are not likely to occur within the study area.
Reduce the area of occupancy of an important population	No, see above.
Fragment an existing important population into two or more populations	No, the proposal will not substantially increase the overall fragmentation of habitat for the species.
Adversely affect habitat critical to the survival of a species	Yes. Habitat within the subject land is considered critical to the survival of the species, as it contains spring flowering vegetation communities dominated by *Corymbia maculata.*
Disrupt the breeding cycle of an important population	No. The removal of 0.03 ha of marginal habitat for the species will not disrupt the breeding cycle of the species. In addition, there are no breeding roosts within the subject land.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. The proposal will impact 0.03 ha of medium-quality habitat; however, the proposal will not modify, destroy, remove, isolate, or decrease habitat to the extent that the species is likely to decline at a regional scale.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	HTEs are present within the subject land, and therefore the proposal may spread these weeds or contribute to the establishment of new weeds via movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. However, environmental safeguards for the management of biosecurity risks should be implemented to reduce these risks to a low level (refer to **Section 11**).
Interfere with the recovery of the species.	As per the National Recovery Plan for this species, the proposed development will not exacerbate the threats this species currently faces. The proposal is unlikely to impact the species recovery at a regional population scale.
Conclusion	Non-significant impact.

Appendix 8 Koala Assessment Report – SEPP (Biodiversity and Conservation) 2021

1 Introduction

This Koala Assessment Report (KAR) has been prepared by MJD Environmental alongside the Biodiversity Development Assessment Report (BAR) to accompany a Development Application for the land at Lot 1 DP 1156433 27 Lang Drive, Bolwarra Heights NSW, hereafter referred to as the 'study area'. This assessment is to be assessed by Maitland City Council under Part 4 of the EP&A Act.

1.1 Proposal Description

The proposed development includes the subdivision of the 8.89 ha lot into two allotments for the purposes of sale – Proposed Lot 1 with an area of 2.32 ha containing all existing improvements such as dwellings, sheds etc and Proposed Lot 2 (currently vacant land) with an area of 6.58 ha. A development application has recently been lodged with Maitland City Council (MCC) through the NSW Planning Portal for this two-lot subdivision (Application Ref: PAN-163523). The proposal will require remnant native canopy within the study area to be removed, in addition to ground disturbance across the entirety of the study area for the development of the associated road infrastructure. Areas to be impacted by the proposal account for 0.28 ha of native vegetation and will hereafter be referred to as the 'subject land'.

1.2 *Application of the SEPP*

The Chapter 4 of the SEPP (Biodiversity and Conservation) 2021 applies due to:

- The land being located within the City of Cessnock LGA which is listed under the SEPP [*Part 4.1 Clause 4.4(1)* and Schedule 2];
- Application of *Part 4.2 Clause 4.9(1) and (5) – Development assessment process – no approved koala plan of management for land,* which indicates:
    - That the lot in which the study area occurs is greater than 1ha (including adjoining land within the same ownership);
    - There being no approved Koala Plan of Management for the study area; and
    - The study area contains trees listed under the Schedule 3 Koala Use Tree species (for the Central Coast koala management area.

1.3 Aims and Objectives

This KAR has been developed to address the requirements of the SEPP (Biodiversity and Conservation) 2021. In doing this the KAR must address the stated key principles and their associated detailed criteria and assess the subject land for its potential to be defined as 'Core Koala Habitat'.

1.4 Suitably Qualified Person

This report has been prepared by Ecologist Dr. Simone-Louise Yasui (B.Sc., MS, & PhD), under the guidance of Director Matt Doherty of MJD Environmental.

Matt Doherty's tertiary qualification and experience spanning 20 years in the field of ecological consulting – including undertaking general ecological field surveys for NSW flora and fauna (including the Koala) and the associated reporting – satisfies the SEPP criteria defining a suitably qualified and experienced person [*Part 4.11 Clause 4.2 (1)*].

2 Koala Assessment Report

2.1 Koala Habitat Value (criteria 1 and 2)

A review of the OEH BioNet Atlas Species Sightings (Assessed 9th June 2023), revealed 209 records occurring within 10 km of the study area. Of these records, most have been recorded between 2004-2022, with some historic records occurring in the 1980s and 1990s, and one record dating back to 1958. The most recent record occurring in late 2022 occurs approximately 8 km from the study area, with few records occurring in close proximity to the study area.

Koala use tree species listed under Schedule 2 of the SEPP are present within the development footprint and constitute at least 15% of the total number of trees in the upper stratum, therefore 'koala habitat' is present in accordance with the SEPP definition.

2.1.1 Site Description

The study area is situated on Lot 1 DP 1156433 27 Lang Drive, Bolwarra Heights NSW, which is currently zoned as R5 Large Lot Residential (refer to BAR **Figure 1**). The study area comprises a large lot residential property which includes managed pasture and lawns, a residential dwelling, large sheds, a planted garden and some remnant woodland. The majority of the study area is occupied by pasture which is subject to frequent management including slashing, with the woodland area and lawn surrounding the dwelling also experiencing frequent mowing. No midstory vegetation is present and the groundcover vegetation shows evidence of historic disturbance in addition to ongoing management.

The vegetation within the study area has been modified through historic land clearing and agricultural practices. The canopy within the study area consists of large late-mature to senescent *Corymbia maculata*, which are consistent with PCT 3433 and represent remnant woodland. Additionally, in front of the residential development is a planted garden which includes several semi-mature to mature native trees. The midstory is absent, with no indication of regeneration. The ground cover is primarily composed of grasses, many of which are non-native, however, there are native grasses present. The groundcover does appear to be managed, particularly around the residential dwelling. Along the western boundary of the study area is vegetation associated with a heavily modified forested wetland, which connects to the creekline that cuts diagonally across the study area. This groundcover of this vegetation has a similar composition to the surrounding pasture, however, there was a greater variety of non-native forbs present, and Casuarina glauca was regenerating in this area.

One PCT was identified within the study area, which both occur within the Hunter subregion of the Sydney Basin Bioregion. The proposal will remove up to:

- 0.03ha of PCT 3433: *Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest*

2.1.2 Targeted Koala Surveys

During the Biodiversity Assessment, formal surveys were undertaken to target *Phascolarctos cinereus* (Koala) by MJD Environmental Ecologist Dr Simone-Louise Yasui, and Field Ecologists Alexander Jeffrey and Stephanie Sheehy. Field survey was undertaken on the 18th, and 19th of July 2023 (See **Table 3** for the prevailing weather conditions during the surveys).

In accordance with the Biodiversity and Conservation SEPP 2021, the following survey activities were undertaken to determine the presence of Koalas:

- Spot Assessment Technique – SAT search (following Phillips and Callaghan 2011). SAT requires the identification of a single tree, followed by searching the closet 29 trees and searching in a 1 m circumference at their base for scat. SATs are employed in a maximum grid spacing of 250 m within wooded areas. Search for *P. cinereus* faecal pellets beneath each of the 30 marked trees based on a cursory inspection of the undisturbed ground surface within a distance of 100 centimetres around the base of each tree, followed (if no faecal pellets are

initially detected) by a more thorough inspection involving disturbance of the leaf litter and ground cover within the prescribed search area. Two person minutes per tree were dedicated to a faecal pellet search at the base of each tree. Survey was conducted on 30th May 2023 (refer to BAR **Figure 3**).

- Four (4) Koala Use Trees Species were determined present within the study area; *Corymbia maculata* (Spotted Gum), *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus tereticornis* (Forest Red Gum), and *Melaleuca quinquenervia* (Broad-leaved Paperbark).
- One (1) SAT was undertaken over the study area within areas where these Schedule 2 trees occur with more than a 15% canopy cover and nocturnal spotlighting surveys were conducted (over two nights).
- During the SAT search, and in addition to the required survey effort, secondary indications of Koala usage / occupation of local trees was carried out. This included searching trees for Koala signs such as trunk scratches, fur and urine stains.

There were old scratch marks displayed on a few trees within the study area, however, these markings were attributed to lace monitor and parrot activity given the lack of syndactyly scratch patterns. No other recent secondary indications such as belly rubs, loose fur nor scats were detected. Despite presence of suitable habitat (through Koala use tree species), there was no recent evidence of Koala presence in or around the study area observed during any of the survey efforts. No Koalas were observed during spotlighting and / or opportunistic observation, and no Koala scats were identified around the base of any Koala use trees during the SAT search.

2.1.3 Site Context

Although the study area has been heavily disturbed by historic clearance, it does contributes to a patch of forested vegetation to the south and fragmented vegetation to the west. Overall, connectivity between the study area to the broader landscape is limited given the extensive clearance and agricultural land use that dominates this region. The native vegetation cover of the study area and 1,500 m buffer was carried out by using the NSW State Vegetation Mapping within GIS Software. The native vegetation cover has been assessed at 17.3%.

There are no recorded koala sightings within 2.5 km of the study area within the last five years, nor was there indication of that this species was utilising the study area following multiple survey efforts. The study area is not considered to serve an important ecological function for koalas or is important to the recovery of the species.

2.2 Measures taken to avoid impacts to koalas – (criteria 3, 4, 5, 6, 7, & 8)

The study area is currently a large residential lot which contains infrastructure associated with the residential dwelling but is predominately characterised by a large area of pasture. At the time of the site assessment, some mowing was observed near the dwelling and no regenerating midstory vegetation was present.

To mitigate the potential impacts on biodiversity within the study area, within the BAR is a description of areas of high biodiversity value which should retained through detailed project design. This design will also ensure retention of habitat connectivity within the broader landscape. The proposed development should not further impede the movement by Koalas across the landscapes or impact recovery and / or expansion of Koala populations.

Precautionary measures were taken to determine the likelihood of koalas occurring on site in accordance with the SEPP 2021. No evidence of koalas was observed.

2.3 Analysis of potential impacts (criteria 9)

The ecological field assessment found that the proposal will remove / modify up to:

- 0.03 ha of PCT 3433: *Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest*

In addition, the following indirect impacts may occur because of the development:

- Vehicle Strike - The proposal will create additional roads and there will be increased vehicle movement during construction.
- Edge effects – The removal or modification of vegetation within the study area may increase the risk of weed invasions from disturbance of construction and from neighbouring land.
- Disturbance - Unauthorised disturbance of Koala habitat as a result of construction and operation; and
- Introduction or spread of disease - Increased vehicle movement will be likely during the construction phase that has potential to increase the risk of introduction of *Phytophthora cinnamomi* to the study area via ground disturbance and construction activity combined with machinery bringing spores into the area..

2.4 Plan to manage and protect koalas and their habitat (criteria 10, 11, 12 & 13)

Impact	Management measures
Vehicle strike	Traffic speed limits throughout the site during construction and reduced speed limits will be in place thereafter as the proposal is for a school, therefore school zone speed limits will be enforced.
Noise and light disturbance	Limit construction works to daylight hours to reduce impacts from light and noise. Suitably qualified ecologist or similar to inspect vegetation for all fauna (Inc. Koalas) before development commences, including surrounding trees to Subject Site. If a koala is identified during construction, temporary suspension of works that might disturb the koala and / or prevent from moving itself to adjacent undisturbed habitat.
Introduction or spread of disease, Edge effects	Ensure that all equipment is free of plant material and soil that may contain weed seeds or soil-borne diseases prior to entering the subject site. Vehicles should be washed down at an appropriate location where weeds are regularly managed prior to commencing work. If machinery is transported from an area of confirmed infection of *Phytophthora cinnamomi* or Exotic Rust Fungi to the subject site, stringent wash down must be completed before leaving the area, removing all soil and vegetative material from cabins, trays, and under carriages.
Disturbance to Koala habitat	Ensure the extent of clearing is clearly marked in the field prior to the commencement of vegetation clearing. Ensure that only the minimum vegetation clearing required is undertaken. Suitably qualified ecologist or similar to inspect vegetation for all fauna (Inc. Koalas) before development commences.

Impact	Management measures
	If a koala is identified during construction, temporary suspension of works that might disturb the koala and / or prevent from moving itself to adjacent undisturbed habitat

3 Conclusion

This Koala Assessment Report (KAR) has been prepared by MJD Environmental alongside the Biodiversity Assessment Report (BAR) to accompany a Development Application for the land at Lot 1 DP 1156433 27 Lang Drive, Bolwarra Heights NSW. This assessment is to be assessed by Maitland City Council under Part 4 of the EP&A Act. Development) 2011 (SRD SEPP).

Owing to the lack of evidence of Koala use within the study area, the lack of recent Koala records within the locality, and the minimal impact of preferred koala feed trees it is not considered necessary to prescribe monitoring/adaptive management plans or compensatory measures for the proposal. The proposal should not impact the connectivity of the study area within the wider area, nor the ability of any Koala's present to move through the surrounding landscape.

4 References

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011), *Survey Guidelines for Australia's Threatened Mammals*

NSW Environment Energy and Science (2020a) BioNet Atlas: http://www.bionet.nsw.gov.au/ (accessed June 2023)

NSW Environment Energy and Science (2020b) *Threatened Species Profile Search* - http://www.environment.nsw.gov.au/threatenedSpeciesApp/ (accessed April 2022)

NSW Department of Planning, Industry and Environment (2021) *Koala Habitat Protection SEPP* https://www.planning.nsw.gov.au/Policy-and-Legislation/Environment-and-Heritage/Koala-Habitat-Protection-SEPP, DPIE 8 March 2021 (accessed June 2023)

NSW Department of Planning, Industry and Environment (2019) *Koala Habitat Protection SEPP – Koala Habitat Protection Guideline: Implementing State Environmental Planning Policy*

Phillips and Callaghan (2011). The Spot Assessment Technique: A tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus. *Australian Zoologist* 35(3)

State Environmental Planning Policy (Biodiversity and Conservation) 2021 www.legislation.nsw.gov.au

State Environmental Planning Policy (Koala Habitat Protection) 2021 www.legislation.nsw.gov.au

Appendix 9 VMP Letter of Intent

Our Ref: 22056 - VMP Letter of Intent 07-08-2023
Via: email

Date: 07 August 2023

Attn: Maitland City Council
PO Box 220
Maitland NSW 2320

RE: LETTER OF INTENT – VEGETATION MANAGEMENT PLAN, ACCOMPANYING SUBDIVISION WITHIN LOT 1 DP 1156433 27 LANG DRIVE, BOLWARRA HEIGHTS NSW

We refer to the Development Application for the proposed subdivision of 8.9 ha lot into a 14-lot residential subdivision for the purposes of sale, at Lot 1 DP 1156433 27 Lang Drive, Bolwarra Heights NSW.

This letter is to act as an accompanying document to the above Development Application proposal. It is the intention of the proponent to implement a Vegetation Management Plan (VMP) within the ephemeral creekline which is represented by the low-lying wet area that bisects the site diagonally from the centre of the northern boundary to the western boundary.

Ecological advice prepared to inform the planning proposal recommended the following:

- A Vegetation Management Plan should be prepared to advise the correct weed management and revegetation techniques are undertaken. Weed monitoring/removal should be biannual and carried out by a qualified ecologist/bush regenerator.
- Fence VMP area to protect vegetation from works adjacent to the area.
- Active revegetation to regenerate a functioning riparian corridor. Active revegetation to be undertaken in the form of tree plantings, utilising appropriate native canopy species, as informed by the plant community types (PCTs) identified within the area. For further information regarding recommended revegetation species to utilise see **Attachment 1**.
- Concurrently, natural regeneration should be encouraged once exotic species have been reduced.
- The applicant, SNL Building, anticipates a consent condition requiring the preparation of a Vegetation Management Plan (VMP) for implementation on the site that will require active restoration within the riparian corridor that bisects the site. The subsequent VMP will address the following broad Aims and Objectives required to achieve these aims:

Aims

- Ensure that characteristic habitat features in the riparian corridor are properly managed, enhanced and maintained for a designated period of time.
- Provide a simple, concise practical working document for use that contains achievable rehabilitation objectives relative to the site context.

Objectives

- Assess existing vegetation and habitat management issues relating to the site;
- Detail appropriate rehabilitation and management measures;
- Ensure tree and vegetation protection within the site;
- Provide weed management strategies for existing infestations within the corridor and to prevent future infestation;
- Ensure the VMP is prepared by a suitably qualified and experienced person/ company and implemented by suitably qualified contractors;

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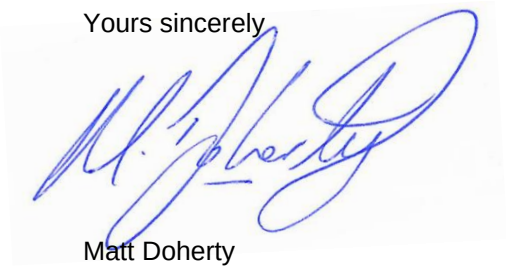
- Identify project tasks, including timing, sequencing and duration; and
- Detail responsibilities for the VMP implementation, management and monitoring. This is to include performance criteria and corrective actions.

Note – It is recommended that a perimeter fence be installed along the interface between the riparian corridor and the construction areas associated with the future residential dwellings. The fence is to be constructed of fauna friendly material (plain wire, no barbed wire) and only to be constructed along the interface, it is not to pass through existing vegetation.

The VMP will be prepared and implemented in alignment of the conditions of consent.

We trust this is sufficient for your purposes, however, should you require any further information or clarification, please do not hesitate to contact the writer.

Yours sincerely



Matt Doherty
Director
MJD Environmental (Aust) Pty Ltd

Encl: Attachment 1 – Revegetation Plan

Attachment 1 – Revegetation Plan

The lack of native vegetation within the low-lying ephemeral creekline, which is currently dominated by non-native grasses, will require significant revegetation to re-establish a functioning riparian corridor. Native revegetation will be particularly important within the midstory and canopy layers as these layers are currently absent or sparse. These revegetation works will primarily focus on the re-establishment of the PCT 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest, which is the dominant vegetation community identified within the locality, but will also include the incorporation of wetland associated species which were also identified on site but not associated with this PCT.

Naturally occurring remnant vegetation, preferably from the local area, is the best source of seed and/or vegetative material for revegetation. Generally, these plants will have evolved to suit local environmental conditions and assist in the preservation of local provenance / genetic stock. On this basis native plants for revegetation shall be sourced from suppliers that have obtained their stock by harvesting seed from local populations, however if unavailable at worst, seed or tube stock must be sourced from the Maitland LGA or within 100km of the site to maintain provenance.

The recommended plant species for revegetation are shown in **Table 1**, which has been derived from known local vegetation community (PCT 3433) and the Maitland City Council Wetlands Species Guide. Supply of the recommended plant species are subject to local availability, and therefore, a large suite of species has been provided, with the final selection of species determined at the discretion of the qualified ecologist/bush regenerator. Densities are based on approximate stems per hectare outcome and the final densities and species selected from the list will be subject to availability to the contractor at the time of planting.

Planting of the riparian zone will comply with DPI NRAR Guidelines for vegetation management plans on waterfront land (DPI NRAR 2012, p. 1), with planting ideally occurring during late autumn to early winter months to allow establishment during the cooler wetter months of the year for the region. If the time of plant cannot be at this time of year additional watering be required at the discretion of the contractor and with due consideration of seasonality.

During the management and monitoring period it is expected that at a minimum the following objectives are met to ensure final sign off is achieved at the completion of the 2-year management period:

- minimum of 80% survival rate of installed tubestock within the revegetation area; and
- reduction of woody and transformer weeds where or when they occur during the restoration period.

Table 1 Recommended Revegetation Species for Riparian Corridor

Scientific Name	Common Name	Planting Density
Canopy Species		
Corymbia maculata	Spotted Gum	1 individual per 10m^2
Eucalyptus fibrosa	Red Ironbark	
Eucalyptus siderophloia		
Eucalyptus umbra	Broad-leaved White Mahogany	
Eucalyptus acmenoides	White Mahogany	
Casuarina glauca	Swamp Oak	
Allocasuarina torulosa	Forest Oak	
Notelaea longifolia	Large Mock-olive	
Eucalyptus globoidea	White Stringybark	
Eucalyptus acmenoides	White Mahogany	
Mid-storey /Shrubs		
Acacia falcata		1 individual per 4m^2
Acacia ulicifolia	Prickly Moses	
Daviesia ulicifolia		
Bursaria spinosa	Native Blackthorn	
Melaleuca nodosa	Prickly-leaved Paperbark	
Melaleuca decora		
Persoonia linearis	Narrow-leaved Geebung	
Pultenaea villosa	Hairy Bush-pea	
Phyllanthus hirtellus	Thyme Spurge	
Leucopogon juniperinus	Prickly Beard-heath	
Groundcovers		
Entolasia stricta	Wiry Panic	4 individuals per m^2
Themeda triandra	Kangaroo Grass	
Microlaena stipoides var. stipoides	Weeping Grass	
Aristida vagans	Three-awn Spear grass	
Lomandra multiflora subsp. multiflora	Many-flowered Mat-rush	
Glycine clandestina	Twining glycine	
Eleocharis acuta		
Eleocharis sphacelata	Tall Spike Rush	
Juncus usitatus		
Schoenoplectus validus		
Carex inversa	Knob Sedge	