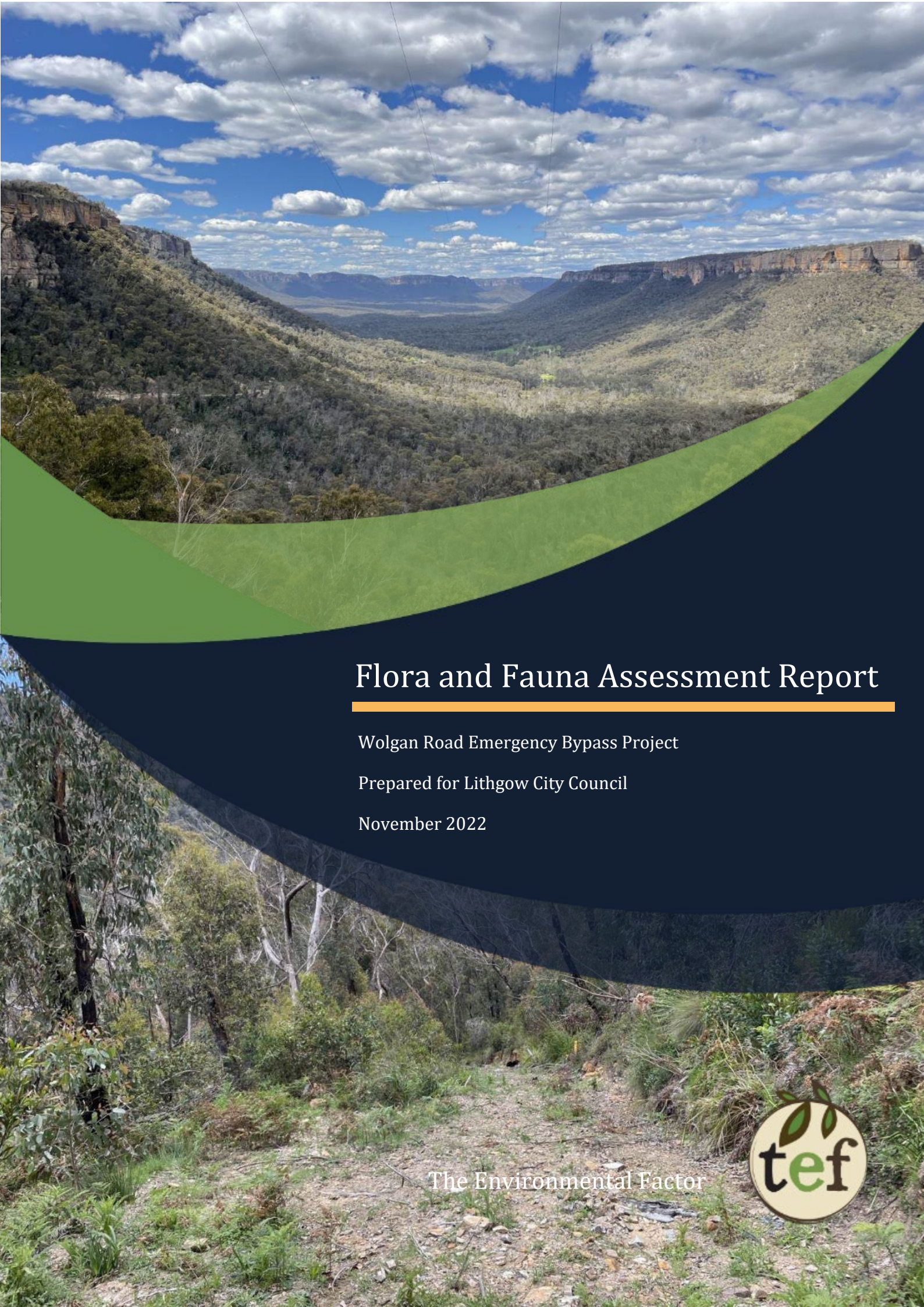

Flora and Fauna Assessment Report

Wolgan Road Emergency Bypass Project

Prepared for Lithgow City Council

November 2022

The Environmental Factor

Flora and Fauna Assessment – Wolgan Road Emergency Bypass Project

Document Verification

Revision	Author/s	Review	Date submitted	Client Review and Approval	
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This Report has been prepared by The Environmental Factor (TEF) at the request of NSW Public Works Advisory (PWA) on behalf of Lithgow City Council (LCC) to consider the potential environmental issues arising from the proposed construction of an emergency road diversion for an impacted section of Wolgan Road, Wolgan Valley, NSW (the Proposal). The purpose of this report is to document the biodiversity assets present on site, and to assess those that are likely to be impacted either directly or indirectly as a result of the Proposal, to support a Review of Environmental Factors (REF), Construction Environmental Management Plan (CEMP) and Environmental Control Plan (ECP) to be prepared for these works.

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Tables, Figures and Plates

Abbreviations

Abbreviation	Description
AOBV	Areas of Outstanding Biodiversity Value
AoS	Assessment of Significance (BC Act)
BAM	Biodiversity Assessment Methodology
BC Act	*Biodiversity Conservation Act 2016*
BOS	Biodiversity Offset Scheme
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
ECP	Environmental Control Plan
EEC	Endangered Ecological Community
EPA	Environmental Protection Agency
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
FFA	Flora and Fauna Assessment
FM Act	*Fisheries Management Act 1994*
HTE	High Threat Exotic
LLC	Lithgow City Council
LEP	Local Environment Plan
MNES	Matters of National Environmental Significance
NSW	New South Wales
PCT	Plant Community Type
SICA	Significant Impact Criteria Assessment (EPBC Act)
TEC	Threatened Ecological Community
TEF	The Environmental Factor
WoNS	Weed of National Significance

EXECUTIVE SUMMARY

The Environmental Factor (TEF) has been engaged by NSW Public Works Advisory (PWA) on behalf of Lithgow City Council (LCC) to undertake a Review of Environmental Factors (REF) and Flora and Fauna Assessment (FFA) to fully consider the potential environmental issues arising from the proposed construction of an emergency road diversion on Wolgan Road, Wolgan Valley, NSW (the Proposal). The Proposal involves the construction of an approximately 2.16 km length emergency access road commencing approximately 4 km north of the township of Lidsdale, and terminating approximately 200 m south of the 'Kurraco Ridge' property driveway, in order to bypass the section of Wolgan Road which is presently destroyed, to therefore temporarily reinstate access to the Wolgan Valley whilst the Wolgan Road undergoes major repairs.

The subject site occurs within remnant forest in the Blue Mountains within proximity to, and roughly parallel with, the Wolgan Road. The alignment generally follows an existing cleared track which is predominantly cleared of large trees, and generally dominated by regrowth native vegetation. Some larger remnant trees, including fire effected trees, stags and hollow-bearing trees along the edges of the existing track will require removal to construct the roadway at the required width.

The study area is comprised of a combination of Crown Land lots and private freehold land containing extensive areas of remnant vegetation. Large areas of native vegetation with and adjacent to the subject site have been affected to varying degrees by the 2019/20 bushfires and are subsequently in various conditions and in many areas are dominated by immature and regrowth vegetation. The site is connected to large tracts of native vegetation within the Blue Mountains. Newnes State Forest occurs to the east and south of the subject site, and Ben Bullen and Wolgan State Forests occur to the north and the west of the site. In addition, The Blue Mountains National Park, Wollemi National Park, and Gardens of Stone National Park are all connected to the subject site in the wider locality

Plant Community Types (PCTs) were difficult to accurately determine during the site surveys due to both the modification of the communities present (high density of regenerating native eucalypts containing only juvenile foliage due to fire) and a lack of reproductive material on mature eucalypt species present at the time of the site assessment. Subsequently, PCTs were assigned based on best fit using landscape position and species composition derived from the identifiable floristic material available.

Ground-truthed vegetation occurring within the subject site is shown in Table 1 below.

Table 1 Summary of native vegetation communities occurring within study area

Vegetation type	Study Area (ha)
PCTID: 0 - Not Native	0.19
PCTID: 3227 - Western Blue Mountains Sheltered Shale Forest	1.12
PCTID: 3369 - Central Tableland Ranges Peppermint-Gum Grassy Forest	3.08
PCTID: 3735 - Central Tableland Peppermint Shrub-Grass Forest	0.51
PCTID: 3749 - Western Blue Mountains Scribbly Gum Forest	0.21

Vegetation type	Study Area (ha)
Total Area	**5.21**
Total Area Native	**4.91**

The following ecological impacts are associated with the Proposal:

- Total impact area (subject site) of approximately **1.30 ha** of vegetation (comprised **of 1.11 ha native vegetation**, and **0.19 ha of existing disturbed track**), including mature trees. This vegetation occurs within and adjacent to the subject site.
- Thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site with direct impacts to all of them likely. Five (5) habitat trees and three (3) mature eucalypts are recommended to be retained, however due to the nature of the works (difficult to construct landscape), this may not be possible, and this assessment has assumed the removal of all of the above.
- Indirect impact potential on an additional **5.21 ha** of vegetation (native vegetation comprises **4.91 ha**) occurring within the study area through increased noise and activity disturbance during construction, which has the potential to impact species present within these areas.
- Potential injury or mortality of terrestrial, aquatic and semi-aquatic fauna within the Proposal footprint during vegetation clearing and construction

Flora and fauna surveys, including habitat assessments and incidental flora and fauna recordings were completed during the site visit to identify important habitat components for any threatened species or ecological communities recorded, or with the potential to occur, within the locality. Based on the desktop assessment, site visit and habitat assessments undertaken**, thirty-two (32) threatened fauna** species and **three (3) threatened flora** species were considered as having the potential to be impacted as a result of the Proposal (see Table 2 below):

Table 2 Summary of BC Act and EPBC Act assessments

Scientific Name	Common name	BC Act	EPBC Act	Summary of Assessment of Significance
Amphibians (frogs)				
Litoria littlejohni	Littlejohn's Tree Frog	V	V	No significant impact
Mixophyes balbus	Stuttering Frog	E	V	No significant impact
Parrots & Cockatoos				
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	No significant impact
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	No significant impact
Glossopsitta pusilla	Little Lorikeet	V	-	No significant impact

Scientific Name	Common name	BC Act	EPBC Act	Summary of Assessment of Significance
Woodland Birds				
Melithreptus gularis gularis	Black-chinned Honeyeater	V	-	No significant impact
Climacteris picumnus	Brown Treecreeper (eastern subspecies)	V	-	No significant impact
Stagonopleura guttata	Diamond Firetail	V	-	No significant impact
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	No significant impact
Petroica phoenicea	Flame Robin	V	-	No significant impact
Melanodryas cucullata	Hooded Robin	V	-	No significant impact
Pycnoptilus floccosus	Pilotbird	-	V	No significant impact
Anthochaera phrygia	Regent Honeyeater	CE	CE	No significant impact
Petroica boodang	Scarlet Robin	V	-	No significant impact
Chthonicola sagittata	Speckled Warbler	V	-	No significant impact
Daphoenositta chrysoptera	Varied Sitella	V	-	No significant impact
Owls				
Nixon connivens	Barking Owl	V	-	No significant impact
Tyto novaehollandiae	Masked Owl	V	-	No significant impact
Nixon strenua	Powerful Owl	V	-	No significant impact
Tyto tenebricosa	Sooty Owl	V	-	No significant impact
Insects				
Paralucia spinifera	Bathurst Copper Butterfly	E	V	No significant impact
Arboreal Mammals (Hollow dependent species)				
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	No significant impact
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	No significant impact

Scientific Name	Common name	BC Act	EPBC Act	Summary of Assessment of Significance
Cercartetus nanus	Eastern Pygmy-possum	V	-	No significant impact
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	No significant impact
Petauroides volans	Greater Glider	-	E	No significant impact
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	No significant impact
Dasyurus maculatus	Spotted-tailed Quoll	V	E	No significant impact
Petaurus norfolcensis	Squirrel Glider	V	-	No significant impact
Petaurus australis	Yellow-bellied Glider	V	-	No significant impact
Saccolaimus flaviventris	Yellow-Bellied Sheathtail Bat	V	-	No significant impact
Mammals (Foraging habitat)				
Phascolarctos cinereus	Koala	E	E	No significant impact
Flora				
Boronia deanei	Deane's Boronia	V	V	No significant impact
Caesia parviflora var. minor	Small Pale Grass-Lily	E	-	No significant impact
Eucalyptus cannonii	Capertee Stringybark	V	-	No significant impact

Of these, only the Flame Robin was recorded within the study area during surveys.

Assessments of significance for the above species were prepared in accordance with Section 1.7 of the EP&A Act and the EPBC Act *Matters of National Environmental Significance – Significant Impact Criteria Guidelines* (DEWHA, 2009). These assessments have concluded that the Proposal is **unlikely to have a significant negative impact** on threatened species occurring within the impact footprint. Therefore, Species Impact Statements and / or Referral to the Environment Minister is not required for this project.

It is recommended that clearing of native vegetation, in particular removal of large habitat trees and trees containing hollows (trees marked as Recommended for Retention – RR), is avoided or minimised wherever possible. Additionally, it is required that an ecologist is present to conduct pre-clearing surveys and the two-stage clearing procedure (see Section 6) immediately prior to, and for the full duration of the removal of vegetation to assess for any potential fauna present (threatened or otherwise). The ecologist must remain present at the time of habitat removal (i.e., nests and hollow-bearing trees) to supervise clearing and rescue any potentially occurring fauna.

Further mitigation measures (Section 6) proposed for these works include timing of clearing to occur outside of key breeding times (Spring) where practicable, erection of nest boxes to offset lost habitat resources, sediment and erosion control, stockpiling and earthworks in line with Bluebook requirements, and adherence to strict hygiene procedures.

1 INTRODUCTION

1.1 Overview

The Environmental Factor (TEF) has been engaged by NSW Public Works Advisory (PWA) on behalf of Lithgow City Council (LCC) to undertake a Review of Environmental Factors (REF) and Flora and Fauna Assessment (FFA) to fully consider the potential environmental issues arising from the proposed construction of an emergency road diversion on Wolgan Road, Wolgan Valley, NSW (the Proposal). The Proposal involves the construction of an approximately 2.16 km length emergency access road commencing approximately 4 km north of the township of Lidsdale, and terminating approximately 200 m south of the 'Kurraco Ridge' property driveway, in order to bypass the section of Wolgan Road which is presently destroyed, to therefore temporarily reinstate access to the Wolgan Valley whilst the Wolgan Road undergoes major repairs.

Wolgan Road is a 2-lane sealed road within the Wolgan Valley, serving as the only access to the valley, and small village of Newnes at the termination of the road. The Wolgan Road services a number of private properties, the rural campus for Cranbrook School, and tourism destinations including the Wollemi National Park, Gardens of Stone National Park, and the Emirates Resort. During heavy rainfall events in November 2022, a section of the road four (4) kilometers north of Lidsdale underwent significant damage, effectively isolating people and properties in the Wolgan Valley. Council, with assistance from NSW Public Works, propose constructing a temporary diversion for use whilst Wolgan Road undergoes repairs. Part of the diversion takes in the 'Donkey Steps track' alignment, a route now used by bushwalkers, which served as the original route into the Wolgan Valley in the late 1860's and follows an alignment roughly parallel to Wolgan Road.

This FFA has been prepared to assess the potential for impacts on ecological values, with particular emphasis on threatened ecological communities, populations and species listed under the *NSW Biodiversity Conservation Act 2016* (BC Act) and Matters of National Environmental Significance (MNES) listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The FFA has been undertaken in accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). The Proposal is being determined under Part 5 Section 1.7 of the EP&A Act via a separate Review of Environmental Factors (REF), which this report will support.

1.2 Terms and definitions

The terms described in Table 3 are used throughout this report.

Table 3 Definitions

Term	Description
Subject Site	The area to be directly affected by the Proposal, including the area proposed for the new road diversion around the impacted section of Wolgan Road. This is comprised of a 2.16 km section of road approximately 6 m wide. A total direct impact area of **1.3 ha**, of which **1.1 ha** comprises native vegetation.

Term	Description
Study Area	Includes the subject site (as described above) and any proximal areas that could be potentially indirectly impacted by the Proposal (assumed to be restricted to a 9 m buffer either side of the subject site). This equals a total impact area (direct and indirect) 5.21 ha of which native vegetation equals 4.91 ha. The subject site and study area are shown in Figure 1
Locality	The area within a 10-kilometre radius of the study area.

1.3 Proposal description

The Proposal involves the construction of an approximately 2.16 km length emergency access road commencing approximately four (4) km north of the township of Lidsdale, and terminating approximately 200 m south of the 'Kurraco Ridge' property driveway, in order to bypass the section of Wolgan Road which is presently destroyed, to therefore temporarily reinstate access to the Wolgan Valley whilst the Wolgan Road undergoes major repairs. (Figure 2). The road diversion will occur to the east of the existing Wolgan Road, and occurs through predominantly native woodland vegetation. The proposed alignment (subject site) will traverse through seven (7) lots as follows:

- Ben Bullen State Forest (State Forest NSW)
- Lot 40 DP751636 (Freehold Land)
- Lot 7006 DP1055080 (Crown Land)
- Lot 7001 DP1055079 (Crown Land)
- Lot 7300 DP1139065 (Crown Land)
- Lot 11C DP751666 (Freehold Land)
- Lot 10D DP751666 (Freehold Land).

The subject site occurs within remnant forest in the Blue Mountains nearby and roughly parallel to the Wolgan Road. The alignment generally follows an existing cleared track which is predominantly cleared of large trees, and generally dominated by regrowth native vegetation that has been partially degraded by past construction activities, including the introduction and spread of exotic weeds. Some larger remnant trees, including fire effected trees, stags and hollow-bearing trees along the edges of the existing track, will require removal to construct the roadway at the required width.

The surrounding area is comprised of a combination of Crown Land lots and private freehold land containing extensive areas of remnant vegetation. Large areas of native vegetation with and adjacent to the subject site have been affected to varying degrees by the 2019/20 bushfires, and are subsequently in various conditions and in many areas are dominated by immature and regrowth vegetation.

The proposed works are situated approximately 100 m to the west of the Wolgan River. The Wolgan River is a watercourse of the Hawkesbury-Nepean catchment, located in the Central Tablelands region of NSW. The western and eastern branches of the Wolgan River converge northeast of Wallerawang near Lithgow, on the eastern slopes of the Great Dividing Range. In total, the study area is intersected by five (5) unnamed waterways. One unnamed watercourse (3rd Order Waterway) occurs at the northern extent of the subject site, and flows north-east where it discharges into the Wolgan River.

The northern portion (3rd Order Waterway) of this tributary is mapped as Key Fish Habitat (KFH), and the subject site intersects the waterway in this area (see Figure 2). The proposed alignment also crosses an additional four (4) unnamed waterways as follows:

- Two 1st order waterways
- Two 2nd order waterways

The two unnamed 1st Order Waterways were dry at the time of surveys. Water was present and flowing across the surface of some sections of the track in the subject site.

Thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent the subject site with direct impacts to all of them likely. Five (5) habitat trees and three (3) mature eucalypts are recommended to be retained, however due to the nature of the works (difficult to construct landscape), this may not be possible, and this assessment has assumed the removal of all of them.

The site is connected to large tracts of native vegetation within the Blue Mountains. The Newnes State Forest occurs to the east and south of the subject site, and Ben Bullen and Wolgan State Forests occur to the north and the west of the site. In addition, The Blue Mountains National Park, Wollemi National Park and Gardens of Stone National Park are all connected to the subject site in the wider locality.

The study area is located on both unmapped land on the Native Vegetation Regulatory Mapping (DPIE 2021), and areas of Category 2 – Regulated Land.

Construction of the emergency access road is proposed to start as soon as possible, with the works to make the alignment safe for vehicles estimated to take 2 - 6 weeks.

The landslide affected section of Wolgan Road has undergone significant damage and requires major works to reinstate the road to its pre-damaged condition. These works are estimated to take approximately 12 months to complete.

1.4 Aims and scope of this report

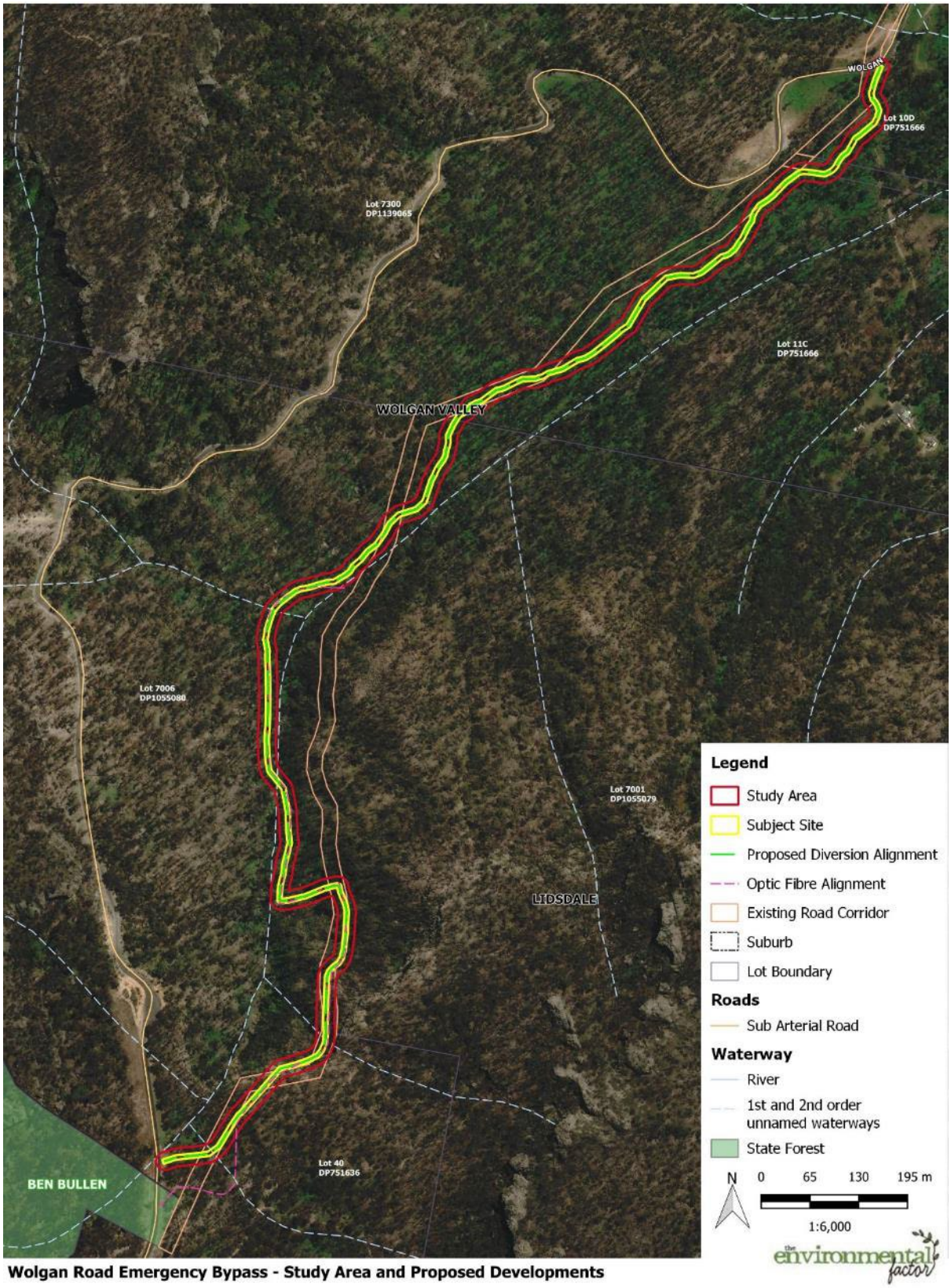
The aims of this assessment are to:

- Identify the presence or likely presence of threatened species, populations and ecological communities and their habitats listed under the BC Act.
- Identify the potential for any Matters of National Environmental Significance (MNES) listed under the EPBC Act to occur within the Proposal footprint and/or to be indirectly impacted by the Proposal.
- Identify the potential impacts of the Proposal on threatened biota or migratory species and their habitats.
- Assess the significance of impacts on threatened biota listed under the BC Act and identify the likely requirement or otherwise for further assessment and approvals under the EP&A Act.
- Assess the significance of impacts on MNES and identify the likely requirement or otherwise for further assessment and approvals under the EPBC Act.

- Recommend mitigation and environmental management measures to avoid or minimise adverse impacts on threatened biota and biodiversity values, as appropriate, to facilitate the relevant planning approvals process.

The results of this assessment will determine the significance of impacts to biodiversity values as a result of the Proposal, and the requirement for further assessment or the completion of a Species Impact Statement (SIS), or a referral to the Minister for Environment (EPBC Act) for impacts to threatened biota listed under NSW legislation, or MNES listed under the EPBC Act, prior to determination of the Proposal through completion of the project Review of Environmental Factors (REF).

The conclusions of this assessment are provided in Section 6 of this report.



Wolgan Road Emergency Bypass - Study Area and Proposed Developments

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Figure 1 Subject site and study area

2 LEGISLATIVE CONTEXT

2.1 NSW State Legislation

2.1.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The *Environmental Planning and Assessment Act 1979* (EP&A Act) forms the legal and policy platform for proposal assessment and approval in NSW and aims to, inter alia, 'encourage the proper management, development and conservation of natural and artificial resources'. All development in NSW is assessed in accordance with the provisions of the EP&A Act and the *Environmental Planning and Assessment Regulation (*EP&A Regulation 2000).

The EP&A Act contains three parts that impose requirements for planning approval. The main two are as follows:

- Part 4 provides for control of 'local development' that requires development consent from the local Council.
- Part 5 provides for control of 'activities' that do not require approval or development consent under Part 4.

The Proposal does not require development consent under Part 4 of the EP&A Act. The proposed works are a Division 5.1 activity under the EP&A Act, as the Proposal is 'permissible without consent' by virtue of State Environmental Planning Policy (Infrastructure) 2007. The determining authority for the project is Council.

Section 5.5 of the EP&A Act stipulates the duty of determining authorities to consider the environmental impacts of an 'activity'. When considering an activity, the determining authority is required to 'examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment'.

As part of the consideration of impacts of a proposal on the environment under Division 5.1 of the EP&A Act, the significance of impacts on threatened species, populations and endangered ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act) or *Fisheries Management Act 1994* (FM Act) must be assessed as described below. Where a significant impact is likely to occur, a species impact statement (SIS) must be prepared in accordance with the Secretary's Environmental Assessment Requirements, or a biodiversity development assessment report (BDAR) in accordance with the Biodiversity Offsets Scheme and Biodiversity Assessment Method.

2.1.2 Biodiversity Conservation Act 2016 (BC Act)

The BC Act provides legal status for biota of conservation significance in NSW. Section 7.2 and 7.8 of the *Biodiversity Conservation Act 2016* (BC Act) states that the determining authority must consider the effect of an activity on:

- Areas of Outstanding Biodiversity Value (AOBV), and/or
- Species, populations or ecological communities, or their habitats and whether there is likely to be a 'significant effect' on those species, populations or ecological communities.

The BC Act provides legal status for biota of conservation significance in NSW. It provides a framework for the Biodiversity Assessment Method (BAM) and the calculation of offset requirements for projects participating in the Biodiversity Offset Scheme (BOS). The BC Act aims to:

- Conserve biological diversity on a bioregional and state scale
- Lists Areas of Outstanding Biodiversity Value (AOBV)
- Assess the extinction risk of species and ecological communities
- Identify Key Threatening Processes
- Slow the rate of biodiversity loss, and conserve threatened species
- Areas of Outstanding Biodiversity Value (AOBV) (as defined under the BC Act).
- Species, populations or ecological communities, or their habitats (as listed under the BC Act) and whether there is likely to be a 'significant effect' on those species, populations or ecological communities.
- Other protected fauna or protected native plants listed under the National Parks and Wildlife Act 1974.

Section 7.3 of the BC Act lists five factors that must be taken into account when determining the significance of potential impacts of a proposed activity on threatened species, populations or ecological communities (or their habitats) listed under the BC Act. The 'five part test' or 'assessment of significance' is used to assist in the determination of whether a project is 'likely' to impose 'a significant effect' on threatened biota and thus whether a SIS is required. There is also the option to prepare a BDAR rather than an SIS, where a significant impact is likely.

Threatened biota and migratory species recorded or likely to occur in the study area are detailed further in Section 4.4 and Appendix E and potential impacts are identified in Section 5.4. These assessments are provided in Appendix F and Appendix G.

2.1.3 Fisheries Management Act 1994 (FM Act)

The objectives of the *Fisheries Management Act 1994* (FM Act) are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. It provides for:

- The listing of threatened species, populations and ecological communities, with endangered species, populations and communities listed under Schedule 4, 'critically endangered' species and communities listed under Schedule 4A, and vulnerable species and communities listed under Schedule 5.
- The listing of 'Key Threatening Processes' (under Schedule 6).
- Diseases affecting fish and marine vegetation (under Schedule 6B).
- Noxious fish and noxious marine vegetation (under Schedule 6C).
- The preparation and implementation of Recovery Plans and Threat Abatement Plans.
- Requirements or otherwise for the preparation of a SIS.

One of the objectives of the FM Act is to 'conserve key fish habitats ' which includes aquatic habitats that are important to the maintenance of fish populations generally and the survival and recovery of threatened aquatic species.

The FM Act has been addressed in the current assessment through undertaking:

- A desktop review to determine the threatened species, populations or ecological communities that have been previously recorded within the locality of the Proposal and hence could occur subject to the habitats present.
- Assessment of aquatic habitats during terrestrial field surveys.
- Assessment of impacts on aquatic habitats.
- Assessment of the potential for impacts on threatened species, populations and ecological communities listed under the Act.
- Identification of suitable impact mitigation and environmental management measures to avoid or mitigate impacts on the aquatic environment.

A Part 2 or Part 7 Fisheries Management Act (FM Act) permit is required for works within a third order (or higher) streams (based on the Strahler system of stream order classification), and first and second order streams that are known or likely to be habitat for listed threatened species, populations or communities.

The study area will impact on five unnamed waterways as follows:

- Two 1st order waterways
- Two 2nd order waterways
- One 3rd order waterway also mapped as Key Fish Habitat

As the 3rd Order Waterway is mapped as containing Key Fish Habitat (KFH), Council will need to seek a Part 2 or Part 7 Fisheries Management Act (FM Act) permit for works to be completed within waterways mapped as Key Fish Habitat, as the project will require 'Activities temporarily or permanently obstructing fish passage'

2.1.3.1 Policy and guidelines for fish habitat conservation and management (NSW DPI 2013)

The Policy and Guidelines for Fish Habitat Conservation and Management (2013) provides classification of Key Fish Habitats based on the characteristics of the waterway present.

Key Fish Habitats are further categorized according to 'sensitivity', with Type 1 containing Highly Sensitive habitat, Type 2 containing Moderately Sensitive habitats and Type 3 containing Minimally Sensitive habitats.

There are no named waterways and five (5) unnamed waterways mapped as occurring in the study area, two of which were dry at the time of surveys.

The proposed works are situated approximately 100 m to the west of the Wolgan River. The Wolgan River is a watercourse of the Hawkesbury-Nepean catchment, located in the Central Tablelands region of NSW. The Proposal will intersect with a 3rd Order Waterway that discharges into the Wolgan River. This 3rd Order Waterway is mapped as containing Key Fish Habitat.

Table 4 Key Fish Habitat Waterway Classifications (NSW DPI 2013)

Classification	Characteristics of Waterway
Class 1 Major Key Fish Habitat	Marine or estuarine waterway or permanently flowing or flooded freshwater waterway (e.g. river or major creek), habitat of a threatened or protected fish species or 'critical habitat'.
Class 2 Moderate Key Fish Habitat	Non-permanently flowing (intermittent) stream, creek or waterway (generally named) with clearly defined bed and banks with semi-permanent to permanent waters in pools or in connected wetlands areas. Freshwater aquatic vegetation is present. Type 1 and 2 habitats present.
Class 3 Minimal Key Fish Habitat	Named or unnamed waterway with intermittent flow and sporadic refuge, breeding or feeding areas for aquatic fauna (e.g. fish, yabbies). Semi-permanent pools form within the waterway or adjacent wetlands after a rain event. Otherwise, any minor waterway that interconnects with wetlands or other Class 1-3 fish habitats.
Class 4 Unlikely Key Fish Habitat	Waterway (generally unnamed) with intermittent flow following rain events only, little or no defined drainage channel, little or no flow or free-standing water or pools post rain events (e.g. dry gullies or shallow floodplain depressions with no aquatic flora present).

2.1.4 NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012)

Any works proposed within the defined riparian zone of a creek are to be carried out in accordance with the WM Act. Works undertaken on waterfront land (i.e. near a river, lake or estuary) require a *Controlled Activity Approval* under Section 91 of the WM Act, unless defined as exempt. The current works are being progressed by WSC and are considered exempt from requiring *Controlled Activity Approval* as WSC is a Local Government Authority.

NSW DPI Water guidelines recommend riparian buffer distances to protect and maintain water quality and habitat. Recommended buffer distances are tabled below (Table 6). Works are not to be carried out within the Total Riparian Zone as described below. Development which encroaches within these riparian buffer distances are recommended to be offset using the 'averaging rule' outlined by NSW DPI Water.

Table 5 Riparian corridors based on stream order (NSW DPI)

Stream order	Vegetated Riparian Zone (each side of watercourse) (m)	Total Riparian Zone (m)
1st	10	20 + channel width
2nd	20	40 + channel width
3rd	30	60 + channel width
4th	40	80 + channel width

2.1.5 NSW Biosecurity Act 2015 (Biosecurity Act)

The *NSW Biosecurity Act 2015* (Biosecurity Act) outlines mandatory measures that persons are to take with respect to biosecurity matters including the management of weeds (Part 2, Division 8 including Weeds of National Significance (WoNS)). Under the Biosecurity Act, the responsibilities for weed management by public and private landholders are consistent, reflecting that weed management is a shared community responsibility. The Act introduces the legally enforceable concept of a General Biosecurity Duty (GBD). Priority weeds are listed within Regional Strategic Weed Management Plans, however the GBD is not restricted to listed weeds.

The Biosecurity Act is administered by NSW Department of Primary Industries which determines the weed species covered by regulatory tools including Prohibited Matters, Control Orders and Biosecurity Zones. Existing Local Control Authorities (Councils) continue to be responsible for enforcing weed legislation.

Priority weeds and WONS observed on site are outlined in Section 4.2.3

2.1.6 Local Land Services Act 2013 (LLS Act)

The *Local Land Services Act 2013* (LLS Act) includes the management of natural resources in the consideration of the principles of Ecological Sustainable Development (ESD).

Vegetation clearing provisions are considered under Part 5A of the LLS Act. The LLS Act regulates the clearing of native vegetation on all land in NSW mapped as Category 2 – Regulated Land, as mapped on the Native Vegetation Regulatory Map. It does not include Excluded Land and Category 1 Exempt Land mapped on the Native Vegetation Regulatory Map (NVR Map).

Vegetation clearing which does not require development consent under the EP&A Act is considered for approval by the Native Vegetation Panel under the LLS Act.

2.1.7 Local Land Services Amendment Act 2016 (LLSA Act)

The *Local Land Services Amendment Act 2016* (LLSA Act), which amended the *Local Land Services Act 2013*, authorised the making of the Land Management (Native Vegetation) Code 2018 (Div 5, Sch 1 of the LLSA Act). The aim of the Code is to authorise clearing of native vegetation on Category 2 regulated land under certain conditions and provide for the establishment and maintenance of set aside areas.

Review of the Native Vegetation Regulatory map (Appendix B) has confirmed that the majority of the study area is located in areas of Category 2 – Regulated Land on the Native Vegetation Regulatory Mapping (Appendix B). Some areas to the northernmost and southernmost extent of the subject site are not mapped on the NVR map.

2.2 Commonwealth Legislation

2.2.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The purpose of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things (DEWHA 2009). An action that 'has, will have or is likely to have a

significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Government Minister for Sustainability, Environment, Water, Population and Communities (the 'Minister').

The EPBC Act identifies nine Matters of National Environmental Significance (MNES) as:

- World heritage properties.
- National heritage places.
- Wetlands of international importance (Ramsar wetlands).
- Threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development.

The EPBC Act has been addressed in the current assessment through:

- Desktop review to determine the MNES that are predicted to occur within the locality of the proposed scheme and hence could occur, subject to the habitats present.
- Targeted field surveys for threatened biota and migratory species listed under the Act.
- Identification of suitable impact mitigation and environmental management measures for threatened biota, where required.
- Assessment of potential impacts on MNES, if appropriate.

Potential impacts on relevant MNES must be subject to Assessments of Significance pursuant to the EPBC Act Significant Impact Guidelines (DEWHA 2009). If a significant impact is considered likely, a referral under the EPBC Act must be submitted to the Commonwealth Environment Minister.

Significant Impact Criteria Assessments (SICA) were completed for EPBC Act listed biota considered at risk of impact as part of the Proposal. These Assessments concluded that a significant impact is not likely for EPBC Act listed threatened biota (Appendix G).

3 METHODOLOGY

3.1 Desktop Review

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the BC Act, and MNES listed under the EPBC Act that may be affected by the Proposal. The results of the desktop assessment were then used to guide onsite field investigations.

3.1.1 Database searches

Database records pertaining to the site and locality (i.e. 10 kilometre radius) were reviewed and included:

Relevant State and Commonwealth Databases

- Protected Matters Search Tool (Department of Climate Change, Energy, the Environment and Water 2022)
- NSW BioNet (DPE 2022), the website of the Atlas of NSW Wildlife
- NSW Scientific Committee Final Determinations
- Priority Weeds for the Central Tablelands (includes Lithgow City Council) (DPI 2022)

State and Federal Guidelines

- Threatened Species Survey and Assessment: Guidelines for developments and activities. Working Draft (DEC 2004)
- NSW Survey Guide for Threatened Frogs (DPIE 2020)
- NSW Guideline to Surveying Threatened Plants and their Habitats (DPIE 2020)
- Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2010)
- Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2010)
- Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2011)
- Draft survey guidelines for Australia's threatened orchids.

Spatial data

- New South Wales Vegetation Information System (VIS) (DPE 2022)
- DFSI – Lithgow City LGA Topographical and Cadastral layers
- Sixmaps Satellite Imagery 2013/2014
- OEH Mitchell Landscape Soil v3.1
- CRS GDA 94 MGA zone 55
- Google Satellite Imagery 2019

- NSW Spatial Portal ss-sdi Spot 6/7 Satellite Imagery 2020

Following collation of database records and species and community profiles, a 'likelihood of occurrence' assessment was prepared with reference to the broad habitats contained within the subject site (Appendix E). The assessment was further refined following field surveys and assessment of habitat present.

3.1.2 Vegetation mapping

GIS mapping was completed prior to surveys being undertaken to inform our ecologists of the habitats and vegetation likely to be on site and to provide a visual representation of vegetation communities present within the study area, as well as any previous records of threatened species recorded.

3.2 Field survey

A rapid site assessment was undertaken over one (1) day on the 17th November 2022, by Senior Ecologist Skye Rivett (BAAS 22001). During the site assessment, the following activities were undertaken:

- Identifying and recording the vegetation communities present within the subject site, and where they extend beyond and into the study area, with focus on identifying any threatened ecological communities (TEC)
- Recording of incidental flora species encountered within the study area, including searches for locally occurring threatened species where relevant, species diagnostic of threatened ecological communities and priority weeds (High Threat Exotics or HTE)
- Recording opportunistic sightings of any fauna species, seen or heard, within the study area
- Identifying and recording the locations of threatened fauna habitat such as important nesting, roosting or foraging microhabitats where relevant within the study area
- Undertaking targeted searches for the habitat of any threatened and regionally significant fauna **where relevant**, including:
  - Tree hollows (habitat for threatened large forest owls, parrots, cockatoos, bats and arboreal mammals)
  - Caves and crevices (habitat for threatened reptiles, small mammals and microbats),
  - Termite mounds (habitat for threatened reptiles and the echidna)
  - Waterbodies (habitat for threatened fish, frogs and water birds)
  - Fruiting / flowering trees (food for threatened birds and mammals)
  - Rocky outcrops and overhangs (habitat for threatened microbats, herpetofauna and marsupials)
  - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals)
  - Any other habitat features that may support fauna (particularly threatened) species
- Assessing the connectivity and quality of the vegetation within the study area and surrounding landscape

A detailed summary of onsite investigation is included in Table 6.

Table 6 Survey effort summary

Survey method	Effort
Rapid Data Points	Modified floristic rapid data points were undertaken within vegetation throughout the road corridor to verify Plant Community Types (PCTs) present and to develop a flora list within the study area.
Fauna habitat assessments	Habitat assessments were conducted across the site. Tree hollows, possible denning sites, waterways, leaf litter, rocky outcrops and other resources were inspected for their suitability as fauna habitat.
Opportunistic general surveys	Observations of fauna or flora on site during the survey period were recorded.
Habitat tree and hollow assessment.	Mature trees containing habitat features (hollows, cracks, fissures) occurring within the subject site were recorded using Avenza (Figure 2 and Figure 3).

3.2.1 Terrestrial flora survey

Vegetation mapping

GIS mapping was completed using QGIS prior to surveys being undertaken to provide a visual representation of vegetation communities predicted to be present within the study area and any previous records of threatened species recorded.

During field surveys, vegetation occurring within the study area was identified and a Plant Community Type (PCT) assigned based on a best-fit approach according to the species composition present on the site. PCT's recorded during surveys were then mapped for the study area using data collected from the site assessment and a condition rating assigned based on structural integrity and level of weed invasion observed.

Targeted flora surveys

Targeted threatened flora transect surveys in the correct survey periods for individual species were **not undertaken** as part of this assessment. Threatened flora assessment was limited to habitat assessment and incidental observations of any potentially occurring threatened flora species. The study area was surveyed incidentally for detectable threatened flora species via random meander transect surveys. Habitat quality for species with potential to occur along the trail was assessed to determine the likelihood of species occurrence within the site. Locations of threatened species (if observed) were recorded using handheld GPS units (mobile phones / tablets) equipped with Avenza mapping software.

3.2.2 Terrestrial fauna survey

Opportunistic observations

Opportunistic observations of fauna species were recorded at all times during field surveys. All species observed or heard utilising the site during surveys were recorded. Any observed evidence of faunal activity (tracks, scats, feathers, pellets) were noted. Where required, scats or pellet specimens were collected and sent for analysis (Scats About) and identification.

Habitat assessment

Habitat assessments on site included active searches for the following habitat features where relevant:

- Trees with bird nests or other potential fauna roosts
- Burrows, dens and warrens, bridges, culverts and hollow-bearing trees for evidence (e.g. guano or bat droppings) of roosting microbats
- Hollow-bearing trees/stags and logs which provide refuge, nest and den sites for a range of threatened fauna species
- Koala food trees and/or evidence of scratches or scats
- Distinctive scats or latrine sites, owl whitewash and regurgitated pellets under roost sites
- Tracks or animal remains
- Evidence of activity such as feeding scars, scratches and diggings
- Leaf litter and fallen timber were inspected for reptile habitat
- Presence of potential habitat for threatened frog species

3.3 Assessments of significance of impacts

Assessments of the likely significance of impacts resulting from the Proposal have been prepared in accordance with Section 1.7 of the EP&A Act and the *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA 2013) for threatened biota known or likely to occur within the Proposal footprint and with potential to be impacted by the Proposal, based on the results of the field survey. Assessments have only been undertaken for those species that may be impacted by the Proposal. These assessments are presented as in Appendix F and Appendix G.

3.3.1 Survey conditions and limitations

Results from field investigations were influenced by timing and duration of surveys and weather conditions prior to, and during the surveys. Details of weather conditions recorded, and the limitations of the surveys undertaken, are outlined further below.

Survey conditions

The survey was conducted throughout the day of 17 November 2022.

During the survey period, conditions were cool, calm and sunny with a top of 17 degrees recorded and a low of -0.6 degrees on 17 November, recorded at the Marrangaroo (Defence) active weather station (ID 063308), the nearest weather station to the site. No rain fell during the site visit. Further data on the weather conditions near the site on days preceding and following the site visit are included in Appendix H.

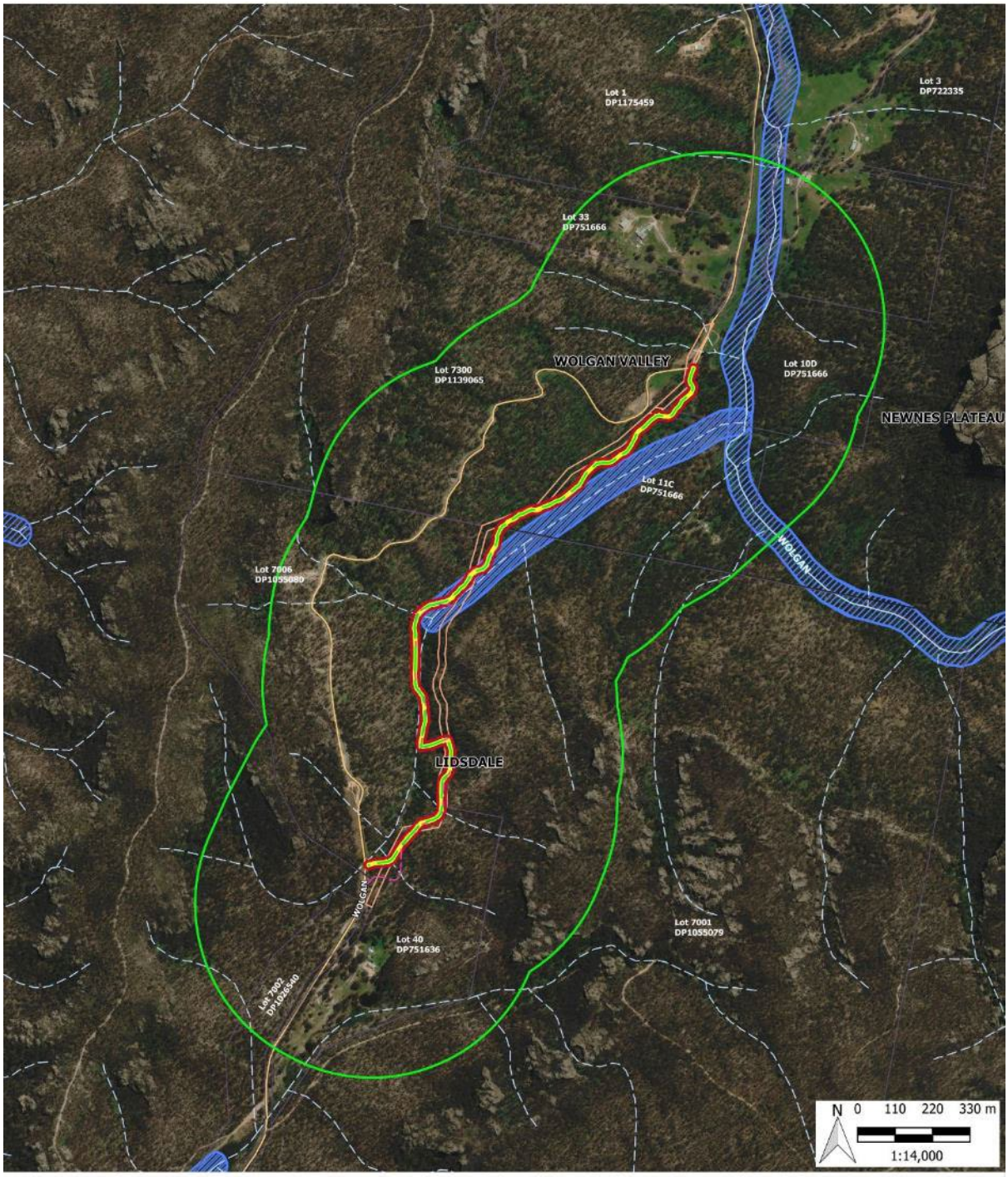
Survey limitations

TEF ecologists were able to walk the entire site and survey flora within the subject site; however, detailed searches outside the immediate impact footprint were not undertaken. Plant identification and habitat assessment within these areas were made based on visible species and resources that could be identified from accessible locations. Fire effects and seasonal restrictions due to project timeframes also limited the detectability of species on site during the survey period.

Given the limited survey effort, it is likely that some species that occur in the study area either permanently, seasonally or transiently were not detected during the survey. These species may include annual, ephemeral or cryptic flora and fauna species; nocturnal fauna; birds and frogs which call at other times of year; and mobile or transient fauna in general.

The habitat assessment conducted allows for identification of habitat resources available for such species, in order to assess their likelihood of occurring within the study area. As such, the survey was not designed to detect all species, rather to provide an overall assessment of the ecological values within the Proposal footprint. This information was used to predict potential impacts of the Proposal on ecological values and to develop a design and/or mitigation measures to specifically avoid impacts on threatened ecological communities and known and potential habitat for threatened species, where practicable.

Due to the nature of the site and the restrictions of impacts to areas that have already undergone significant past disturbance, in addition to the preparation of assessments of significance (Appendix F and Appendix G) for species not easily detected or undetectable at the time of surveys, the level of assessment conducted is deemed adequate.



Wolgan Road Emergency Bypass - Waterways and Key Fish Habitat within a 500m Radius of the Proposal Location

Legend

- 500m Radius
- Study Area
- Subject Site
- Proposed Diversion Alignment
- Alternate Route
- Existing Road Corridor
- Suburb
- Lot Boundary

Roads

- Sub Arterial Road

Waterway

- River
- 1st and 2nd order unnamed waterways
- Key Fish Habitat

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Figure 2 Waterways and Key Fish Habitat

4 RESULTS

4.1 Site description

The subject site occurs within remnant forest in the Wolgan Valley of the Blue Mountains, nearby and roughly parallel to Wolgan Road. The alignment generally follows an existing cleared track which is predominantly cleared of large trees, and generally dominated by dense acacia and eucalypt regrowth. Some larger remnant trees, including fire effected trees, stags and hollow-bearing trees along the edges of the existing track, will require removal to construct the roadway at the required width.

The northern portion of the subject site runs through a valley, with the remnant woodland vegetation in this area having been heavily fire effected in the 2019/2020 fires and dominated by dense native regeneration with exotic weed species present along disturbed track areas. As the subject site progresses uphill to the south, the fire damage (and subsequent regeneration) lessens. The southern section of the site occurs along steeper slopes with fire damage minimal in these areas.

The proposed works are situated approximately 100 m to the west of the Wolgan River, a watercourse of the Hawkesbury-Nepean catchment, located in the Central Tablelands region of NSW. The western and eastern branches of the Wolgan River converge northeast of Wallerawang near Lithgow, on the eastern slopes of the Great Dividing Range. In total, the study area is intersected by four (4) unnamed waterways. One unnamed watercourse (3rd Order Stream) occurs at the northern extent of the subject site and flows north-east where it discharges into the Wolgan River. This stream contained water at time of survey, with the northern portion of this tributary where the subject site intersects mapped as Key Fish Habitat (KFH)(see Figure 2). The proposed alignment crosses the same watercourse again, further to the south, as well as an additional two unnamed watercourses (1st and 2nd Order Streams), which were dry at time if survey. Surface water was also present and flowing across the surface of some sections of the track within the subject site.

The site is connected to large tracts of native vegetation within the Blue Mountains. The Newnes State Forest occurs to the east and south of the subject site, with Ben Bullen and Wolgan State Forests occurring to the north and the west of the site. In addition, The Blue Mountains National Park, Wollemi National Park and Gardens of Stone National Park are all connected to the subject site within the wider locality.

The majority of the study area is located in areas of Category 2 – Regulated Land on the Native Vegetation Regulatory Mapping (Appendix B). Some areas to the northernmost and southernmost extent of the subject site are not mapped on the NVR map.

An area mapped as containing biodiversity values on the Biodiversity Values Map (Appendix C) occurs to the north of the subject site along Wolgan River. This area is located within a 500 m radius of the subject site, however falls outside of the subject site and would not be impacted by the Proposal.

4.2 Flora

4.2.1 Vegetation communities

Vegetation mapping of the study area and surrounding locality was investigated (Figure 1). The results of this database search were used to guide on ground investigation and to determine actual PCT's present on site.

PCTs were difficult to accurately determine during the site surveys due to both the modification of the communities present (high density of regenerating native eucalypts containing only juvenile foliage due to fire) and a lack of reproductive material on mature eucalypt species present at the time of the site assessment. Subsequently, PCTs were assigned based on best fit using landscape position and species composition derived from the small amount of floristic identifying material available.

Ground-truthed vegetation revealed some discrepancies with mapped vegetation communities, with four (4) PCT's (plus non-native vegetation) confirmed as present within the study area and subject site during surveys (see Figure 3 and Figure 4) as follows:

PCT 3227 - Western Blue Mountains Sheltered Shale Forest

This PCT occurred towards the northern end of the study area along valley flats and was heavily fire effected, subsequently dominated by regrowth eucalypt and acacia species within the understorey. The canopy species comprised of predominantly *Eucalyptus cypellocarpa*, *Eucalyptus macrorhyncha*, an unidentified *Eucalyptus* sp. and possibly *Eucalyptus viminalis* and/ or *Eucalyptus radiata* (not possible to adequately identify species due to a lack of reproductive material present and only juvenille regrowth present for identification purposes). The mid-story component was dominated by *Acacia longifolia*, *Acacia melanoxylon* and *Ozothamnus sp. with Allocasuarina littoralis* and some *Pomaderris* spp. also present. The groundcover was predominantly native and dominated by *Hydrocotyle laxiflora* in fire effected areas, with *Poa labillardiera, Lomandra longifolia* and *Dichondra repens* also present.

PCT 3369 - Central Tableland Ranges Peppermint-Gum Grassy Forest

This PCT occurred on lower slopes towards the mid and northern end of the study area and was heavily fire effected, subsequently dominated by regrowth eucalypts and acacia in the understorey. The canopy species were comprised predominantly of a Stringybark, most likely *Eucalyptus macrorhyncha*, with *Eucalyptus dives* an unidentified *Eucalyptus* sp. also present. As with PCT 3227, the mid-story component was dominated by *Acacia longifolia*, *Acacia melanoxylon* and *Ozothamnus sp* with *Bursaria spinosa*, *Pomaderris* spp. and *Allocasuarina littoralis* also present. The groundcover was predominantly native and dominated by mixed forbs, ferns, climbers and grasses including *Hydrocotyle laxiflora*, *Pteridium esculentum, Gonocarpus tetragynus*, *Lomandra longifolia*, *Dichondra repens, Clematis aristata, Hardenbergia violacea, Billardiera scandens* and *Gahnia aspera*.

3735 - Central Tableland Peppermint Shrub-Grass Forest

This PCT occurred on higher slopes towards the southern end of the study area on either side of an existing track and was less fire effected than the lower valley areas. Canopy species were dominated by *Eucalyptus praecox* and *Eucalyptus dives*, with mid and ground layers containing a mixture of *Acacia spp.* and other flowering shrubs including *Podolobium ilicifolium, Leucopogon lanceolatus*,

Leptospermum polygalifolium, Acacia terminalis, *Acacia melanoxylon*, *Acacia longifolia*, *Dampiera stricta* and *Hibbertia scandens*. The groundcover stratum contained a diversity of forbs and ferns including *Gahnia aspera, Lomandra longifolia*, *Diuris* sp., *Adiantum aethiopicum*, and *Xanthosia pillosa*.

PCT 3749 - Western Blue Mountains Scribbly Gum Forest

This PCT occurred along the escarpment on either side of the existing track at the far northern end of the study area and contained a canopy dominated by *Eucalyptis rossii* and possibly *Eucalyptus macrohyncha*. The shrub layer contained a variety of shrubs including *Banksia spinulosa*, *Acacia buxifolia*, *Persoonia linearis*, and *Pultanaea spp*. The groundcover was dominated by *Poa libillardiera*, *Stylidium graminifolium*, and *Boronia microphylla* with a mixture of forbs throughout.

Table 7 Ground-truthed PCT's within Study Area

Vegetation type	subject site (ha)
PCTID: 0 - Not Native	0.19
PCTID: 3227 - Western Blue Mountains Sheltered Shale Forest	0.28
PCTID: 3369 - Central Tableland Ranges Peppermint-Gum Grassy Forest	0.76
PCTID: 3735 - Central Tableland Peppermint Shrub-Grass Forest	0.05
PCTID: 3749 - Western Blue Mountains Scribbly Gum Forest	0.02
Total Area	1.30
Total Area Native	**1.11**

Plate 1 Existing clearance along northern section of study area showing regrowth due to previous clearing and recent fire

Plate 2 Low fire effected area showing high shrub diversity and less dense regrowth within PCT 3735 at southern end of study area

Plate 3 Moderate fire effected area within study area

Plate 4 High fire effected area showing dense Acacia and Eucalyptus regrowth along alignment

Plate 5 Existing cleared track and PCT 3735 on track edges, southern end of study area

Plate 6 Existing track containing dense regrowth with PCT 3369 on track edges

Plate 7 PCT 3749 at southern end of study area

Plate 8 Blackberry infestation along track edges

4.2.2 Flora species

Seventy-seven (77) species of flora were recorded within the study area, comprising 87% native and 13 % exotic species. The full list of species recorded during the survey is presented in Appendix D. Generally, vegetation within the subject site was predominantly native and in good quality.

No threatened flora species were recorded as occurring on the site, however targeted seasonal surveys were not undertaken. The vegetation present within the study area consisted of patches of good to moderate condition forest with native canopy species of mixed successional ages and a diverse shrubby understory. Current disturbances, historical bushfires, and clearing for transport corridors has degraded the landscape allowing exotic species to invade the understory near trail areas.

4.2.3 Declared and listed environmental weeds

Ten (10) exotic plant species occurred within the study area (see Appendix D for full list). Of these, one (1) was considered a High Threat Exotic (HTE), Weed of National Significance (WoNS) and Priority weed for the region, and was recorded during surveys in low densities across the study area, predominately within lower valley fire affected areas.

Table 8 WONS and Priority listed weeds for the Central Tablelands recorded within the study area

Scientific Name	Common Name	Control Category
Rubus fruticosus sp. agg.	Blackberry	Weed of National Significance *Priority Weed – Prohibition on certain dealings*

4.3 Fauna

4.3.1 Fauna species

General fauna observations undertaken during the site visit detected a range of avian fauna species within the study area. A total of sixteen (16) fauna species were recorded within the study area during surveys with all being native avian species. A full list of species recorded on site can be found in Appendix D. No threatened fauna species were recorded within the study area during surveys, however seasonal targeted surveys were not undertaken.

4.3.2 Fauna habitat

The study area and broader locality support a range of habitat for native wildlife. Remnant canopy species of varying successional ages occurring within the study area were observed to provide many habitat features including a range of hollow sizes, lose bark and foraging resources (Plate 7 - Plate 12). Habitat resources including fallen logs, leaf litter, creek lines and wet areas, hollows, stags, and structurally diverse vegetation offer potential suitable nesting, foraging and sheltering sites for a range of fauna species including reptiles, birds and small mammals including microbats.

Many areas of the subject site and surrounding study area have been fire affected during the 2019/2022 bushfires. In these areas canopy and shrub vegetation was often very dense and dominated by regrowth, and larger living trees were sparse. Despite this, hollow bearing trees and stags (which were often remnant burnt trees) were still present and are likely to provide sheltering habitat for various species. Additionally, the abundant and dense shrub and regrowth eucalypt layer provides sheltered connectivity and foraging habitat for fauna.

The study area is connected to large tracts of native vegetation within the surrounding Blue Mountains. The Newnes State Forest occurs to the east and south of the subject site, and Ben Bullen and Wolgan State Forests occur to the north and the west of the site. In addition, The Blue Mountains National Park, Wollemi National Park and Gardens of Stone National Park are all connected to the subject site in the wider locality.

Forested habitat

The subject site is located within dense remnant forest vegetation in varying levels of impact by past bushfires. All areas of forest in the subject site are highly connected and provide ample foraging and connectivity habitat for a variety of species including small birds, mammals and reptiles. Areas of dense regrowth vegetation provide good sheltering habitat for small native species, and allow them to move throughout the landscape safely. In addition to areas of fire affected habitat, large areas of intact forest also occur the study area, particularly to the south of the site, providing high quality habitat for a variety of species. Habitat resources include canopy trees, nectar, fruits and leaves as well as foraging substrate and fruiting and flowering small trees and shrubs.

Hollow-bearing trees, nest trees and stags

Although large areas of forest across the study area have been historically affected to varying degrees by fire, hollow-bearing trees and large stag (dead sanding trees) were still present within the landscape – although often burnt. Thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent the subject site with direct impacts to all of them likely. These habitat features contained a range of hollow sizes and shapes providing observed and potential nesting habitat for a variety of native arboreal mammals and birds including several species of threatened microbat and glider species previously recorded in the locality.

Hollow-bearing trees are an important habitat resource, providing denning, nesting or sheltering sites for many birds, bats, arboreal mammals, reptiles and amphibians. Nestling Kookaburras were observed occupying a hollow-bearing tree within the subject site that would require removal. In addition to hollow-bearing trees, some mature eucalypts contained stick nests at the time of surveys, although none were observed to contain nesting fauna.

Rocky outcrops and rocky habitat

Areas of large rocky outcrops, caves and smaller scattered rock were present along the track edges and in the wider study area. Rocky habitat may provide shelter for a variety of small and large reptile species such as skinks, dragons and snakes. Areas of large rocky outcrops and caves were not present within the proposed subject site, and would not be impacted directly by the Proposal.

Aquatic habitat and Key Fish Habitat

Aquatic habitats within the study area include four unnamed watercourses, of which two contained water at the time of the surveys. One unnamed watercourse (3rd Order Stream) occurs at the northern extent of the subject site, and flows north-east where it discharged into the Wolgan River. The northern portion of this stream is mapped as Key Fish Habitat (KFH). The mapped area of Key Fish Habitat may provide some habitat for some small fish species which may occur in the lower reaches of the stream where water is present continuously, and for semi-aquatic species such as turtles and aquatic reptiles.

The remaining watercourses were dry at the time of surveys. Aquatic habitats include the area of Key Fish Habitat within the subject site which contained water at the time of surveys, and any water pools

or soaks present either permanently or intermittently following rainfall that may provide breeding and shelter resources for common frog and reptile species.

Plate 9 High quality, low fire effected forest in the subject site

Plate 10 Large hollow-bearing tree recommended for retention within the subject site

Plate 11 Rocky outcrops adjacent to existing track

Plate 12 Waterway crossing the existing track

Plate 13 High-quality waterway bisecting the subject site

Plate 14 High quality remnant vegetation and rocky escarpments adjacent the study area

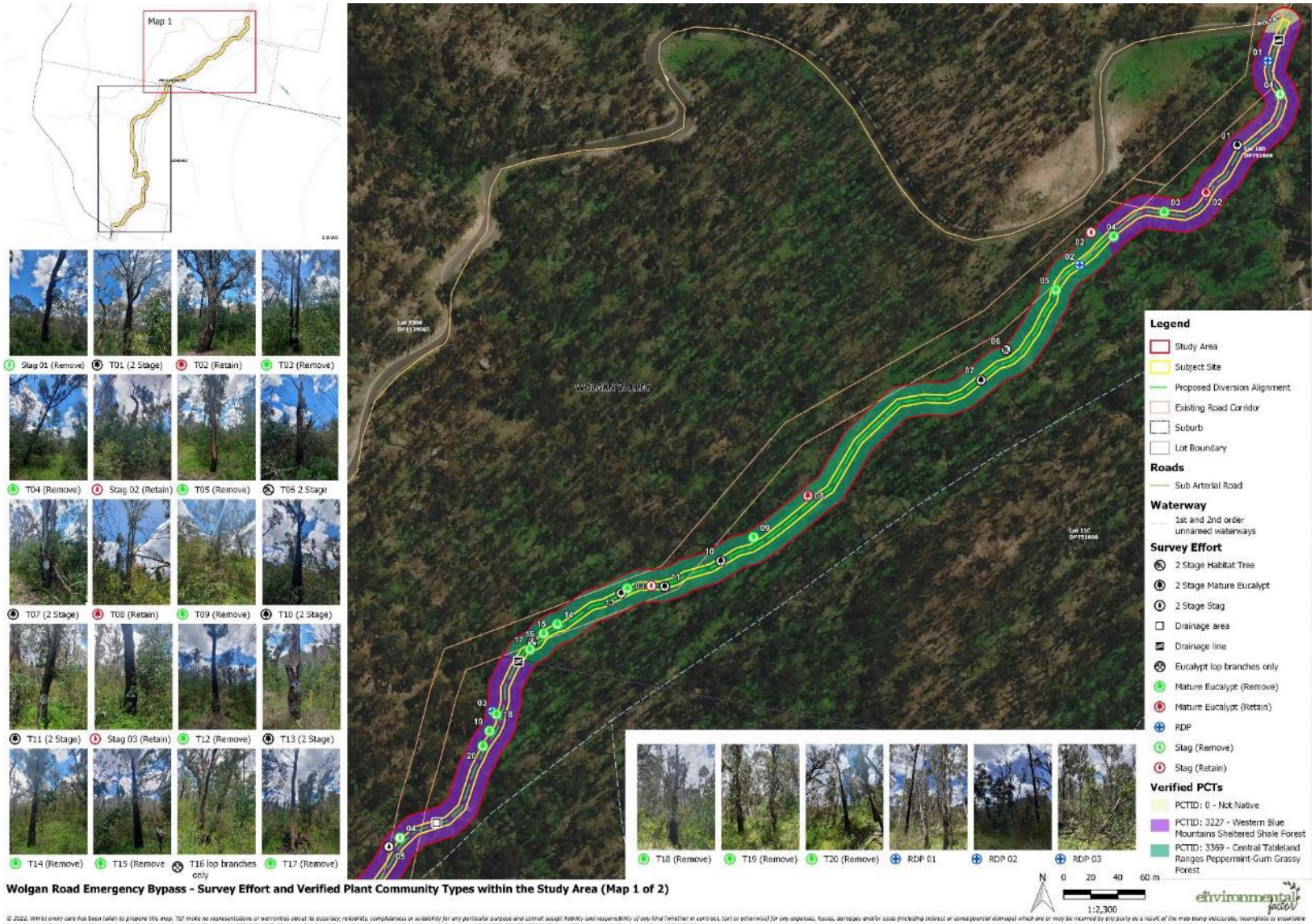

Figure 3 Survey effort 2/2

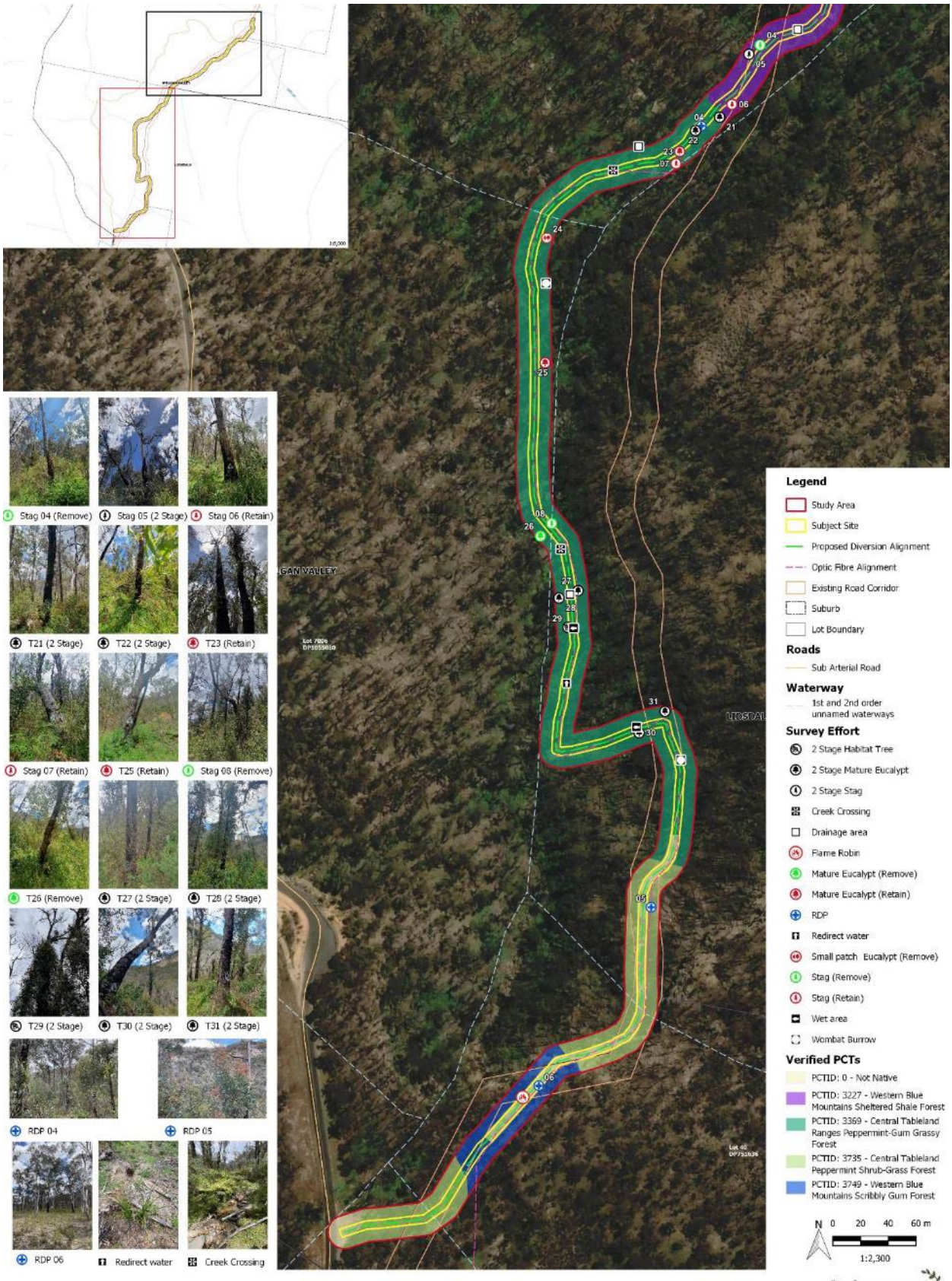

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Figure 4 Survey effort 2/2

4.4 Conservation significance

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the BC Act, and Matters of National Environmental Significance (MNES) listed under the EPBC Act that may be affected by the Proposal (Appendix E). For each species and ecological community, the specific habitat requirements have been considered in relation to the natural resources present within the study area and described accordingly. Based on the presence or absence of important habitat resources required for each species, as well as the location of recent records, habitat connectivity, and the age of historical sightings, a likelihood of occurrence rating has been assigned to reflect the probability of whether each species will frequent and/or rely on resources within the study area (Table 19, Appendix E)

4.5 Likelihood of occurrence of threatened biota

The likelihood of occurrence assessment, started during the desktop assessment phase, was refined based on the results of the field survey. The likelihood of threatened biota occurring in the Proposal footprint was assessed based on presence of records from the locality, species distribution and habitat preferences, the suitability of potential habitat present in the study area, and species recorded on site. The results of this assessment are provided in Appendix E.

4.5.1 Threatened ecological communities

No PCTs commensurate with threatened ecological communities (TECs) were identified within the study area during surveys. Subsequently, no assessments of significance for these have been prepared (see Appendix E).

4.5.2 Threatened species

One threatened bird species was recorded on the site during surveys:

- Flame Robin

Forty-eight (48) species of threatened fauna and fifteen (15) species of threatened flora have previously been recorded within the locality (Figure 4), with a further sixteen (16) threatened fauna and eighteen (18) threatened flora species predicted to occur (Appendix E).

Of these, a total of thirty (32) threatened fauna species and three (3) threatened flora were considered to have a moderate or higher likelihood of being impacted within the study area (Table 9); consequently, Assessments of Significance (AoS) and/or Significant Impact Criteria Assessments (SICA) were conducted for these species (Appendix F and Appendix G).

Table 9 Threatened biota with the potential to be impacted by the Proposal

Scientific Name	Common name	BC Act	EPBC Act	Summary of Assessment of Significance
Amphibians (frogs)				
Litoria littlejohni	Littlejohn's Tree Frog	V	V	No significant impact
Mixophyes balbus	Stuttering Frog	V	-	No significant impact
Parrots & Cockatoos				

Scientific Name	Common name	BC Act	EPBC Act	Summary of Assessment of Significance
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	No significant impact
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	No significant impact
Glossopsitta pusilla	Little Lorikeet	V	-	No significant impact
Woodland Birds				
Melithreptus gularis gularis	Black-chinned Honeyeater	V	-	No significant impact
Climacteris picumnus	Brown Treecreeper (eastern subspecies)	V	-	No significant impact
Stagonopleura guttata	Diamond Firetail	V	-	No significant impact
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	No significant impact
Petroica phoenicea	Flame Robin	V	-	No significant impact
Melanodryas cucullata	Hooded Robin	V	-	No significant impact
Pycnoptilus floccosus	Pilotbird	-	V	No significant impact
Anthochaera phrygia	Regent Honeyeater	CE	CE	No significant impact
Petroica boodang	Scarlet Robin	V	-	No significant impact
Chthonicola sagittata	Speckled Warbler	V	-	No significant impact
Daphoenositta chrysoptera	Varied Sitella	V	-	No significant impact
Owls				
Nixon connivens	Barking Owl	V	-	No significant impact
Tyto novaehollandiae	Masked Owl	V	-	No significant impact
Nixon strenua	Powerful Owl	V	-	No significant impact
Tyto tenebricosa	Sooty Owl	V	-	No significant impact
Insects				
Paralucia spinifera	Bathurst Copper Butterfly	E	V	No significant impact

Scientific Name	Common name	BC Act	EPBC Act	Summary of Assessment of Significance
Arboreal Mammals (Hollow dependent species)				
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	No significant impact
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	No significant impact
Cercartetus nanus	Eastern Pygmy-possum	V	-	No significant impact
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	No significant impact
Petauroides volans	Greater Glider	-	E	No significant impact
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	No significant impact
Dasyurus maculatus	Spotted-tailed Quoll	V	E	No significant impact
Petaurus norfolcensis	Squirrel Glider	V	-	No significant impact
Petaurus australis	Yellow-bellied Glider	V	-	No significant impact
Saccolaimus flaviventris	Yellow-Bellied Sheathtail Bat	V	-	No significant impact
Mammals (Foraging habitat)				
Phascolarctos cinereus	Koala	E	E	No significant impact
Flora				
Boronia deanei	Deane's Boronia	V	V	No significant impact
Caesia parviflora var. minor	Small Pale Grass-Lily	E	-	No significant impact
Eucalyptus cannonii	Capertee Stringybark	V	-	No significant impact

4.5.3 Migratory species

Of the twelve (12) listed migratory species (PMST 2022) with the potential to occur within the locality, none were considered likely to occur and be impacted by the Proposal, following the field survey and habitat assessment.

4.5.4 Other MNES

The listed additional Matters of National Environmental Significance (MNES), that are predicted to occur within the locality, are unlikely to be impacted by the Proposal. The desktop assessment (PMST

2022) indicates that there are four (4) Wetlands of International Importance (Ramsar) between 300 and 1000 km away from the study area and no marine areas occur within proximity to the study area.

Wollemi National Park also occurs within a 10km radius of the study area however does not encroach on the study area. No impacts will occur to these matters as a result of the Proposal.

4.5.5 SEPP Koala Habitat Protection

The forest vegetation within the study area contained potentially six (6) species of the genus *Eucalyptus* listed as a feed tree species under Schedule 2 of the SEPP, as follows:

- *Eucalyptus cypellocarpa* – Monkey Gum
- *Eucalyptus dives* – Broad-leaved Peppermint
- *Eucalyptus macrorhyncha* - Stringybark
- *Eucalyptus radiata* – Narrow-leaved Peppermint
- *Eucalyptus rossii* – Inland Scribble Gum
- *Eucalyptus viminalis* – Ribbon Gum

No Koalas, or signs of recent habitat use (e.g. scratchings or scats) were observed. However, Koala records from within 10km were retrieved from online databases (Bionet Atlas 2022) and it was determined that this species is likely to transiently utilise the study area for foraging resources. Subsequently, an Assessment of Significance (AoS) under the BC Act and a Significant Impact Criteria Assessment (SICA) under the EPBC Act has been prepared for this species (Appendix F and Appendix G).

4.6 Habitat connectivity

The subject site and study area is highly connected to large tracts of native vegetation within the surrounding Blue Mountains. The Newnes State Forest occurs to the east and south of the subject site, and Ben Bullen and Wolgan State Forests occur to the north and the west of the site. In addition, The Blue Mountains National Park, Wollemi National Park and Gardens of Stone National Park are all connected to the subject site in the wider locality. Habitat in the study area contains a large proportion of high-quality habitat for fauna, including large expanses of forest and woodland habitat, sandstone caves, escarpments and rocky outcrops and high quality wetland and aquatic habitat. The study area is highly connected to large expanses of native vegetation within the surrounding locality, with only minor barriers to fauna movement such as rural fencing, roadways and infrastructure occurring intermittently.

5 IMPACT ASSESSMENT

This section assesses the potential impacts of the Proposal during construction and operation on threatened flora and fauna species and their habitats.

5.1 Vegetation clearing and construction impacts

5.1.1 Loss of flora species and vegetation communities

In total, **4.91 ha** of native vegetation occurs within the study area. Of this**, 1.11 ha** of native vegetation will be directly impacted, including some mature trees, hollow-bearing trees and stags, and predominantly regrowth and juvenile species which have regrown on the existing track. This represents **32%** of the overall native vegetation present within the immediate study area. However, given the context of the extensive connected vegetation surrounding the study area, the loss of this small amount of previously disturbed vegetation occurring along an existing cleared track is unlikely to result in a significant loss of native vegetation from the locality, with extensive tracts of high-quality forested habitat surrounding the study area including connections to the Blue Mountains National Park, Wollemi National Park and Gardens of Stone National Park.

5.1.2 Loss of fauna habitat and habitat resources

Thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent the subject site with direct impacts to all of them likely. In total, **nine (9) hollow-bearing trees**, **three stags** and **one (1) nest tree** require removal. A further **twenty-five (25) mature eucalypts** that do not contain known habitat but provide habitat value to fauna will also require removal along and adjacent to the proposed track. One hollow-bearing tree was recorded as containing nestling Kookaburra at the time of the surveys, and given the reduction in available hollow-bearing habitat in the surrounding landscape due to the 2019/22 bushfires, it is likely that most hollow-bearing trees support fauna within the study area.

The broader study area was noted to contain a high density of hollow bearing trees, nests and logs catering for a variety of fauna, and it is likely that most hollow bearing trees can be avoided as part of the proposed works. Logs and fallen timber were mostly present within the broader study area outside of the subject site, due the existing track previously being cleared.

All habitat trees to be removed within the spring breeding season, in particular those that are known to be active (contain nestlings), require a two-stage clearing process to be undertaken (as outlined in Section 5). Additional mitigation measures outlined in Section 6 will also help reduce any potential impacts to individual fauna that may be present during construction works.

5.1.3 Impacts to aquatic habitats

The proposed alignment will intersect five (5) waterways as follows:

- Two 1st order waterways
- Two 2nd order waterways
- One 3rd order waterway also mapped as Key Fish Habitat

Impacts to the above waterways include the laying of culverts within stream beds, earth works along and within the riparian edge, and sedimentation during construction which may impact on aquatic

fauna present within the streams. As the Proposal will require construction works within areas of KFH and 3rd order waterways, a Part 7 permit under the FM Act is required.

During construction, safeguards and management measures outlined in Section 7 would be implemented to reduce the risk of construction related sedimentation and contamination impacting on the health of riparian areas.

5.1.4 Habitat fragmentation

Clearing of a minor component of previously disturbed vegetation along the track alignment is unlikely to increase habitat fragmentation in the study area given the connectivity with significant areas of high-quality habitat in adjacent areas.

The Proposal would result in a clearing gap of up to (6) six meters wide which is unlikely to create a barrier for movement for species within the study area. The higher-quality vegetation adjacent to the proposed track which has not previously been disturbed by construction and infrastructure activities would remain unaffected as most of the clearing will take place within and directly adjacent to an existing disturbed track. The vegetation remaining in the study area is contiguous and subsequently local fauna will retain important connectivity to suitable habitat resources, including tree hollows, nesting, roosting and feeding areas.

5.1.5 Fauna injury and mortality

Fauna injury or mortality may occur as a result of tree clearing requirements for the proposed works through the felling of habitat trees and earth works requiring movement of soil, logs and rocks. Additionally, increased fauna injury and mortality may occur as a result of the addition of a new access road due to road collisions with wildlife. All mitigation measures outlined in Section 6 are to be adhered to in order to reduce this threat.

5.2 Indirect impacts

Indirect impacts within the study area during the construction and operational phases of the Proposal are outlined below.

5.2.1 Invasion and spread of weeds, pests and pathogens

The Proposal has the potential to result in further introduction and spread of exotic plants throughout the site, and to adjacent areas as a result of construction activities and the ongoing and future land use of the site. Disturbance of soil during construction creates an environment conducive to the spread of weeds. Additionally, inappropriate hygiene measures associated with imported materials and vehicle and machinery movements also increases the risk of introducing and spreading weeds, pests and pathogens.

Given the current condition of the subject site containing some exotic species, likely introduced during previous construction activities, the further spread of existing weed species and/or the introduction of new weed species could occur. Safeguard and management measures (Section 5) implemented to limit the spread of existing weeds to the site are designed to minimise the likelihood of new exotic species being introduced, and will limit the impact of this threat on surrounding vegetation.

5.2.2 Sedimentation, erosion and contamination

The Proposal has the potential to result in sedimentation, erosion and contamination of waterways within and adjacent to the subject site. This could be as a result of increased sediment transfer and

erosion potential in areas of cleared vegetation, inappropriate management of soil, chemicals and stockpiled materials, soil disturbance during construction and potential runoff in times of high-rainfall and waterflow in riparian areas. Sediment and chemical contaminated runoff can enter waterways and detrimentally affect water quality, and subsequently aquatic habitat and life.

During construction, the safeguards and management measures outlined in Section 5 would be implemented to reduce the risk of construction related sedimentation and contamination impacting on the health of riparian areas.

5.2.3 Noise and vibration disturbance

The Proposal would result in an increase in noise and vibration disturbance due to the use of machinery during construction, as well as ongoing noise impacts from vehicle use during the operational phase of the Proposal.

Noise and vibration levels during the construction period would result in an increase above existing background levels for the duration of construction. Noise levels would vary during the construction period, with some activities being louder and producing higher levels of vibration than others (e.g., vegetation removal, machinery use). Noise levels during the operational phase would be intermittent and of limited number and duration due to road use. Noise and vibration have been shown to have a variety of impacts on fauna, including changing foraging behavior, impacting breeding success and changing species occurrences. Fauna most at risk would be those residing within the study area, and in particular any species that may be nesting or roosting in the area. Some fauna may vacate areas in proximity to the Proposal site during construction. Other more resilient fauna species are likely to become accustomed to the noise, with this increased or novel impact unlikely to result in a decrease in population numbers or diversity of these species.

Given the temporary nature of the construction works, and location within close proximity to an existing road (Wolgan Road) in conjunction with the availability of alternate habitat in surrounding areas, it is unlikely the temporary increase in noise and vibration during construction would significantly disturb fauna that occur in the study area.

The safeguards and management measures outlined in Section 5 would be implemented to reduce the magnitude of impacts of noise and vibration on fauna in the environment.

5.3 Key threatening processes

A key threatening process (KTP) is defined under the BC Act as an action, activity or Proposal that:

- Adversely affects two (2) or more threatened species, populations or ecological communities.
- Could cause species, populations or ecological communities which are not currently threatened to become threatened.

There are currently thirty-eight (38) KTPs listed under the BC Act (DPIE 2021) eight (8) listed under the FM Act (DPIE 2021) and twenty-one (21) under the EPBC Act (DAWE 2021). Several KTPs are listed under more than one Act. Those KTPs potentially relevant to this Proposal are discussed in Table 10 below. The Proposal may exacerbate a number of KTPs (as tabled below) and appropriate mitigation actions should be employed to minimise these impacts. Mitigation measures to limit the impacts of KTPs of relevance are discussed in Section 6.

Table 10 Key threatened processes relevant to the Proposal

KTP	Status	Comment
Clearing of native vegetation	BC Act; EPBC Act	The Proposal would result in the clearing of potentially **1.11 ha** of native midstory and understory vegetation and likely include some mature trees. The vegetation is in moderate to good condition. The clearing of this vegetation would comprise an increase in the operation of this KTP. The CEMP would include measures to minimise impacts on native vegetation and potentially threatened flora and fauna.
Clearing of hollow-bearing trees	BC Act	Up to twelve (12) hollow bearing trees / stags may be directly impacted by the current Proposal. The Proposal would increase the operation of this KTP through the removal of these limited habitat resources, however, wherever possible, hollow-bearing trees will be retained.
Removal of dead wood and dead trees	BC Act	There are low to moderate quantities of dead wood and dead trees scattered throughout the study area that would provide habitat resources for native fauna, including threatened species. The subject site also contains woody debris which would be removed as a result of the Proposal. The Proposal may increase the operation of this KTP.
Invasion of plant communities by perennial exotic grasses	BC Act	There is the potential for perennial exotic grasses to further invade native vegetation through disturbance during construction of the Proposal. Mitigation measures outlined in Section 6 are likely to effectively limit the operation of this KTP.
Infection of native plants by *Phytophthora cinnamomi*	BC Act; EPBC Act	Construction activities have the potential to introduce the root-rot fungus Phytophthora cinnamomi into the broader study area, which could lead to dieback of vegetation. Mitigation measures are likely to effectively limit the operation of this KTP.
Introduction and establishment of Exotic Rust Fungi of the order *Pucciniales* pathogenic on plants of the family *Myrtaceae*	BC Act	Construction activities have the potential to introduce Myrtle Rust to the study area. Mitigation measures are likely to effectively limit the operation of this KTP.

5.4 Impacts on listed threatened biota

Currently, direct impacts are predicted to affect up to **1.11 ha** of native vegetation within the subject site comprised of predominantly regrowth and disturbed native vegetation along and adjacent to the existing track. In total, thirty (32) threatened fauna species and three (3) threatened flora were considered to have a moderate likelihood of being impacted within the study area.

Assessments of Significance were completed for threatened species and ecological communities listed under the BC Act that were considered likely to occur within, or be impacted by, the Proposal. A summary of the results of assessments for threatened biota listed under the BC Act is provided in

Table 11. The full assessments of significance for affected threatened biota listed under the BC Act are provided in Appendix F.

The results of the Significant Impact Criteria assessments for threatened species and ecological communities listed under the EPBC Act that were considered likely to occur or be impacted by the Proposal are provided in Table 11. The full assessments of significance for affected threatened biota listed under the EPBC Act are provided in Appendix G.

Table 11 - Summary of Assessments of Significance and Significant Criteria Impact Assessments under the BC and EPBC Act

Scientific Name	Common name	BC Act	EPBC Act	Summary of Assessment of Significance
Amphibia (frogs)				
Litoria littlejohni	Littlejohn's Tree Frog	V	V	No significant impact
Mixophyes balbus	Stuttering Frog	E	V	No significant impact
Parrots & Cockatoos				
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	No significant impact
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	No significant impact
Glossopsitta pusilla	Little Lorikeet	V	-	No significant impact
Woodland Birds				
Melithreptus gularis gularis	Black-chinned Honeyeater	V	-	No significant impact
Climacteris picumnus	Brown Treecreeper (eastern subspecies)	V	-	No significant impact
Stagonopleura guttata	Diamond Firetail	V	-	No significant impact
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	No significant impact
Petroica phoenicea	Flame Robin	V	-	No significant impact
Melanodryas cucullata	Hooded Robin	V	-	No significant impact
Pycnoptilus floccosus	Pilotbird	-	V	No significant impact
Anthochaera phrygia	Regent Honeyeater	CE	CE	No significant impact
Petroica boodang	Scarlet Robin	V	-	No significant impact

Scientific Name	Common name	BC Act	EPBC Act	Summary of Assessment of Significance
Chthonicola sagittata	Speckled Warbler	V	-	No significant impact
Daphoenositta chrysoptera	Varied Sitella	V	-	No significant impact
Owls				
Nixon connivens	Barking Owl	V	-	No significant impact
Tyto novaehollandiae	Masked Owl	V	-	No significant impact
Nixon strenua	Powerful Owl	V	-	No significant impact
Tyto tenebricosa	Sooty Owl	V	-	No significant impact
Insects				
Paralucia spinifera	Bathurst Copper Butterfly	E	V	No significant impact
Arboreal Mammals (Hollow dependent species)				
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	No significant impact
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	No significant impact
Cercartetus nanus	Eastern Pygmy-possum	V	-	No significant impact
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	No significant impact
Petauroides volans	Greater Glider	-	E	No significant impact
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	No significant impact
Dasyurus maculatus	Spotted-tailed Quoll	V	E	No significant impact
Petaurus norfolcensis	Squirrel Glider	V	-	No significant impact
Petaurus australis	Yellow-bellied Glider	V	-	No significant impact
Saccolaimus flaviventris	Yellow-Bellied Sheathtail Bat	V	-	No significant impact
Mammals (Foraging habitat)				
Phascolarctos cinereus	Koala	E	E	No significant impact
Flora				

Scientific Name	Common name	BC Act	EPBC Act	Summary of Assessment of Significance
Boronia deanei	Deane's Boronia	V	V	No significant impact
Caesia parviflora var. minor	Small Pale Grass-Lily	E	-	No significant impact
Eucalyptus cannonii	Capertee Stringybark	V	-	No significant impact

6 MITIGATION MEASURES

The below mitigation measures have informed this assessment and are considered part of the scope of works. Consequently, the below measures will be included in the project Review of Environmental Factors (REF) as Environmental Safeguards, which will serve as conditions of consent for the works. Evidence, in the form of documentation and accurately kept records, must be collected to ensure these actions have been completed as part of the project.

Table 12 Recommended mitigation measures for biodiversity

Biodiversity impact	Mitigation measure	Responsibility and timing
General	Ensure all workers are provided with an environmental induction prior to the commencement of works to outline key biodiversity features of the site, and the management measures in place to protect biodiversity during construction Site is to be kept tidy and free from rubbish at all times, to prevent wastes being blown into adjacent areas of native vegetation or waterways.	Project and site manager Pre-construction and construction
Native vegetation loss	Clearly delineate vegetation to be removed/retained, and induct all site personnel as to the approved extent of clearing Vehicles and machinery to utilise existing roads, fire trails or existing cleared areas where possible, and are not to extend beyond the direct impact footprint. The presence of a suitably qualified arborist is recommended during earthworks occurring near retained trees to avoid rootzones impacts. Any revegetation activities should be undertaken using native species sourced from local seed wherever possible. Areas to be re-seeded should be marked in the CEMP as a record of rehabilitation efforts made. Vegetation cover should be returned to the site outside of operational footprint areas within a reasonably practicable timeframe post clearing to reduce soil exposure and loss.	Project and site manager Pre-construction and construction
Loss of fauna habitat and habitat resources	Vegetation clearing should be staged, commencing with the most disturbed vegetation in the north of the site and progressing south to increase the opportunity for fauna to vacate the site and disperse into areas of adjoining habitat to evade injury. **Two-stage clearing process** • Pre-clearing surveys process are to be undertaken immediately prior (within 24 hours) of vegetation clearing by a suitably qualified and appropriately licenced ecologist to identify any habitat present • If animals or animal habitat are found, or suspected to be present, procedures outlined in the protocol for **capture and relocation** (below) will be followed.	Project and site manager Pre-construction and construction

Biodiversity impact	Mitigation measure	Responsibility and timing
	• After all habitat vegetation is identified and appropriately marked (i.e with an 'X' or with flagging tape), surrounding **non-habitat vegetation** can then be cleared. • If no fauna are found, then surrounding **non-habitat vegetation** can be cleared. This process will be monitored by the ecologist in case fauna are found to be at risk. • The ecologist will document the outcomes of this process (e.g. number and species encountered/rescued). • A wildlife rescue organisation (e.g. WIRES) should be made aware of operations in case any injured fauna are found. All animals encountered will be treated humanely, ethically, and in accordance with relevant codes under the NSW Prevention of Cruelty to Animals Act 1979 • At the completion of non-habitat vegetation clearing, the site will be left overnight (at least 12 hours) to allow for any nocturnal resident fauna to escape overnight. **Capture and relocation process** One day after the clearing of non-habitat vegetation (as per above), the site can be cleared of habitat vegetation. For habitat and hollow-bearing trees expected or known to contain fauna (all trees marked with an "X") are to be felled in accordance with the procedure detailed below: • A suitably qualified and experienced ecologist will be present, with appropriate animal-handling equipment and holding containers. • Prior to felling or removal, clearing machinery will be used to gently shake or 'bang' the habitat tree for a period of 2-3 minutes (dependant on tree health and structural integrity) to encourage any resident fauna to vacate hollows. Sticks, poles or other similar hand-held objects will also be used to hit the trunk of the tree or log at various points, to encourage animals to vacate the tree. The tree will be observed for at least 5 minutes prior to completing this action. • After the observation period, trees will be gently lowered/felled using an excavator bucket or dozer blade for support if possible. The ecologist will observe the tree felling and ensure that any hollows are not blocked by being placed against the ground.	

Biodiversity impact	Mitigation measure	Responsibility and timing
	• Once deemed safe by the plant operator, the ecologist will inspect each tree and hollows for fauna that may be present (uninjured, injured or deceased). Use of fibre-optic cameras to assist this process is recommended. The ecologist will document this process using the tree hollow inspection register. • Felled habitat trees with any occupied hollows will be left on the ground overnight or up to 24 hours to allow the animal to exit the hollow. Habitat trees can then be cut into appropriate sections according to the protocol for habitat salvage and relocation (described below). For any hollow logs: • Gently knock the log with an excavator for a short time while the log is observed by the ecologists. • Any fauna leaving the log will be rescued by the ecologists according to the protocol for fauna capture and relocation (described below); and • If no fauna emerge after an appropriate time (>5 min), the ecologists will inspect the hollow and instruct the plant operator to salvage hollows or translocate the log in accordance with the protocol for habitat salvage and relocation (described below). • Felled habitat trees and logs can be cut into sections after at least 24 hours on the ground/post clearing to permit the recovery of hollow resources. The project ecologist is to direct an appropriately accredited chainsaw operator in these works. • Following clearing operations, salvaged hollows are to be relocated in the adjacent woodland area, under direction from the project ecologist. • Any stockpiled hollow sections of trunks or branches should be placed on their ends (with the hollow opening against the ground) to minimise the chance of fauna entering hollows while they are stockpiled. • Vegetation in the adjacent woodland area is not to be damaged during relocation habitat features. Appropriately, sized machinery should be used to relocate hollow trunks and limbs and will use existing tracks or disturbed areas only.	
Invasion and spread of weeds and pests	Develop and implement an active weed and pest management plan prior to construction commencing, to reduce the risk of weed spread and safety issues arising from pest and weed presence (e.g. blackberry).	Project manager, site manager and Council

Biodiversity impact	Mitigation measure	Responsibility and timing
	Declared weeds within the Subject Site must be managed according to requirements under the Biosecurity Act 2015. It is recommended that all Weeds of National Significance and NSW Priority Weeds should be controlled, and where possible, eradicate to reduce the risk of further spread. Council should implement an ongoing weed control program throughout the Subject Land to manage the spread of weeds across the site. Strict hygiene protocols must be followed. If weeds are accidentally transported to site, or identified during construction activities, all weed material should be immediately contained and removed from site. Use of Aboriginal cultural burning and other traditional land management practices to be investigated as part of immediate and longer-term weed and pest management for the site.	Construction and post-construction
Habitat loss and fragmentation	Where practicable, time works to fall outside of key pollinating and seed-setting seasons to reduce the risks of poor pollination / seed-set due to construction activities. Prior to clearing, a preclearance survey should be undertaken including inspection for threatened species (flora and fauna), and habitat features (i.e nests or burrows) to confirm occupation by fauna. Care should be taken to identify nests and/or roosting sites. If fauna habitat is present the appointed contractor would contact the project ecologist for further advice prior to clearing.	Pre-construction and construction
Fauna injury and mortality	Where practicable, it is recommended that construction occurs outside of key breeding seasons (fledging of active nests/roosts) (approximately June to January) for species likely to utilise the site to avoid or minimise the chance of nest abandonment, injury or death to native fauna. Ensure the presence of an ecologist or fauna spotter catcher at all times during pre-clearing and clearing activities to remove and relocate wildlife as necessary, and to attend to any wildlife that are injured as a result of works.	Project manager Pre-construction and construction
Impacts to waterways, chemical contamination and sedimentation	All erosion, sedimentation and contamination control plans should be established and implemented prior to construction Sediment and erosion controls must be installed downslope of any disturbance areas prior to to earthworks.	Project manager and site manager Construction

Biodiversity impact	Mitigation measure	Responsibility and timing
	Soils to be stockpiled at designated stockpile locations in a cleared area, within pre-approved zones away from waterways, drainage lines and native vegetation, and are appropriately stabilized in accordance with the 'Blue Book' (Landcom 2004). Chemicals or pollutants on site to be stored appropriately in bunded areas to prevent pollution of soils or waters which may impact upon biodiversity. Any use of herbicide is to be safe for environmentally sensitive areas and registered for use within waterways to reduce potential for impacts to aquatic fauna and amphibia Recently disturbed soils must be stabilised progressively and promptly after works are completed to prevent erosion and sediment migration. Maintain Vegetation Protection Zones outside direct impact area to avoid compaction of soils. This includes no movement of excavation machinery or parking or storing equipment outside designated clearing areas or laydown areas. Vegetation existing along gullies or eroded areas should be retained and protected where possible, to ensure future erosion potential is minimised.	
Introduction and spread of pathogens and diseases	Development and implementation of a pathogen management procedure as part of the CEMP Strict hygiene protocols, as outlined in the CEMP should be implemented and followed including: • All machinery entering the site must be appropriately washed down and disinfected prior to work on site to prevent the potential spread of weeds and pathogens • Protocols to prevent introduction or spread of chytrid fungus should be implemented following hygiene protocol for the control of disease in frogs (DECC 2008b).	Project manager and site manager Pre-construction and construction

7 CONCLUSION

The study area occurs within remnant forest in the Wolgan Valley within the Blue Mountains nearby and roughly parallel to Wolgan Road. The alignment generally follows an existing cleared track which is predominantly cleared of large trees, and generally dominated by regrowth native vegetation and has been degraded by past construction activities, including the introduction and spread of exotic weeds. Some larger remnant trees, including fire effected trees, stags and hollow-bearing trees along the edges of the existing track will require removal to construct the roadway at the required width.

Plant Community Types (PCTs) were difficult to accurately determine during the site surveys due to both the modification of the communities present (high density of regenerating native eucalypts containing only juvenile foliage due to fire) and a lack of reproductive material on mature eucalypt species present at the time of the site assessment. The following PCTs were assigned based on best fit of vegetation that could be identified:

- PCTID: 3227 - Western Blue Mountains Sheltered Shale Forest
- PCTID: 3369 - Central Tableland Ranges Peppermint-Gum Grassy Forest
- PCTID: 3735 - Central Tableland Peppermint Shrub-Grass Forest
- PCTID: 3749 - Western Blue Mountains Scribbly Gum Forest

None of the PCTs identified on site are associated with threatened ecological communities (TECs).

The following ecological impacts are associated with the Proposal based on the current design (Appendix A).

- Total impact area (subject site) of approximately **1.30 ha** of vegetation (comprised of **1.11 ha** native vegetation, and **0.19 ha** of existing disturbed track), including mature trees.
- Thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent the subject site with direct impacts to all of them likely. Five (5) habitat trees and three (3) mature eucalypts are recommended to be retained, however due to the nature of the works (difficult to construct landscape), this may not be possible, and this assessment has assumed the removal of all of them.
- Indirect impact potential on an additional **5.21 ha** of vegetation (native vegetation comprises **4.91 ha**) occurring within the study area through increased noise and activity disturbance during construction, which has the potential to impact species present within these areas.
- Potential injury or mortality of terrestrial, aquatic and semi-aquatic fauna within the Proposal footprint during vegetation clearing and construction

Based on the desktop assessment, site visit and habitat assessments undertaken**, thirty (32) threatened fauna** species and **three (3) threatened flora** species were considered as having the potential to be impacted as a result of the proposal (see Table 11). Of these, only the Flame Robin was recorded within the study area during site surveys.

Assessments of Significance for threatened species likely to be impacted by the Proposal were prepared in accordance with Section 1.7 of the EP&A Act and the EPBC Act *Matters of National Environmental Significance – Significant Impact Criteria guidelines* (DEWHA 2009). These assessments

concluded that a significant impact to these species and community is **unlikely**. Consequently, neither participation in the Biodiversity Offset Scheme/preparation of a Species Impact Statement nor Referrals to the Minister are warranted.

It is recommended that clearing of native vegetation, in particular removal of large habitat trees and trees containing hollows (trees marked as Recommended for Retention – RR), is avoided or minimised where possible throughout the subject site. Additionally, it is required that an ecologist is present to conduct pre-clearing surveys and the two-stage clearing procedure (see Section 6) immediately prior to and for the full duration of the removal of vegetation to assess for any potential fauna present (threatened or otherwise), and an ecologist must be present at the time of habitat removal (i.e. nests and hollow-bearing trees) to supervise clearing and rescue any potentially occurring fauna.

Further mitigation measures proposed for these works include timing of clearing to occur outside of key breeding times (Spring) where practicable, erection of nest boxes to offset lost habitat resources, sediment and erosion control, stockpiling and earthworks in line with Bluebook requirements, and adherence to strict hygiene procedures.

8 REFERENCES

BOM (2022) weather observations at Marrangaroo (Defence).weather station

DAWE 2022 Species Profile and Threats Databases

DAWE 2022 Protected Matters Search Tool for MNES listed under the EPBC Act. http://www.environment.gov.au/epbc/protected-matters-search-tool

DCCEEW 2022 SPRAT Profiles

DPI 2022 Priority Weeds of the Central Tablelands NSW WeedWise

DPI 2022 Weeds of National Significance NSW WeedWise

DPIE 2022 Areas of Outstanding Biodiversity register Area of Outstanding Biodiversity Value register | NSW Environment, Energy and Science

DPIE 2022 Biodiversity Values Map https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

DPIE 2022 Key threatening processes http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/key-threatening-processes accessed Feb 2021

DPIE 2022 SEPP Koala Habitat Protection 2020 Koala Habitat Protection SEPP - (nsw.gov.au)

DPIE 2022 NSW Government Vegetation Regulatory Map https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap

DPIE (2022) Bionet Wildlife Atlas Threatened species records, which holds data from a number of custodians.

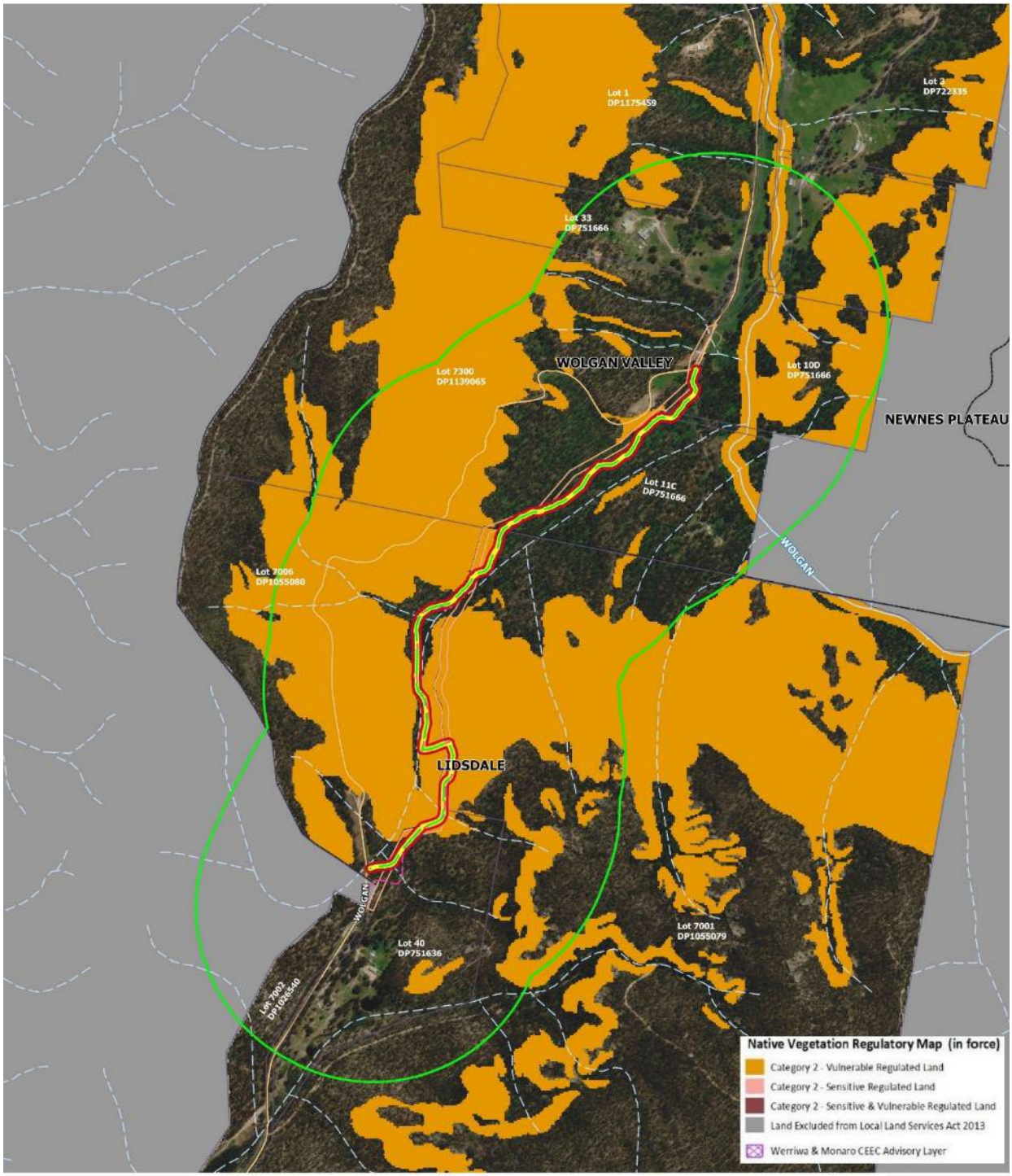
New South Wales Flora online – PlantNET 2022 http://plantnet.rbgsyd.nsw.gov.au/floraonline.html

9 APPENDICES

Appendix	Item
Appendix A	Design Drawings
Appendix B	Native Vegetation Regulatory Map
Appendix C	Biodiversity Values Map
Appendix D	Species recorded during field investigations
Appendix E	Threatened species likelihood of occurrence table
Appendix F	Tests of Significance for State listed species
Appendix G	EPBC Act Significant Impact Criteria Assessments
Appendix H	BOM Daily Weather Observations

Appendix A – Design Drawings

Appendix B – Native Vegetation Regulatory Map



Wolgan Road Emergency Bypass - Native Vegetation Regulatory Map within a 500m Radius of the Proposal Location

Legend

- 500m Radius
- Study Area
- Subject Site
- Proposed Diversion Alignment
- Optic Fibre Alignment
- Existing Road Corridor
- Suburb
- Lot Boundary

Roads

- Sub Arterial Road

Waterways

- River
- 1st, 2nd & 3rd order unnamed waterways

N 0 110 220 330 m

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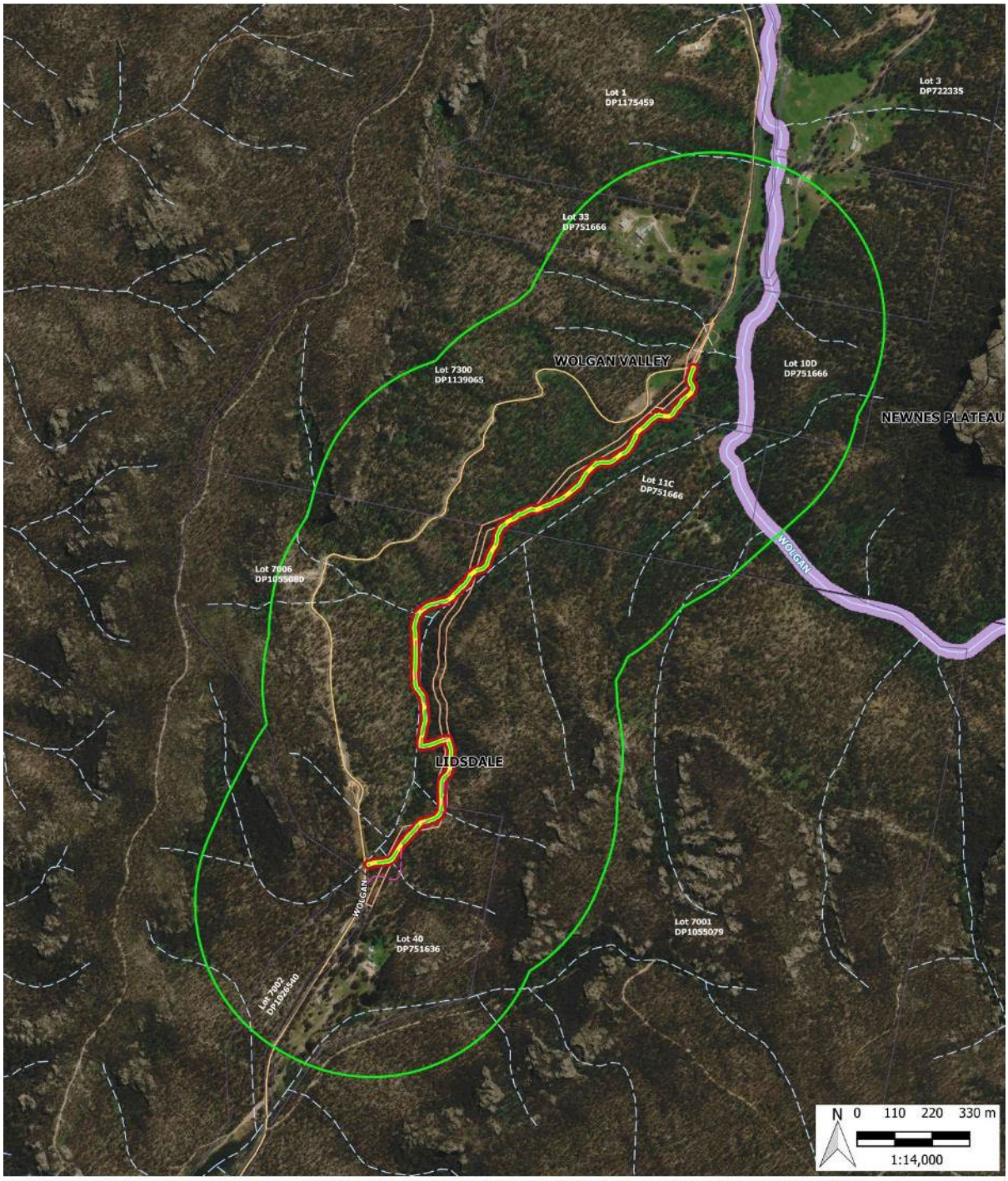
Appendix C – Biodiversity Values Map



Wolgan Road Emergency Bypass - Biodiveristy Values within a 500m Radius of the Proposal Location

Legend

- 500m Radius
- Study Area
- Subject Site
- Proposed Diversion Alignment
- Optic Fibre Alignment
- Existing Road Corridor
- Suburb
- Lot Boundary

Roads

- Sub Arterial Road

Waterway

- River
- 1st, 2nd & 3rd order unnamed waterways

Biodiversity Values

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Appendix D – Species recorded during field surveys

Table 13 Flora recorded during surveys

Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Acacia buxifolia	Box-leaved Wattle	N	-	-
Acacia longifolia	-	N	-	-
Acacia melanoxylon	Blackwood	N	-	-
Acacia terminalis	Sunshine Wattle	N	-	-
Adiantum spp.	Maidenhair Fern	N	-	-
Allocasuarina littoralis	Black She-Oak	N	-	-
Banksia spinulosa	Hairpin Banksia	N	-	-
Billardiera scandens	Hairy Apple Berry	N	-	-
Boronia microphylla	Small-leaved Boronia	N	-	-
Bursaria spinosa	Native Blackthorn	N	-	-
Choretrum candollei	White Sour Bush	N	-	-
Cirsium vulgare	Spear Thistle	E	-	-
Clematis aristata	Old Man's Beard	N	-	-
Comesperma ericinum	Pyramid Flower	N	-	-
Conyza bonariensis	Flaxleaf Fleabane	E	-	-
Dampiera stricta	-	N	-	-
Desmodium varians	Slender Tick-trefoil	N	-	-
Dianella spp.	-	N	-	-
Dichondra repens	Kidney Weed	N	-	-
Dillwynia spp.	-	N	-	-
Diuris spp.	-	N	-	-

Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Dodonaea triquetra	Large-leaf Hop-bush	N	-	-
Echinopogon caespitosus	Bushy Hedgehog-grass	N	-	-
Entolasia spp.	-	N	-	-
Eucalyptus cypellocarpa	Monkey Gum	N	-	-
Eucalyptus dives	Broad-leaved Peppermint	N	-	-
Eucalyptus macrorhyncha	Red Stringybark	N	-	-
Eucalyptus praecox	Brittle Gum	N	-	-
Eucalyptus radiata	Narrow-leaved Peppermint	N	-	-
Eucalyptus rossii	Inland Scribbly Gum	N	-	-
Eucalyptus spp.	-	N	-	-
Eucalyptus viminalis	Ribbon Gum	N	-	-
Euchiton involucratus	Star Cudweed	N	-	-
Gahnia aspera	Rough Saw-sedge	N	-	-
Geitonoplesium cymosum	Scrambling Lily	N	-	-
Geranium solanderi	Native Geranium	N	-	-
Gleichenia dicarpa	Pouched Coral Fern	N	-	-
Glycine tabacina	Variable Glycine	N	-	-
Hardenbergia violacea	False Sarsaparilla	N	-	-
Hibbertia scandens	Climbing Guinea Flower	N	-	-
Hydrocotyle laxiflora	Stinking Pennywort	N	-	-
Hypochaeris radicata	Catsear	E	-	-
Indigofera australis	Australian Indigo	N	-	-

Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Lagenifera stipitata	Blue Bottle-daisy	N	-	-
Lepidosperma urophorum	-	N	-	-
Leptospermum polygalifolium	Tantoon	N	-	-
Leptospermum spp.	Tea-tree	N	-	-
Leucopogon lanceolatus	-	N	-	-
Libertia paniculata	Branching Grass-flag	N	-	-
Lomandra longifolia	Spiny-headed Mat-rush	N	-	-
Lysimachia arvensis	Scarlet Pimpernel	E	-	-
Mentha spp.	-	N	-	-
Myoporum montanum	Western Boobialla	N	-	-
Myosotis spp.	Forget-me-not	E	-	-
Ozothamnus spp.	-	N	-	-
Persoonia linearis	Narrow-leaved Geebung	N	-	-
Poa labillardierei var. labillardierei	Tussock	N	-	-
Podolobium ilicifolium	Prickly Shaggy Pea	N	-	-
Polyscias sambucifolia	Elderberry Panax	N	-	-
Pomaderris spp.	-	N	-	-
Poranthera microphylla	Small Poranthera	N	-	-
Pteridium esculentum	Bracken	N	-	-
Pultenaea spp.	-	N	-	-
Rubus fruticosus sp. agg.	Blackberry complex	HTE	Y	-

Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Rubus parvifolius	Native Raspberry	N	-	-
Senecio hispidulus	Hill Fireweed	N	-	-
Senecio linearifolius var. latifolius	-	N	-	-
Solanum nigrum	Black-berry Nightshade	E	-	-
Sonchus oleraceus	Common Sowthistle	E	-	-
Stylidium graminifolium	Grass Triggerplant	N	-	-
Verbena rigida	Veined Verbena	E	-	-
Veronica plebeia	Trailing Speedwell	N	-	-
Viola hederacea	Ivy-leaved Violet	N	-	-
Viola silicestris	-	N	-	-
Vittadinia cuneata	Fuzzweed	N	-	-
Wahlenbergia stricta	Tall Bluebell	N	-	-
Xanthosia pilosa	Woolly Xanthosia	N	-	-

Table 14 Fauna recorded during surveys

Class	Common name	Scientific name	Conservation Status	Observation
Aves	Bell Miner	*Manorina melanophrys*	P	O
Aves	Eastern Whipbird	*Psophodes olivaceus*	P	O
Aves	Fan-tailed Cuckoo	*Cacomantis flabelliformis*	P	O
Aves	Flame Robin	*Petroica phoenicea*	V,P	O
Aves	Grey Fantail	Rhipidura albiscapa	P	O
Aves	Laughing Kookaburra	*Dacelo novaeguineae*	P	O
Aves	Noisy Friarbird	*Philemon corniculatus*	P	O
Aves	Olive-backed Oriole	*Oriolus sagittatus*	P	O
Aves	Pied Currawong	*Strepera graculina*	P	O
Aves	Red Wattlebird	*Anthochaera carunculata*	P	O

Class	Common name	Scientific name	Conservation Status	Observation
Aves	Red-browed Finch	*Neochmia temporalis*	P	O
Aves	Rufous Whistler	*Pachycephala rufiventris*	P	O
Aves	Sacred Kingfisher	*Todiramphus sanctus*	P	O
Aves	Spotted Pardalote	*Pardalotus punctatus*	P	O
Aves	Wedge-tailed Eagle	*Aquila audax*	P	O
Aves	Yellow-faced Honeyeater	*Caligavis chrysops*	P	O

Appendix E – Threatened Species Likelihood of Occurrence

The below assessment includes national and state significant species from the following sources:

- Bionet Atlas of NSW Wildlife
- DAWE database (PMST search)
- Current survey
- Search area is 10 km radius.
- Fauna records prior to 1992 (older than 30 years) are not considered when assessing likelihood of occurrence.
- Not considered further pelagic seabirds, shorebirds, sandpipers, turtles, whales, sharks - no preferred marine or coastal habitat in study area.

All habitat information is taken from NSW DPIE and Commonwealth DAWE Threatened Species profiles (DPIE 2021 DAWE 2021) unless otherwise stated. The codes used in this table are:

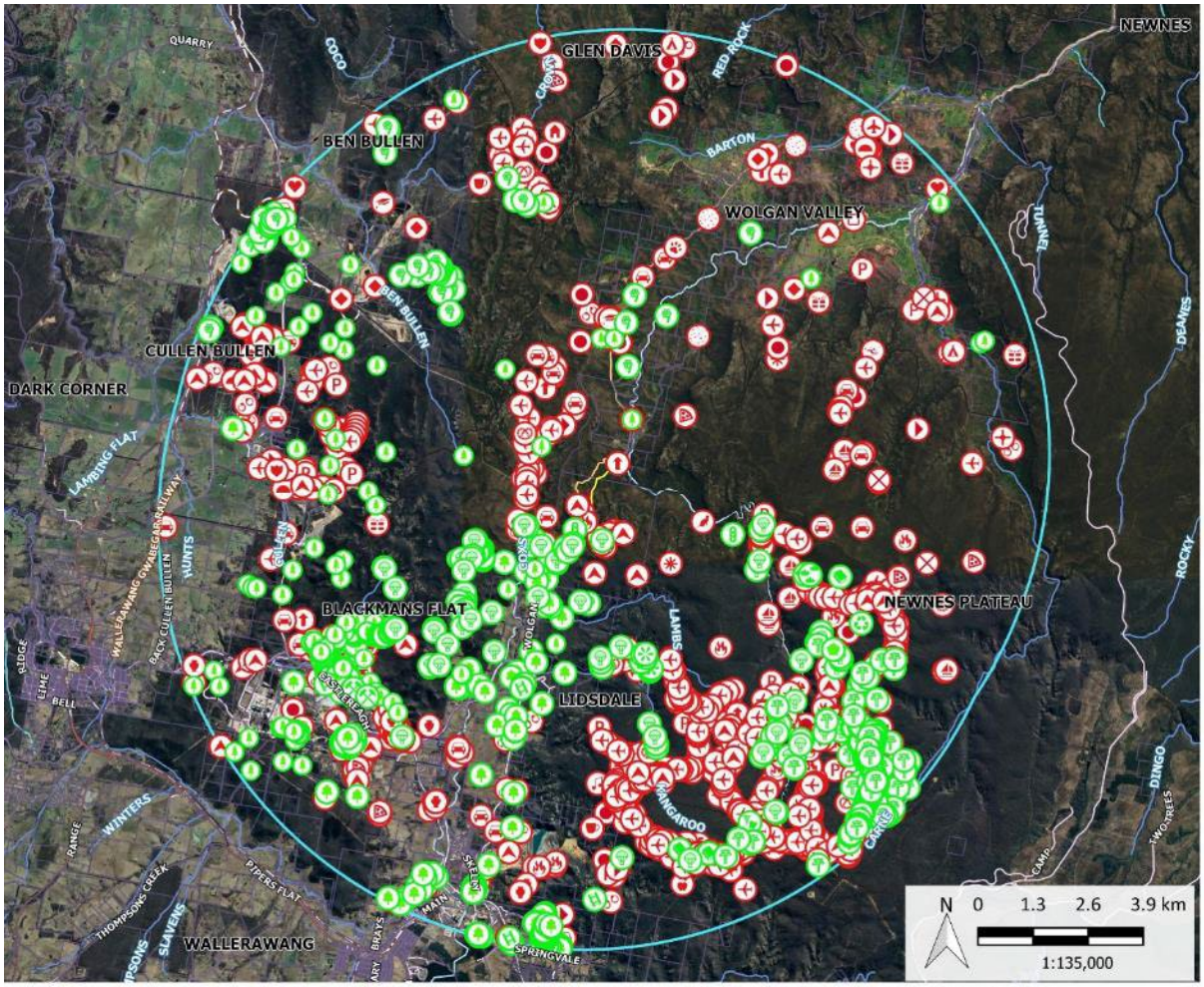
- CE – Critically Endangered
- E – Endangered
- V – Vulnerable
- EP – Endangered Population
- C – CAMBA
- J – JAMBA
- R – ROKAMBA
- CEEC – Critically Endangered Ecological Community
- EEC – Endangered Ecological Community
- Mi – Migratory Species

Table 15 Likelihood of occurrence definitions

Likelihood of occurrence	Definition
Known	Species recorded in the Subject Land/Study Area
Likely	Species previously recorded within a 10 kilometre radius of the Subject Land/Study Area and suitable habitat occurs within the Subject Land/Study Area.
Possible	Species previously recorded within a 10 kilometre radius of the Subject Land/Study Area but only marginal suitable habitat recorded within the Subject Land/Study Area. OR Species not previously recorded within a 10 kilometre radius of the Subject Land/Study Area, but the Proposal footprint is within the species known distribution and suitable habitat occurs within the Subject Land/Study Area.
Unlikely	Species previously recorded within a 10 kilometre radius of the Subject Land/Study Area but no suitable habitat recorded within the Subject Land/Study Area.
Nil	Species not previously recorded within a 10 kilometre radius of the Subject Land/Study Area and no suitable habitat occurs within the Subject Land/Study Area..

Table 16 Likelihood of impact definitions

Likelihood of impact	Definition
Nil	Species/ community will not be impacted by the Proposal.
Low	Species / community has been determined as 'possible', 'likely' or 'known' to occur within the Subject Land/Study Area, but is unlikely to be impacted by the Proposal due to avoidance of individuals and / or their broad habitats within the subject site.Impact to important habitat resources will not occur or has been avoided through the design process.
Moderate	Species / community is 'known' or 'likely' to occur within the Subject Land/Study Area and the Proposal will impact on an area of habitat / resources. Impact to individuals / important habitat resources is unlikely or has been avoided / reduced through the design process but may be subject to direct or indirect impacts.
High	Species / community is known or likely to occur within the Subject Land/Study area and the Proposal will impact on important habitat resources or individuals.



Wolgan Road Emergency REF - Bionet Threatened Species within a 10km radius of the proposal location

Legend

- Suburb
- Lot Boundary

Roads

- Arterial Road
- Local Road
- Primary Road
- Sub Arterial Road

Waterways

- Creek
- River
- Gully

ThreatenedSpecies

- Austral Toadflax
- Barking Owl
- Black Gum
- Black-chinned Honeyeater (eastern subspecies)
- Blue Mountains Water Skink
- Broad-headed Snake
- Brown Treecreeper (eastern subspecies)
- Brush-tailed Rock-wallaby
- Cambage Kunzea
- Capertee Stringybark
- Clandulla Geebung
- Deane's Boronia
- Diamond Firetail
- Dusky Woodswallow
- Eastern Cave Bat
- Eastern Coastal Free-tailed Bat
- Eastern False Pipistrelle
- Eastern Pygmy-possum
- Flame Robin
- Gang-gang Cockatoo
- Giant Dragonfly
- Glossy Black-Cockatoo
- Greater Broad-nosed Bat
- Greater Glider
- Grey-crowned Babbler (eastern subspecies)
- Grey-headed Flying-fox
- Hooded Robin (south-eastern form)
- Isotoma fluviatilis subsp. fluviatilis
- Klaphake's Sedge
- Koala
- Large Bent-winged Bat
- Large-eared Pied Bat
- Little Eagle
- Little Lorikeet
- Littlejohn's Tree Frog
- Masked Owl
- Mount Vincent Mint-bush
- Painted Honeyeater
- Persoonia hindii
- Pilotbird
- Powerful Owl
- Purple Copper Butterfly Bathurst Copper Butterfly
- Regent Honeyeater
- Rosenberg's Goanna
- Scarlet Robin
- Silver-leafed Gum
- Small Pale Grass-lily
- Sooty Owl
- Southern Myotis
- Speckled Warbler
- Spotted-tailed Quoll
- Square-tailed Kite
- Squirrel Glider
- Stuttering Frog
- Superb Midge Orchid
- Turquoise Parrot
- Varied Sittella
- Veronica blakelyi
- White-bellied Sea-Eagle
- White-throated Needletail
- Wollemi Mint-bush
- Yellow-bellied Glider

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Figure 5 Threatened species recorded within 10 km of the study area

Table 17 Threatened biota likelihood of occurrence table

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Amphibia							
Litoria booroolongensis	Booroolong Frog	E	E	The Booroolong Frog is restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range with recent records from the south-west slopes of NSW. It is now thought to be regionally extinct in all but the southern part of its range and an isolated population near Tamworth. It inhabits riffle habitat in pristine rivers and streams. Water quality is important for this species as it does not tolerate high turbidity and pollution levels. The frog lives along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins, and will shelter under rocks or amongst vegetation near the ground on the stream edge. Breeding occurs in spring and early summer and tadpoles metamorphose in late summer to early autumn. Eggs are laid in submerged rock crevices and tadpoles grow in slow-flowing connected or isolated pools.	PMST	Unlikely	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Heleioporus australiacus	Giant Burrowing Frog	V	V	Found in heath and woodland in a variety of soils – except clay based soils. In non-breeding season it may be found over 300 m from the breeding site, buried beneath the leaf litter. Breeding habitat is in first or second order streams. This species is long-lived.	PMST	Unlikely	Low
Litoria littllejohni	Littlejohn's Tree Frog	V	V	Breeds in upper reaches of permanent streams. Non-breeding habitat is in moist heaths and woodlands in litter and low vegetation. Tadpoles can be found in slow moving or still pools that receive a lot of sunlight.	Bionet (1), PMST	Possible – Records exist within the locality and suitable habitat occurs within the study area.	Moderate – Waterways have the potential to be impacted by this proposal. An AoS & SICA has been prepared for this species.
Mixophyes balbus	Stuttering Frog	E	V	This species is found in wet, tall open forest and rainforest and in the foothills and escarpment on the eastern side of the Great Dividing Range. Breed in streams during summer after heavy rain.	Bionet (1), PMST	Possible – Records exist within the locality and suitable habitat occurs within	Moderate – Waterways have the potential to be impacted by this proposal. An AoS/SICA has

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						the study area.	been prepared for this species.
Aves/Birds							
Botaurus poiciloptilus	Australasian Bittern	E	E	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Preferred habitat is comprised of wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus) or cutting grass (Gahnia) growing over a muddy or peaty substrate.	PMST	Unlikely	Low
Rostratula australis	Australian Painted Snipe	E	E	The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin. This species occupies wetland and swamp habitats, preferring the fringes of swamps and dams with a cover of grasses, reeds, scrub or woodland. Breeding occurs anytime during spring and summer when conditions	PMST	Unlikely	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				are favourable. It nests on the ground amongst tall vegetation.			
Ninox connivens	Barking Owl	V	-	Found throughout continental Australia except for central arid regions. The Barking Owl requires large tree hollows in order to roost and breed. It occupies open forests and woodlands including partially cleared farmland. They often roost in densely formed Acacia and Casuarina species. Known to successfully breed along timbered watercourses in heavily cleared habitats, where a higher density of prey is found around fertile riparian soils. A large portion of its diet consists of arboreal mammals but can adapt to ground dwelling species where the habitat cannot sustain preferred prey. Requires very large permanent territories in most habitats due to sparse prey densities.	Bionet (9), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Melithreptus gularis gularis	Black-chinned Honeyeater	V	-	The Black-chinned Honeyeater is widespread throughout NSW, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. The Black-chinned Honeyeater occupies open woodland habitats and open forests of smooth gums, stringybarks, ironbarks and	Bionet (2)	Possible – No records of this species exist within the locality in the last 10 years, however suitable	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				Casuarinas and Melaleucas. They require large foraging territories of woodland patches at least 5 hectares large.		habitat occurs within the study area.	
Climacteris picumnus victoriae	Brown Treecreeper (eastern sub-species)	V	-	The eastern subspecies of Brown Treecreeper lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys with its western boundary of the range running approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. This species territory is in open woodland habitats (including Box-Gum Woodland), prefering woodlands dominated by stringybarks and rough barked eucalypts with a grassy understory. It requires tree hollows in live and dead trees or stumps for nesting.	Bionet (63)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Calidris ferruginea	Curlew Sandpiper	E	CE - Mi, C,J,R	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. Inland	PMST	Unlikely	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				records are probably mainly of birds pausing for a few days during migration.			
Stagonopleura guttata	Diamond firetail	V	-	The Diamond Firetail tends to occur in proximity to watercourses building small dome nests in shrubs and dense foliage. It is found within Box-Gum Woodlands, Snow Gum Woodlands, open forests, mallee, Natural Temperate Grassland and in secondary grasslands derived from other communities. This species forages on grasses, forbs and insects along the ground. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. (DPE 2022)	Bionet (9)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Dry, open eucalypt forests and woodland are the preferred habitat. Mallee associations with a sparse understorey of eucalypt saplings, acacias and other shrubs and ground cover of grasses or sedges and woody debris are also inhabited. Farmland, particularly forest or woodland edges are also inhabited and very occasionally, moist forest or rainforest. This species feeds on insects foraged aerially or from the ground or canopy, and also feeds on flower nectar. The nest is a loose bowl of grass, twigs and roots which is lined with finer grass and typically placed 1-10m	Bionet (24)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				above ground level in a tree fork, however also behind bark or in stump hollows about. The Dusky Woodswallow feeds on insects taken on the wing, as well as from foliage and on the ground. It also eats nectar from flowers.		the study area.	
Numenius madagascariensis	Eastern Curlew	-	CE - Mi, C,J,R	The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours, lagoons and occasionally on wooden oyster leases or other similar structures. It is rarely found inland. The Eastern Curlew occurs only in our flyway, and about 75 per cent of the world's curlews winter in Australia.	PMST	Unlikely	Low
Petroica phoenicea	Flame Robin	V	-	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understories. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks.	Bionet (376)	Known – This species was recorded during surveys and many recent records of this species exist within the locality. Suitable habitat	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						occurs within the study area.	
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	This species is nomadic, spending summer in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests and winter at lower altitudes in drier more open eucalypt forest and woodlands, particularly in coastal areas. This species nests in hollow-bearing trees close to water with breeding taking place between October and January. Favours old growth forest and woodland attributes with dense understoreys, for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts.	Bionet (253), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS/SICA has been prepared for this species.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	The species 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	Bionet (28), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				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.		the study area.	
Falco hypoleucos	Grey Falcon	E	-	Restricted to shrubland, grassland and wooded watercourses and sometimes near wetlands where surface water attracts prey. Occasionally found in open woodlands near the coast. Nests are constructed in high living eucalypts near a watercourse. Likely to be extinct in areas with higher than 500mm annual rainfall.	PMST	Possible – No records of this species exist within the locality and marginally suitable habitat occurs within the study area.	Low – This species has never been recorded within the locality within the last 10 years and only marginally suitable habitat occurs within the study area.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	The Grey-crowned Babbler occupies Box-gum woodlands, Box-cypress-pine and Box Woodlands on alluvial plains. They construct several large dome stick nests within a territory and breed cooperatively during the warmer	Bionet (1)	Possible – No records of this species exist within the locality in the last 10	Low – This species has not been recorded within the locality within the last 10 years and only

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				months. Birds are generally unable to cross large open areas.		years, however marginally suitable habitat occurs within the study area.	marginally suitable habitat occurs within the study area.
Melanodryas cucullata	Hooded Robin	V	-	The Hooded Robin is found widespread across Australia, except for the driest deserts and the wetter coastal areas. It prefers lightly wooded forests such as eucalypt woodlands, acacia scrub and mallee with structurally diverse habitats including saplings, tall native grasses and an abundance of fallen leaf litter and woody debris to forage. They occupy home ranges of 10 hectares to 30 hectares throughout the year.	Bionet (8)	Possible – No records of this species exist within the locality in the last 10 years, however suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Hieraaetus morphnoides	Little Eagle	V	-	The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	Bionet (9)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Glossopsitta pusilla	Little Lorikeet	V	-	In NSW Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. They are considered nomadic responding to food availability and highly gregarious often foraging in mixed flocks. They occur in dry, open eucalypt forests and woodlands using roadside vegetation. They rely on nectar and pollen, particularly on profusely-flowering eucalypts, melaleucas and mistletoes. On the western slopes and tablelands White Box E. albens and Yellow Box E. melliodora are particularly important food sources for pollen and nectar respectively. They often	Bionet (11)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				return to the same nest hollow annually preferring smooth barked Eucalypts with small hollows (3 cm entrance diameter).			
Tyto novaehollandiae	Masked Owl	V	-	The Masked Owl distribution extends across eastern Australia occupying forest and open woodland with adjacent clearings. Lives in dry eucalypt forests and woodlands to 1100 m. The typical diet consists of tree-dwelling and ground mammals, particularly rats. Pairs have a large home-range of 500 to 1000 ha. This species roosts in large tree hollows, dense foliage, caves. Similarly nesting requires large tree hollows or caves.	Bionet (1)	Possible – No records of this species exist within the locality in the last 10 years, however suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Grantiella picta	Painted Honeyeater	V	V	A nomadic species inhabiting Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) 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. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small,	Bionet (1), PMST	Possible – No records of this species exist within the locality in the last 10 years,	Low – This species has not been recorded within the locality within the last 10 years and only marginally

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.		however marginally suitable habitat occurs within the study area.	suitable habitat occurs within the study area.
Pycnoptilus floccosus	Pilotbird	-	V	The Pilotbird is found in wet forested areas and heathland in eastern Victoria and southeastern New South Wales. It forages on the ground, turning over leaf litter using strong legs.	Bionet (22), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. A SICA has been prepared for this species.
Ninox strenua	Powerful Owl	V	-	The Powerful Owl is the largest owl in Australasia. It is a typical hawk-owl, with large yellow eyes and no facial-disc. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. The species	Bionet (51)	Likely – Recent records of this species exist within	Moderate – Clearing of suitable habitat will occur. An AoS has been

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine Syncarpia glomulifera, Black She-oak Allocasuarina littoralis, Blackwood Acacia melanoxylon, Rough-barked Apple Angophora floribunda, Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species.		the locality and suitable habitat occurs within the study area.	prepared for this species.
Erythrotriorchis radiatus	Red Goshawk	CE	V	Endemic to Australia, this species is very rare in NSW. Inhabits open woodland and forest preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands.	PMST	Low	Low
Anthochaera phrygia	Regent Honeyeater	CE	CE	The Regent Honeyeater is a migratory woodland bird moving across the landscape in response to climatic conditions and food availability. This species prefers Box-Ironbark woodland and riparian forests particularly habitats with mature trees, high canopy cover and abundance of mistletoes. Nonbreeding flocks occasionally seen in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests, presumably in response to drought. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian	Bionet (6), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within	Moderate – Clearing of suitable habitat will occur. An AoS & SICA has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female.		the study area.	
Petroica boodang	Scarlet Robin	V	-	In NSW, this species occupies open forests and woodlands from the coast to the inland slopes. It breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within an open understorey of shrubs and grasses and sometimes in open areas. Abundant logs and coarse woody debris are important structural components of its habitat. In autumn and winter it migrates to more open habitats such as grassy open woodland or paddocks with scattered trees.	Bionet (400)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Tyto tenebricosa	Sooty Owl	V	-	The Sooty Owl occurs around the east coast of Australia around coastal escarpment, and also along the eastern tablelands. This species occupies permanent territories in rainforests, including dry rainforests, subtropical and warm temperate rainforests, as well as moist eucalypt forests. The species roosts by day in the hollow of a tall forest tree or in heavy vegetation and hunts by night for small ground	Bionet (6)	Likely – Recent records of this species exist within the locality and suitable	Moderate – Clearing of suitable habitat will occur. An AoS has been

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				and tree-dwelling mammals. The Sooty Owl require very large tree-hollows for nesting (OEH 2022).		habitat occurs within the study area.	prepared for this species.
Chthonicola sagittata	Speckled Warbler	V	-	The Speckled Warbler occupies open Eucalypt woodlands with a grassy understory and often rocky outcrops. Relatively large undisturbed areas are required to sustain this species in an area. 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. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings.	Bionet (10)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Lophoictinia isura	Square-tailed Kite	V	-	The Square-tailed Kite ranges along coastal and subcoastal areas in NSW and Victoria. They're a regular resident in the north, north-east of NSW and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, the species has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Appears to occupy large hunting ranges of more than 100km2. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs. (Sourced from NSW Office of Environment - Threatended species profile 2022)	Bionet (1)	Possible – No recent records for this species exists within the locality however marginally suitable habitat occurs within the study area.	Low – Limited impacts to marginally suitable will not significantly impact this species.
Polytelis swainsonii	Superb Parrot	V	V	Found to forage in grassy box woodland up to 10km from the nesting site. They typically nest in colonies and return to the same location over generations. During the summer they return from wintering in northern NSW to breed, often in open box-woodland or isolated paddock trees requiring tree hollows to breed.	PMST	Possible – No records for this species exists within the locality however	Low – Limited impacts to marginally suitable will not significantly

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						marginally suitable habitat occurs within the study area.	impact this species.
Lathamus discolor	Swift Parrot	E	CE	In NSW, the Swift Parrot mostly occurs mostly on the coast and south west slopes. It breeds in Tasmania and returns to the south-eastern mainland to forage over the cooler months (March – October). They move across the landscape to forage on lerp infestations or an abundance of eucalypt flowers. Preferred feed trees include Eucalyptus robusta, Corymbia maculata, C. gummifera, E. sideroxylon and E. albens.	PMST	Possible – No records for this species exists within the locality however marginally suitable habitat occurs within the study area.	Low – Limited impacts to marginally suitable will not significantly impact this species.
Neophema pulchella	Turquoise Parrot	V	-	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. Prefers to feed in the shade of a	Bionet (1)	Possible – No recent records for this species exists within	Low – Limited impacts to marginally suitable will not significantly

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. Nests in tree hollows, logs or posts, from August to December.		the locality however marginally suitable habitat occurs within the study area.	impact this species.
Daphoenositta chrysoptera	Varied Sitella	V	-	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands, with a nearly continuous distribution in NSW from the coast to the far west.It prefers open Eucalypt and Acacia woodlands with Stringybark Eucalypts from which to glean insects. They are territorial preferring to use the same tree fork to construct nests for breeding.	Bionet (54)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Haliaeetus leucogaster	White-bellied Sea-eagle	V	-	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. Habitats are characterised by the presence of large areas	Bionet (5)	Likely – Recent records of this species	Moderate – Clearing of suitable habitat will occur. An AoS

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				of open water including larger rivers. Terrestrial habitats include grassland, heathland, woodland and forests. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days. (Sourced from NSW Office of Environment - Threatended species profile - 2022)		exist within the locality and suitable habitat occurs within the study area.	has been prepared for this species.
Hirundapus caudacutus	White-throated Needletail	-	V - Mi, C,J,R	In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. This species is mostly aerial. Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. This species forages aerially and opportunistically in many environments. The species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows and it has been suggested that they also sometimes roost aerially. The species breeds in	Bionet (7), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Low – No significant habitat will be impacted as a result of this proposal.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				Asia in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests. White-throated Needletails take refuge in a range of shelter types during extreme conditions including the potential to roost in tree hollows.			
Fish							
Proctroctes maraena	Australian Grayling	E	V	It is a migratory species that spawns in the lower freshwaters of coastal rivers and spends approximately 6 months in coastal seas as larvae/juveniles before migrating back into freshwater rivers and streams where they remain for the rest of their lives. During the freshwater phase of the life cycle, Australian Grayling inhabit lower altitude reaches of both large rivers and smaller streams. Very little is known about the specific environmental requirements or habitats occupied during the estuarine or marine phase of the life-cycle as very few specimens have been collected.	PMST	Nil	Low
Macquaria australasica	Macquarie Perch	E	E	This species of freshwater fish inhabits river and lake habitats, especially the upper reaches of rivers and their tributaries. Spawning occurs in spring and summer in shallow upland streams or flowing sections of river systems. This species is found in the upper reaches of the	PMST	Nil	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				Lachlan, Murrumbidgee and Murray Rivers, and in parts of the Hawkesbury and Shoalhaven catchment areas. The species requires clear water with deep, rocky holes with abundant cover (including aquatic vegetation, woody debris, large boulders and overhanging banks (DotE 2016c; DPI 2016b).			
Invertebrates							
Paralucia spinifera	Bathurst Copper Butterfly	E	V	This species tends to be restricted to elevations above 900 m within the central tablelands of NSW approximently bounded by Oberon, Hartley and Bathurst. Occupies open woodland or open forest with a sparse understorey and only occurs where Bursaria spinosa subsp. lasiophylla. Its lifecycle relies on a mutualistic relationship with Bursaria spinosa subsp. lasiophylla and an ant species.	Bionet (69), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area as altitude is above 900m asl.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Petalura gigantea	Giant Dragonfly	E	-	The Giant Dragonfly is found along the east coast of NSW from the Victorian border to northern NSW. It is not found west of the Great Dividing Range. There are known occurrences in the Blue Mountains and Southern Highlands, in the Clarence River catchment, and on a few coastal swamps from north of Grafton to Nadgee. They live in permanent swamps and bogs with some free water and open vegetation. Adults spend most of their time settled on low vegetation on or adjacent to the swamp hunting for flying insects. Females lay eggs into moss or other soft vegetation bordering swamps. Larvae dig long branching burrows under the swamp leaving their burrows at night to feed on insects and other invertebrates on the surface and also use underwater entrances to hunt for food in the aquatic vegetation.	Bionet (9)	Unlikely -No suitable habitat occurs within the study area.	Low
Mammals							
Petrogale penicillata	Brush-tailed Rock Wallaby	E	V	The Brush-tailed Rock Wallaby is found in fragmented populations throughout the Great Dividing Range. They live on rocky escarpments, granite outcrops and cliffs, which have caves and ledges facing north for warmth. They graze	Bionet (1), PMST	Possible – No records of this species exist within the locality in the last 10	Low – No potential or critical habitat will be impacted

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				on native grasses, foliage, fruits of shrubs, roots and bark found in surrounding habitat.		years, however suitable habitat occurs within the study area.	as a result of this proposal.
Nyctophilus corbeni	Corben's Long-eared Bat, South-eastern Long-eared Bat	V	V	Distribution coincides with the Murray Darling Basin, particularly the Pilliga Scrub region. Inhabits a variety of vegetation types, including mallee, buloke (Allocasuarina leuhmannii) and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. Roosts in tree hollows, crevices, and under loose bark. Slow flying agile bat, utilising the understorey to hunt non-flying prey . Mating takes place in autumn with one or two young born in late spring to early summer.	PMST	Unlikely – Outside of known distribution and no suitable habitat occurs within the study area.	Low
Vespadelus troughtoni	Eastern Cave Bat	V	-	Distributed on both sides of the Great Dividing Range from southern Queensland to the Central Coast of New South Wales. Found in dry open forest woodland near rocky cliffs	Bionet (11)	Possible – Recent records of this species	Low – No potential or critical habitat will be impacted

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				or overhangs. Roosts in caves and occasionally manmade structures like mines.		exist within the locality however only marginally suitable foraging habitat occurs within the study area.	as a result of this proposal.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	Occurring in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range, this species is found along the east coast from south QLD to southern NSW. Likely insectivorous, the Eastern Coastal Free-tailed Bat is usually solitary, and roosts mainly in tree hollows, but will also roost under bark or in man-made structures.	Bionet (3)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	This species of bat inhabits moist forest generally with trees larger than 20 m and roosts in eucalypt hollows, underneath bark or in buildings. Diet consists of moths, beetles and other insects, which it collects within or just below the tree canopy. This species hibernates during winter and breeding takes place in late spring.	Bionet (100)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Cercartetus nanus	Eastern Pygmy-possum	V	-	This species is distributed along the coast of southern QLD, NSW, and Victoria, southeastern SA, and is present throughout Tasmania. Banksia species and myrtaceous shrubs and trees are favoured food sources and nesting sites in drier habitats, except in NE NSW where rainforest is preferred habitat. The eastern Pygmy-possum's diet consists largely of pollen and nectar from Banksia species, Eucalypts, Bottlebrushes and insects. It nests in hollows in trees but its small size allows it to nest in a variety of places including under the bark of Eucalypts, forks of tea-trees, and in abandoned bird nests.	Bionet (40)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	The Greater Broad-nosed Bat is a large powerful bat, up to 95 mm long, with a broad head and a short square muzzle that 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. 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. Roosts in tree hollows, but also found in buildings. 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.	Bionet (15)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Petauroides volans	Greater Glider	V	V	The Greater Glider has low mobility and a typically small home range (1 – 4ha). Found in tall eucalypt forests and woodlands this species is dependent on large tracts of undisturbed tall forest with suitably large nesting hollows.The species is solitary, with populations ranging from 0.6 to 2.8 individuals per hectare and are unlikely to disperse this patch. Modelling suggests at least 160 km2 of native forest patches is required to support a viable population.	Bionet (835), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within	Moderate – Clearing of suitable habitat will occur. An AoS & SICA has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						the study area.	
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	This species roosts in camps generally located within 20 km of a regular food source and are commonly found in gullies, close to water and in vegetation with a dense canopy. This species is known to forage in areas supporting subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps on the nectar and pollen of native trees, in particular eucalypts, Melaleucas and Banksias. This species will also forage in urban gardens and cultivated fruit crops. Typically found on the coastal plain and eastern slopes of NSW, only making regular movements to the western slopes in northern NSW. This species has complex migratory movements across local landscapes to source food across different time of the year. The Grey-headed Flying-fox roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast.	Bionet (3), PMST	Likely – Recent records of this species exist within the locality and suitable foraging habitat occurs within the study area.	Low – Impacts will be limited to clearing of low quality foraging habitat. No potential or critical habitat will be impacted as a result of this proposal.
Phascolarctos cinereus	Koala	E	E	The Koala has a fragmented distribution throughout eastern Australia. It is limited to areas of preferred feed trees in eucalypt woodlands and forests. The size of their home range varies depending on the quality of habitat. Inhabit eucalypt woodlands and forests. The Koala feeds	Bionet (4), PMST	Likely – Recent records of this species exist within	Moderate – Clearing of suitable habitat will occur. An AoS & SICA has been

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. They spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.		the locality and suitable habitat occurs within the study area.	prepared for this species.
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	Caves are the primary roosting habitat for this species, but they may also use mines, stormwater outlets or tunnels and other man-made infrastructure. Eastern Bentwing-bats occur along the east and north-west coasts of Australia, hunting in forested areas, catching moths and other flying insects above the tree tops.	Bionet (125)	Possible – Recent records of this species exist within the locality however only marginally suitable foraging habitat occurs within	Low – No potential or critical habitat will be impacted as a result of this proposal.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						the study area.	
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	The Large-eared Pied Bat is distributed between south-eastern QLD to NSW from the coast to the western slopes of the divide. This species primarily roosts beneath cliff overhangs, within disused mine shafts and may use tree hollows. Only two maternity roosts are known to occur within NSW. This species requires a combination of sandstone cliff for roosting habitat adjacent to Box-Gum Woodland or riparian corridors to provide appropriate foraging grounds.	Bionet (83), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS & SICA has been prepared for this species.
Pseudomys novaehollandiae	New Holland Mouse	-	V	The New Holland Mouse occurs in disjunct, coastal populations in South-east Australia from Tasmania to Queensland. In NSW it has been found in a variety of coastal habitats including heathland, woodland, dry sclerophyll forest with a dense shrub layer and vegetated sand dunes, though it has also recently been recorded from sites up to 100 km inland between 550 – 900 m asl. It is commonly referred to as a 'disturbance enhanced' or early successional species as populations have demonstrated the capacity to recolonise and increase in size in areas of	PMST	Possible – No records exist for this species within the locality, however the study area is within this species	Low -

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				regenerating native vegetation after wildfire, clearing and sandmining. The species' presence has been strongly correlated with the density of understorey vegetation, and with a high floristic diversity in regenerating heath.		known range and suitable habitat exists within the study area.	
Myotis macropus	Southern Myotis	V	-	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. The Southern Myotis roosts in tree hollows, mine shafts, storm water channels, buildings, under bridges as well as amongst dense emergent riparian vegetation. This species is strongly associated with waterways foraging for small fish and insects over streams by raking their feet across the water surface.	Bionet (1)	Likely – Recent records of this species exist within the locality, however only marginally suitable habitat occurs within the study area.	Low – Only marginally suitable habitat occurs within the study area and this habitat is only likely to be transiently utilised for foraging.
Dasyurus maculatus	Spotted-tailed Quoll	V	E	The Spotted Tailed Quoll inhabits a range of environments in NSW including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Den subject sites are in hollow-bearing trees, fallen logs, small caves, rock crevices,	Bionet (2), PMST	Possible – No recent records of this species exist within	Moderate – Clearing of suitable habitat will occur. An AoS & SICA has been

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				boulder fields and rocky-cliff faces. Females occupy home ranges of up to 750 ha and males up to 3,500 ha, which are usually traversed along densely vegetated creek lines.		the locality however one (1) record exists within the locality and suitable habitat occurs within the study area.	prepared for this species.
Petaurus norfolcensis	Squirrel Glider	V	-	This species of glider is widely though sparsely distributed throughout eastern Australia. In NSW it 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. This species prefers a diversity of food supplies including wattle, gum, eucalypt saplings, nectar, honeydew and manna, with invertebrates and pollen providing protein, and requires an abundant supply of tree-hollows for nesting and shelter.	Bionet (11)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Petaurus australis	Yellow-bellied Glider	V	-	The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. The species requires tall mature forests with an abundance of tree hollows to shelter and breed.	Bionet (4), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V	-	The Yellow-bellied Sheathtail Bat is found throughout south-east Australia. It roosts in tree hollows and buildings and occasionally in mammal burrows where roost sites area scarce. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Breeding has been recorded from December to mid-March, when a single young is born.	Bionet (22)	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Moderate – Clearing of suitable habitat will occur. An AoS has been prepared for this species.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Reptiles							
Eulamprus leuraensis	Blue Mountains Water Skink	E	E	The Blue Mountains Water Skink occurs in altitudes above 560 m in the Blue Mountains of NSW from Hazelbrook to the Newnes Plateau. This semi-aquatic species is restricted to an isolated and naturally fragmented habitat of sedge and shrub swamps that have boggy soils and appear to be permanently wet. The vegetation in these swamps typically takes the form of a sedgeland interspersed with shrubs, but may occur as a dense shrub thicket.	Bionet (35), PMST	Possible – Recent records of this species exist within the locality and marginally suitable habitat occurs within the study area.	Low – No potential or critical habitat will be impacted as a result of this proposal.
Hoplocephalus bungaroides	Broad-headed Snake	E	V	The Broad-headed Snake requires sandstone rock ledges and exfoliating sandstone refuge to shelter during autumn, winter, spring with nearby tree hollows to occupy over the summer months.	Bionet (4), PMST	Possible – Recent records of this species exist within the locality and suitable habitat	Low – No impacts to suitable habitat will occur as result of this proposal.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						occurs within the study area.	
Aprasia parapulchella	Pink-tailed Worm-lizard	V	V	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites.	PMST	Possible -	?
Varanus rosenbergi	Rosenberg's goanna	V	-	Individuals require large areas of habitat and are found in heath, open forest and woodland. This species is associated with termite mounds as they require these for nesting. Hollow logs, rock crevices and burrows (existing or new) are used for shelter.	Bionet (3)	Likely – Recent records of this species exist within the locality and suitable foraging habitat occurs within	Low – No breeding or nesting habitat will be impacted as a result of this proposal.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						the study area.	
Delma impar	Striped Legless Lizard	V	V	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. Also occurs in the ACT, Victoria and south-eastern South Australia. Mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Sometimes found in modified grasslands with significant amounts of surface rocks.	PMST	Unlikely – Outside of known and predicted distribution of this species and only marginally suitable habitat exists.	Low
Flora							
Acacia bynoeana	Bynoe's Wattle	E	V	Occurs in sandy soils in heath or dry sclerophyll forest. Tends to prefer slightly disturbed areas such as trail margins, recently burnt patches and spoil mounds. 30 known locations with size of population very small at each location (1-5 plants). This species is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Bynoe's Wattle prefers open, sometimes slightly disturbed	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. It is associated with the following overstorey species: Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple		study area is unlikely to support this species.	
Boronia deanei	Deane's Boronia	V	V	This small erect shrub is found in scattered populations between the far south-east of NSW and the Blue Mountains (including the upper Kangaroo River near Carrington Falls, the Endrick River near Nerriga and Nalbaugh Plateau), mainly in conservation reserves. Grows in high altitude swamps, in wet heath and in drier open forest on low nutrient poorly drained soils on sandstone or granite	Bionet (1), PMST	Possible – Limited suitable habitat exists within the study area.	Moderate – This species has the potential to be impacted as a result of this proposal. An AoS & SICA has been prepared for this species.
Caesia parviflora var.minor	Small Pale Grass-lily	E	-	Outlying population in NSW – between Grafton and Coffs Harbour. Variety may be more common than thought due to difficulty in identifying to a variety level. Prefers damp places in open forest on sandstone.	Bionet (6)	Possible – Limited suitable habitat exists within the study area.	Moderate – This species has the potential to be impacted as a result of this proposal. An AoS has been

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
							prepared for this species.
Carex klaphakei	Klaphake's Sedge	E	-	Carex klaphakei is found in only a few locations, the Blue Mountains at Blackheath and Mt Werong, the Southern Highlands (at Penrose), and Newnes Plateau. Grows with other native sedges and rushes in swamps on sandstone at altitudes of greater than 600 m.	Bionet (11)	Possible – Limited suitable habitat occurs within the study area.	Low – The limited suitable habitat is already disturbed by existing road therefore there are unlikely to be any new impacts resulting from the proposal.
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	Scattered, coastal distribution. Known historically from a number of locations on the NSW South coast. Does not have specific or well defined habitat preferences. Occurs in a variety of communities including swamp heath and woodland. Larger populations occur in scribbly gum woodland. prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta).	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						support this species.	
Cynanchum elegans	White-flowered Wax Plant	E	E	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 and Forest Red Gum Eucalyptus tereticornis aligned open forest and woodland.	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Eucalyptus aggregata	Black Gum	V	V	This species grows in grassy woodlands on alluvial soils in moist sites along creeks on broad, cold and poorly-drained flats and hollows. It commonly occurs with Eucalyptus ovata, E. pauciflora, E. rubida, E. stellulata and E. viminalis with a grassy understorey of River Tussock. It occurs on the central and southern tablelands of NSW, and in a small disjunct population in Victoria. In NSW, it occurs predominantly in the South Eastern Highlands Bioregion,	Bionet (609), PMST	Possible – Limited suitable habitat occurs within the study area.	Low –. This species along with associated flora species were recorded during surveys.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				with the most eastern part of the distribution located just within the Sydney Basin Bioregion.			
Eucalyptus cannonii	Capertee Stringybark	V	-	Capertee Stringybark has a broad altitudinal range, from around 450m to 1,050m. Within this range, the species appears to tolerate most situations except the valley floors. Has a diverse range of associated eucalypt species. Mature trees survive hot fires. This species hybridises with other stringybarks, in particular, Eucalyptus macrorhyncha.	Bionet (234)	Likely – Records exist within the locality and suitable habitat was recorded within the study area.	Moderate – This species has the potential to be impacted by the proposal. An AoS has been prepared for this species.
Eucalyptus pulverulenta	Silver-leafed Gum	V	V	The Silver-leafed Gum grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum (Eucalyptus mannifera), Red Stringybark (E. macrorhynca), Broad-leafed Peppermint (E. dives), Silvertop Ash (E. sieberi) and Apple Box (E. bridgesiana). Sometimes planted as street trees or ornamental (in private gardens), this species is found in two quite separate areas, the Lithgow to Bathurst area and the Monaro (Bredbo to Bombala).	Bionet (5), PMST	Possible – Records of this species exists within the locality and suitable habitat exists.	Low – However, this species is very obvious where present and was not recorded within the study area.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Euphrasia arguta	-	CE	CE	Euphrasia arguta is restricted to the Nundle State Forest but historically has been recorded along the plains and woodlands of Bathurst. Known populations occur in eucalypt forest with a mixed grass/shrub understorey, while previous records are described as occurring in open forest, grassy country and river meadows. Annual and dies back over winter. Dense stands observed in cleared firebreak areas, suggesting it may respond well to disturbance.	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Genoplesium superbum	Superb Midge Orchid	E	-	The Superb Midge Orchid is restricted to the Central and Southern Tablelands of NSW where it has been recorded from 2 locations near Nerriga, c. 20 km apart, and north of Wallerawang. The Superb Midge Orchid occurs predominantly in wet heathland on shallow soils above a sandstone cap but has also been found in open woodland interspersed with heath and dry open shrubby woodland.	Bionet (4)	Possible – Records of this species exists within the locality and marginally suitable habitat exists. However, this species was	Low – No heath vegetation or suitable habitat will be impacted as a result of this proposal.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						not recorded within the study area.	
Grevillea obtusiflora	Grey Grevillea	E	E	Grevillea obtusiflora has two subspecies, G. obtusiflora subsp. obtusiflora and G. obtusiflora subsp. fecunda. Subspecies obtusiflora is restricted to Clandulla State Forest near Kandos. Subspecies fecunda occurs in the Capertee Valley, north-west of Lithgow, and south into Gardens of Stone National Park. Subspecies obtusiflora occurs as scattered groups in the understorey of low open eucalypt forest at altitudes of around 730 metres above sea level. Subspecies fecunda occurs in clusters within low, open scrub beneath open, dry sclerophyll forest, on orange, sandy loam soils with sandstone boulders, at altitudes of above around 550 metres. Subspecies obtusiflora flowers sparsely in winter and spring with flowering peaking in October. Subspecies fecunda flowers abundantly in spring and sets produces copious amounts of fruit. Due to the flower shape, subspecies fecunda is mainly pollinated by birds, with bees being potential secondary pollinators. Seed is most likely dispersed directly below the plant and is distributed by wind, water and ants. Seedlings have been recorded soon after seed is shed. Subpopulation sizes vary from a few isolated stems to	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				more than hundred stems covering. Only around five such subpopulations are known in the wild. This species is known to quickly recolonise roadside scrapes.(DEP 2022)			
Haloragodendron lucasii	-	E	E	The known locations of this species are confined to a very narrow distribution on the north shore of Sydney. Associated with dry sclerophyll forest and reported to grow in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland. Associated with high soil moisture and relatively high soil-phosphorus levels. Flowering occurs from August to November with fruits appearing from October to December. (DPE 2022)	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Homoranthus darwinioides	Fairy Bells	V	V	Rare in the central tablelands and western slopes of NSW, occurring from Putty to the Dubbo district. It is found west of Muswellbrook between Merriwa and Bylong, and north of Muswellbrook to Goonoo SCA. The species has been collected from Lee's Pinch, but not relocated at its original locality north of Mt Coricudgy above the headwaters of Widden Brook. Grows in in various woodland habitats with shrubby understoreys, usually in gravely sandy soils.	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				Landforms the species has been recorded growing on include flat sunny ridge tops with scrubby woodland, sloping ridges, gentle south-facing slopes, and a slight depression on a roadside with loamy sand. Associated species include Callitris endlicheri, Eucalyptus crebra, E. fibrosa, C. trachyphloia, E. beyeri subsp. illaquens, E. dwyeri, E. rossii, Leptospermum divaricatum, Melaleuca uncinata, Calytrix tetragona, Allocasuarina spp. and Micromyrtus spp. Flowers in spring or from March to December.(DPE 2022)		study area is unlikely to support this species.	
Isotoma fluviatilis subsp. fluviatilis	Isotoma fluviatilis subsp. fluviatilis	-	X	Considered extinct under Commonwealth legislation, this species of small, prostrate herb is currently known from only two adjacent sites on a single private property at Erskine Park in the Penrith LGA. Previous sightings are all from western Sydney, at Homebush and at Agnes Banks. Known to grow in damp places, on the Cumberland Plain, including freshwater wetland, grassland/alluvial woodland and an alluvial woodland/shale plains woodland (Cumberland Plain Woodland) ecotone.	Bionet (1)	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Kunzea cambagei	-	V	V	Kunzea cambagei mainly occurs in the western and southern parts of the Blue Mountains, NSW, mainly the Yerranderie/Mt Werong area, with four main populations with 20 to 150 individuals. Populations are also located west of Berrima, along the Wingecarribee River; Loombah Plateau east of Mount Werong; the Oberon-Colong Stock Route within Kanangra-Boyd National Park (NP); and Wanganderry Plateau within the Nattai NP. Cambage Kunzea is restricted to damp, sandy soils in wet heath or mallee open scrub at higher altitudes on sandstone outcrops or Silurian group sediments. This species flowers between September and November (NSW, OEH, 2022).	Bionet (19), PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Leucochrysum albicans var. tricolor	Hoary Sunray	-	E	The Hoary Sunray occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils, often on roadsides. It requires bare ground and disturbance for germination. In NSW it currently occurs on the Southern Tablelands adjacent areas in an area roughly bounded by Albury, Bega and Goulburn, with a few scattered localities know from beyond this region.	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						support this species.	
Persoonia hindii	-	E	-	Restricted to the Newnes Plateau in the Blue Mountains, north of Lithgow. Was only discovered in 1989 and all known locations occur within Newnes State Forest. Occurs on sandy soils in dry sclerophyll forest and woodlands.	Bionet (797)	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Persoonia marginata	Clandulla Geebung	V	V	Occurs in the western blue mountains. Populations are largely disjunct and include Clandulla, Ben Bullen and Sunny Corner State Forests; isolated populations have also been recorded from Turon and Gardens of Stone National Parks. Grows on sandstone in woodland communities and dry sclerophyll forest.	Bionet (55), PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						unlikely to support this species.	
Pomaderris brunnea	Rufous Pomaderris	E	V	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. Found in moist woodland or forest on clay and alluvial soils of flood plains and creek lines. Flowers appear in September and October. Found in association with Eucalyptus amplifolia, Angophora floribunda, Acacia parramattensis, Bursaria spinosa and Kunzea ambigua.	PMST	Unlikely – Geographical location, disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Pomaderris cotoneaster	Cotoneaster Pomaderris	E	E	Cotoneaster Pomaderris has a very disjunct distribution, being known from the Nungatta area, northern Kosciuszko National Park (near Tumut), the Tantawangalo area in South-East Forests National Park and adjoining freehold land, Badgery's Lookout near Tallong, Bungonia State Conservation Area, the Yerranderie area, Kanangra-Boyd	PMST	Unlikely – Disturbance history, current vegetation condition and	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				National Park, the Canyonleigh area and Ettrema Gorge in Morton National Park. The species has also been recorded along the Genoa River in Victoria. Cotoneaster Pomaderris has been recorded in a range of habitats in predominantly forested country. The habitats include forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs.		landscape within the study area is unlikely to support this species.	
Prasophyllum petilum	Tarengo Leek Orchid	E	E	Natural populations are known from a total of five sites in NSW. These are near Boorowa, Queanbeyan area, Ilford, Delegate and a newly recognised population c.10 km west of Muswellbrook. Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Highly susceptible to grazing impacts.	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Prasophyllum sp Wybong	Leek orchid	-	CE	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the	PMST	Unlikely – Disturbance history, current	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				largest number of individuals. Habitat occurs within open eucalypt woodland and grassland.		vegetation condition and landscape within the study area is unlikely to support this species.	
Prostanthera cryptandroides subsp. Cryptandroides	Wollemi Mint-bush	V	V	Distributed between Lithgow and Sandy Hollow on the NSW central west slopes, central tablelands and western parts of the central coast botanical regions. Associated communities include: Narrabeen Rocky Heath, Narrabeen Acacia Woodland, Narrabeen Exposed Woodland; Open Heath of Common Fringe Myrtle, Small Leaf Tea Tree and Nepean cone bush; and Open Scrubland of Dwyer's Red Gum, Bushy Baeckea, Egg-and-bacon plant, Common Aotus. At Glen Davis, occurs in open forest dominated by Eucalyptus fibrosa. Other eucalypt species may be present as sub-dominants. Fire sensitive with recruitment only from seed.	Bionet (2), PMST	Unlikely – Geographical location, disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Prostanthera stricta	Mount Vincent Mint-bush	V	V	Prostanthera stricta is often a locally dominant undershrub in heath or scrub communities along cliff edges, or as an understorey species within a range of open forest or tall open forest types, or in adjacent transitional communities. Prostanthera stricta grows in areas of both skeletal soil and on deeper, well-drained soil profiles in areas characterised by steep rocky sideslopes, cliff lines, sandstone platforms, or gentle slopes with exposed sandstone outcropping and is likely to be fire sensitive.	Bionet (1)	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Pultanaea glabra	Smooth Bush-pea	V	V	All known populations occur within the Blue Mountains LGA, specifically the Katoomba-Hazelbrook and Mt Victoria areas. Occurs on swamp margins, hillslopes, gullies and creekbanks and occurs within dry sclerophyll forest and tall damp heath on sandstone.	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						support this species.	
Pultenaea parrisiae	Parris'Bush-pea	V	V	Occurs at three sites in NSW (Wadbilliga Trig area and two sites south of Nalbaugh). Grows on loam soils between 550-600 m elevation, sometimes at the margins of woodlands and also in riparian vegetation. Grows in moist heathland in swamps or seasonal seepage areas in loam soils.	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Rhizanthella slateri	Eastern Underground Orchid	V	E	"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. It is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				located only when the soil is disturbed. Flowers September to November."		unlikely to support this species.	
Thesium australe	Australe Toadflax	V	V	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands in grassland on coastal headlands or grassland and grassy woodland away from the coast. Australe Toadflax has been recorded from the Lithgow are to the east of Bathurst. This species does not tolerate high intensity grazing or dominant weeds such as Blackberry. It occurs along coastal headlands or grassy woodland habitats inland. It is a root parasite plant with a strong association with Kangaroo Grass (Themeda australis).	Bionet (4), PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Veronica blakelyi	-	V	-	Restricted to the western Blue Mountains, near Clarence, near Mt Horrible, on Nullo Mountain and in the Coricudgy Range. Over this range, occurrences are patchy and generally small in in size. Occurs in eucalypt forest, often in moist and sheltered areas. Associated canopy species including Eucalyptus dives, E. dalrympleana, E. rossii and E. pauciflora. This species appears to resprout after fire.	Bionet (165)	Possible – Records of this species exist within the locality and marginally suitable	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						habitat exists. However, this species was not recorded within the study area.	
Velleia perfoliata	-	V	V	Only known from the Hawkesbury district and upper Hunter Valley. Found in shallow depressions on Hawkesbury sandstone shelves, on rocky hill sides, under cliffs or on rocky/sandy soils along tracks and trails. Grows in heath and open forest on fairly shallow soils of sandy loam texture.	PMST	Unlikely – Disturbance history, current vegetation condition and landscape within the study area is unlikely to support this species.	Low
Wollemia nobilis	Wollemi Pine	CE	CE	This species is restricted to remote canyons in the Wollemi National Park, north-west of Sydney. It occurs in warm temperate rainforest and rain forest margins in remote sandstone canyons.	PMST	Unlikely – Geographical location, disturbance history,	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						current vegetation condition and landscape within the study area is unlikely to support this species.	
Xerochrysum palustre	Swamp Everlasting, Swamp Paper-daisy	-	V	Found in swamps and bogs which are dominated by heaths. Also found in peaty soils on the edges of bog margins with a shrub or grass cover.	PMST	Unlikely – No suitable habitat exists within the study area.	Low
Threatened Ecological Communities							
Natural Temperate Grassland of the South Eastern Highlands		-	CE	The community can be found in a variety of topographies and substrates between 500 and 1200 m asl. Community is found on sweeping plains with poor drainage where frost forms. May also occur in a mosaic with several woodland communities. Confined to the Southern Tablelands bounded by the ACT, Yass, Abercrombie River, Goulburn,	PMST	Unlikely – Vegetation communities identified during site investigation	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				Great Eastern Escarpment, Victorian border and the eastern boundary of KNP.		do not align with this TEC.	
Temperate Highland Peat Swamps on Sandstone		-	E	The Temperate Highland Peat Swamps on Sandstone ecological community is comprised of temporary or permanent swamps with a substrate of peat over sandstone, and vegetation characterised by the presence of sedges, graminoids and forbs with or without shrubs. The swamps generally occur at altitudes from around 600 m to 1200 m above sea level and are restricted to the South Eastern Highlands and Sydney Basin.	PMST	Unlikely – Vegetation communities identified during site investigation do not align with this TEC.	Low
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion		-	E	Associated with high altitudes on volcanic substrates with high rainfall which support the growth of tall trees and softer plants that are characteristic of this community. The UBEF ecological community occurs in parts of the Blue Mountains, Southern Highlands, and Southern Tablelands, roughly between the localities of Denman, to the north, and Yadboro, to the south. The ecological community is mostly within the Sydney Basin bioregion. Some patches of its eastern edge may extend into the nearby South East Highlands bioregion.	PMST	Unlikely – Vegetation communities identified during site investigation do not align with this TEC.	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and		CEEC	CEEC	Occurs on the tablelands and western slopes of NSW, on moderate to highly fertile soils. Found in areas with annual rainfall between 400 - 1200 mm, at altitudes between 170 - 1200 m asl. Open woodland/forest, characterised by White Box, Yellow Box and Blakely's Red Gum. Intact sites are rare, but contain a high species diversity of trees, shrubs, climbers, grasses and particularly herbs. The NSW listing includes sites with/without canopy layer and areas with predominately exotic groundlayer, whereas to meet the federal listing criteria areas must have either intact tree layer and predominately native groundlayer, or an intact ground layer with high species diversity but no remaining tree layer.	PMST	Unlikely – Vegetation communities identified during site investigation do not align with this TEC.	Low
Migratory Species							
Monarcha melanopsis	Black-faced Monarch	-	Mi	This species of bird usually inhabits dense gullies of rainforest, sclerophyll forests and eucalypt woodlands along the coastal regions from Victoria to Cape York and is migratory over much of its range.	PMST	Possible – No records of this species exist within the locality however suitable habitat exists	Low – Species is highly mobile and migratory, and no critical habitat exists within the study area.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
						within the study area.	
Actitis hypoleucos	Common Sandpiper	-	Mi, C,J,R	In Australia, the Common Sandpiper is found in coastal or inland wetlands, both saline or fresh. It is found mainly on muddy edges or rocky shores. When in Australia, the population is concentrated in northern and western Australia .	PMST	Unlikely – No suitable habitat exists within the study area.	Low
Calidris ferruginea	Curlew Sandpiper	E	CE - Mi, C,J,R	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. Inland records are probably mainly of birds pausing for a few days during migration.	PMST	Unlikely – No suitable habitat exists within the study area.	Low
Numenius madagascariensis	Eastern Curlew	-	CE - Mi, C,J,R	The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours, lagoons and occasionally on wooden oyster leases or other similar structures. It is rarely found inland. The Eastern	PMST	Unlikely – No suitable habitat exists	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				Curlew occurs only in our flyway, and about 75 per cent of the world's curlews winter in Australia.		within the study area.	
Apus pacificus	Fork-tailed Swift	-	Mi, C,J,R	In Australia, the Fork-tailed Swift mostly occurs over dry or open habitats, including inland plains, riparian woodland and tea-tree swamps, low scrub, heathland, saltmarsh and sometimes above foothills or in coastal areas spending most of their time in the air, or roosting on cliffs or walls. They also occur over settled areas, including towns, urban areas and cities. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. An aerial eater, flying anywhere from 1 m to 300 m above the ground to forage on insects including small bees, wasps, termites and moths. (DCCEEW 2022)	PMST	Unlikely – No records of this species exist within the locality and limited suitable habitat exists within the study area.	Low
Gallinago hardwickii	Latham's Snipe	-	Mi, J,R	Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture (DCCEEW 2022).	PMST	Unlikely – No suitable habitat exists within the study area.	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Calidris melanotos	Pectoral Sandpiper	-	Mi, J,R	These birds forage on grasslands and mudflats, picking up food by sight, sometimes by probing. They mainly eat arthropods and other invertebrates. Some Asian breeders winter in southern Australia and NZ.	PMST	Unlikely – No suitable habitat exists within the study area.	Low
Rhipidura rufifrons	Rufous Fantail	-	Mi	Found along NSW coast and ranges. Inhabits rainforest, dense wet forests, swamp woodlands and mangroves. During migration, it may be found in more open habitats or urban areas.	PMST	Unlikely – No suitable habitat exists within the study area.	Low
Myiagra cyanoleuca	Satin Flycatcher	-	Mi	In NSW widespread on and east of the Great Divide, sparsely scattered on the western slopes, very occasional records on the western plains. Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, often near wetlands and watercourses. On migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Generally, not in rainforests.	PMST	Possible – No records of this species exist within the locality however suitable habitat exists within the study area.	Low – Species is highly mobile and migratory, and no critical habitat exists within the study area.

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
Calidris acuminata	Sharp-tailed Sandpiper	-	Mi, C,J,R	The Sharp-tailed Sandpiper prefers the grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Its breeding habitat in Siberia is the peat-hummock and lichen tundra of the high Arctic.	PMST	Unlikely – No suitable habitat exists within the study area.	Low
Hirundapus caudacutus	White-throated Needletail	-	V - Mi, C,J,R	In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. This species is mostly aerial. Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings.	Bionet (7), PMST	Likely – Recent records of this species exist within the locality and suitable habitat occurs within the study area.	Low – No significant habitat will be cleared as result of this proposal.
Motacilla flava	Yellow Wagtail	-	Mi, C,J,R	The Yellow Wagtail is an extremely rare visitor to Australia and may be recorded as a vagrant on occasion. It prefers a range of damp or wet habitats with low vegetation, including damp meadows, pastures near water, and can even be found occupying sewage farms and bogs. It breeds from April to August, although this varies with latitude. The	PMST	Unlikely – No suitable habitat exists within the study area.	Low

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of Record	Likelihood of occurrence	Likelihood of impact
				nest is a grass cup lined with hair and placed on or close to the ground in a shallow scrape. It feeds on a wide variety of terrestrial and aquatic invertebrates as well as some plant material, particularly seeds.(Birdlife.org 2022)			

Appendix F – NSW Assessments of Significance (BC Act)

Assessments of Significance for threatened species prepared in accordance with Section 1.7 of the EP&A Act will be provided in the final report, however they concluded that a significant impact to these species and community is ***unlikely****.*

ASSESSMENTS OF SIGNIFICANCE FOR NSW LISTED THREATENED BIOTA

Section 1.7 of the EP&A Act lists considerations that must be taken into account in the determination of the significance of potential impacts of a proposed Proposal on 'threatened species, populations or ecological communities (or their habitats)' listed under the BC Act. The Test of Significance is used to determine whether a Proposal is 'likely' to impose 'a significant effect' on threatened biota and thus whether a Species Impact Statement (SIS) is required. Should the Test of Significance conclude that there is likely to be a 'significant effect' on a listed species, population or endangered ecological community, an SIS must be prepared or participation in the Biodiversity Offset Scheme.

Biodiversity Conservation Act 2016 Part 7.3 sets out the following Test of Significance considerations which must be addressed to determine whether a significant impact is likely to occur.

The following species and TEC's are all listed under the BC Act and have been assessed due to their potential to be impacted by the proposal:

Table 18 – Summary table of threatened species and/or TEC's requiring Assessments of Significance (BC Act)

Scientific Name	Common name	BC Act	Summary of Assessment of Significance
Amphibians (Frogs)			
Litoria littlejohni	Littlejohn's Tree Frog	V	No significant impact
Mixophyes balbus	Stuttering Frog	E	No significant impact
Parrots & Cockatoos			
Callocephalon fimbriatum	Gang-gang Cockatoo	V	No significant impact
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	No significant impact
Glossopsitta pusilla	Little Lorikeet	V	No significant impact
Woodland Birds			
Melithreptus gularis gularis	Black-chinned Honeyeater	V	No significant impact
Climacteris picumnus	Brown Treecreeper (eastern subspecies)	V	No significant impact
Stagonopleura guttata	Diamond Firetail	V	No significant impact
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	No significant impact

Scientific Name	Common name	BC Act	Summary of Assessment of Significance
Petroica phoenicea	Flame Robin	V	No significant impact
Melanodryas cucullata	Hooded Robin	V	No significant impact
Anthochaera phrygia	Regent Honeyeater	CE	No significant impact
Petroica boodang	Scarlet Robin	V	No significant impact
Chthonicola sagittata	Speckled Warbler	V	No significant impact
Daphoenositta chrysoptera	Varied Sitella	V	No significant impact
Owls			
Nixon connivens	Barking Owl	V	No significant impact
Tyto novaehollandiae	Masked Owl	V	No significant impact
Nixon strenua	Powerful Owl	V	No significant impact
Tyto tenebricosa	Sooty Owl	V	No significant impact
Insects			
Paralucia spinifera	Bathurst Copper Butterfly	E	No significant impact
Arboreal Mammals (Hollow dependent species)			
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	No significant impact
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	No significant impact
Cercartetus nanus	Eastern Pygmy-possum	V	No significant impact
Scoteanax rueppellii	Greater Broad-nosed Bat	V	No significant impact
Chalinolobus dwyeri	Large-eared Pied Bat	V	No significant impact
Dasyurus maculatus	Spotted-tailed Quoll	V	No significant impact
Petaurus norfolcensis	Squirrel Glider	V	No significant impact
Petaurus australis	Yellow-bellied Glider	V	No significant impact
Saccolaimus flaviventris	Yellow-Bellied Sheathtail Bat	V	No significant impact
Mammals (Foraging habitat)			
Phascolarctos cinereus	Koala	E	No significant impact

Scientific Name	Common name	BC Act	Summary of Assessment of Significance
Flora			
Boronia deanei	Deane's Boronia	V	No significant impact
Caesia parviflora var. minor	Small Pale Grass-Lily	E	No significant impact
Eucalyptus cannonii	Capertee Stringybark	V	No significant impact

Amphibians (frogs):

Littlejohn's Tree Frog, *Litoria littlejohni* – Vulnerable; Stuttering Frog, *Mixophyes balbus* – Endangered.

These species have been grouped together based on similar habitat requirements.

Determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

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,

One (1) record for each of these species exists within the locality and suitable habitat occurs within the study area consisting of four (4) creek-lines being crossed by the proposal. The impact to this suitable habitat will be limited to an area of approximately 6 meters by 6 metres (36 square metres) for each creek crossing and will be limited to culvert construction and short-term localised sedimentation.

Limited suitable breeding habitat occurs, and no known records exist within the study area. The impact areas are small relative to the length of the creek-lines, and higher quality habitat exists within protected areas in the locality including the Wolgan River around 400m east and downstream of the impacted creek-lines.

Impacts of the proposal would be minimal, localized to a small (36 square metres across four sites) area and short in duration. Subsequently, there are ample available breeding sites for the species outside of the immediate impact area.

Additionally, pre-clearance surveys will investigate any potential breeding sites within the study area prior to impacts occurring. Subsequently, therefore it is unlikely that these impacts will disrupt the breeding cycle of an important population of these species.

The implementation of safeguards and management measures as outlined in Section 6 are designed to minimize impacts on biodiversity and aquatic habitats and features, and subsequently aim to protect habitat suitable for these species.

Given the minor nature of the proposed works, impacts are unlikely 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.

In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

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

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,

Not applicable to this threatened species.

In relation to the habitat of a threatened species or ecological community:

i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
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**
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 proposal would result in the temporary disturbance and permanent modification of **36 square meters** of potential habitat for these species. Potential habitat in the subject site has been disturbed and previously modified by the existing track disturbance across the subject site. Although suitable habitat occurs within the study area, no known records exist within the study area. Higher quality habitat exists within protected areas in the nearby locality including the Wolgan River around 400m east and downstream of these impacted creek-lines.

The introduction of culverts along with the construction and operation of a roadway through the potential habitat of these species will cause minimal, temporary fragmentation during construction and minor ongoing disturbance during operation of the roadway. This fragmentation of habitat will be limited to 36 square metres across four (4) creek crossings. The installation of culverts during construction would allow for the passage of water, and subsequently the movement of species through the aquatic system, and subsequently impacts of fragmentation would be temporary and restricted to construction.

Although suitable habitat occurs within the study area, no known records exist within the study area. The impact areas are small relative to the length of the creek-lines, and higher quality habitat exists within protected areas in the locality including the Wolgan River around 400m east and downstream of the impacted creek-lines. The habitat to be removed is considered marginally suitable and very minimal in relation to the potential habitat in the broader locality above and below these creek-lines. The potential impacts are limited to temporary sedimentation during construction, and disturbances associated with the operation of the proposed roadway. It is unlikely that habitat suitable for the species would be removed, modified, fragmented or isolated to an extent that would impact the long-term survival of the species in the locality

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

The site does not support any declared registered areas of outstanding biodiversity value (formerly critical habitat).
https://www.environment.nsw.gov.au/criticalhabitat/CriticalHabitatProtectionByDoctype.htm

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following listed relevant Key threatening processes have the potential to occur or increase as a result of the proposal, if appropriate mitigation measures are not implemented:

- Clearing of native vegetation
- Infection of native plants by *Phytophthora cinnamomi*.
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales, pathogenic on plants of the family Myrtaceae.
- Infection of frogs by amphibian chytrid causing the disease chytridiomycosis
- Anthropogenic climate change

Safeguard and mitigation measures outlined in Section 6 are designed to minimise and mitigate these potential impacts.

Conclusion:

Based on consideration of the above criteria, the proposal is unlikely to have a significant effect on a local population of Littlejohn's Tree Frog or Stuttering Frog. (if present) as:

- Temporary impacts and minor permanent (installation of culverts) modification to only 36 square metres of potential habitat for these species is unlikely to prevent the species from persisting within suitable habitat in the study area
- Significant areas of high-quality habitat likely to support the species occurs outside of the study area (Wolgan River)
- The implementation of safeguard and mitigation measures outlined in Section 6 would minimise impacts to the species.

Parrots:

Gang-gang Cockatoo, *Callocephalon fimbriatum* – Vulnerable; Glossy Black-Cockatoo, *Calyptorhynchus lathami*, – Vulnerable; Little Lorikeet, *Glossopsitta pusilla* – Vulnerable

These species have been grouped together based on similar habitat requirements.

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,

Gang-gang Cockatoo, Glossy Black-Cockatoo, and Little Lorikeet require open woodland habitats with tree hollows for nesting sites. Each species has specific requirements as to the location, type and hollow size and area size of these sites.

- **Gang-gang Cockatoo:** This species is nomadic, spending summer in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests and winter at lower altitudes in drier more open eucalypt forest and woodlands, particularly in coastal areas. This species nests in hollow-bearing trees close to water with breeding taking place between October and January. Favours old growth forest and woodland attributes with dense understoreys, for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground.
- **Glossy Black-Cockatoo:** The species 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.

- **Little Lorikeet:** Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Nesting season from May to September. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like *Allocasuarina*.

The above listed species are likely to occur and persist in the locality and broader locality, as suitable habitat occurs within the study area, and broader locality. Local and recent records occur for **Gang-gang Cockatoo**, **Glossy Black-Cockatoo**, and **Little Lorikeet.**

There are a number of habitat features including hollow bearing trees, stags and feed trees within the subject site that will be impacted by the proposal. This will result in a reduction in the availability of possible nesting and foraging habitat for these species. These species were not recorded during site surveys and no evidence of nesting or nesting behavior was observed incidentally. Targeted surveys for these species were not undertaken. The subject site occurs along a previously cleared trail that has been subject to significant disturbances due to clearing for the installation of telecommunications infrastructure and damaged by the 2019/20 bushfire resulting in a loss of mature trees and habitat at the site, and a dominance of shrubby, immature regrowth along the track, and an incursion of exotic weed species. Subsequently, the **subject site** is unlikely to provide significant or important habitat for these species, especially given the availability of significantly higher quality habitat in the locality.

Therefore, it is considered unlikely the proposal would have an adverse effect on the life cycle of these species such that a viable local population of these species would be placed at risk of extinction.

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,

Not applicable to these threatened species.

In relation to the habitat of a threatened species or ecological community:

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

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

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,

Approximately **1.11 ha** of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. This includes nine (9) hollow-bearing trees. Hollow-bearing trees and mature eucalypts could be utilised by these species for foraging and/or nesting resources. Given the wide availability of high quality woodland habitat available in the locality, habitat available in the subject site is unlikely to provide important of significant habitat for these species.

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that these highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

There is a large area of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support these species. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth vegetation, and given the large availability of high quality vegetation in the locality. Given the high mobility of these species, and the wide availability of alternant resources in the study are and locality, it is unlikely that the removal of vegetation as a result of the proposal would negatively affect the long-term survival of these species.

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

The site does not support any declared registered areas of outstanding biodiversity.

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following listed Key threatening processes have the potential to occur or increase as a result of the proposal, if appropriate mitigation measures are not implemented:

- Loss of hollow bearing trees
- Clearing of native vegetation
- Removal of dead wood and dead trees
- Invasion of plant communities by perennial exotic grasses
- Infection of native plants by *Phytophthora cinnamomi*.
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales, pathogenic on plants of the family Myrtaceae.
- Anthropogenic climate change

Safeguard and mitigation measures outlined in Section 6 are designed to minimise and mitigate these potential impacts.

Conclusion

Conclusion:

Based on consideration of the above criteria, the proposal is unlikely to have a significant effect on a local population of the Gang-gang Cockatoo, Glossy Black Cockatoo and Little Lorikeet (if present) as:

- The removal of only 1.11 ha of low quality predominantly regrowth vegetation and up to twenty-five (25) mature eucalypts is unlikely to detrimentally impact on the availability of foraging resources for these species given the wide availability of highly connected, high quality woodland available in the locality within various State Forests, National Parks and Nature Reserves.
- The loss of only nine (9) marginal quality hollow-bearing trees is unlikely to substantially reduce the availability of nesting sites for these species given the wide availability of habitat available in the locality.
- The proposal is unlikely to further increase existing habitat fragmentation so as to pose a barrier to movement of these species through the study area or locality or to isolate patches of habitat
- There are areas of significantly higher habitat quality within the study area and locality which is highly connected to the subject site and subsequently habitat to be removed by the proposal is unlikely to be important for the persistence of a viable local population of these species

Woodland Birds:

Black-chinned Honeyeater, *Melithreptus gularis gularis* – Vulnerable; Brown Treecreeper (eastern subspecies), *Climacteris picumnus* – Vulnerable; Diamond Firetail, *Stagonopleura guttata* – Vulnerable; Dusky Woodswallow, *Artamus cyanopterus cyanopterus* – Vulnerable; Flame Robin, *Petroica phoenicea* – Vulnerable; Hooded Robin, *Melanodryas cucullate* – Vulnerable; Regent Honeyeater, *Anthochaera Phrygia* – Critically Endangered; Scarlet Robin, *Petroica boodang* – Vulnerable; Speckled Warbler, *Chthonicola sagittate* – Vulnerable; Varied Sitella, *Daphoenositta chrysoptera* – Vulnerable.

These species have been grouped together based on similar habitat requirements.

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,

The woodland birds listed above all have confirmed records within the locality in the last 10 years and are likely to occur utilise habitat resources identified within the study area to survive and reproduce. These species use woodland and forested areas and edges with diverse grassy and shrubby understory for foraging and nesting opportunities. Insects are gleaned from the air, under bark, or within debris

and fallen timber resources. Contiguous vegetation is preferred by these species to allow ease of movement throughout home ranges and habitat resources. Of the above listed threatened woodland birds, the Flame Robin was the only species observed to be utilising the study area during surveys.

The study area is along a previously cleared trail which has recently been subject to clearing for installation of telecommunications infrastructure, and bushfire disturbances and vegetation in this area is predominantly shrubby regrowth eucalypts and acacias, as well as exotic weeds which have become established due to the disturbance along the previously formed trail.

Up to **1.11 ha** of native vegetation will be directly impacted as part of works, comprised of predominantly regrowth and disturbed vegetation along the track. This could cause a reduction in the availability of possible nesting and foraging habitat for these species, however no evidence of nesting by any of these species was observed during surveys within the study area, although targeted surveys were not undertaken. Additionally, vegetation in the study area is highly connected to large tracts of contiguous habitat within conservation areas in the broader locality, which provides high quality habitat for these species to persist and breed.

Given the minimal impact of the proposal on predominantly low-quality habitat, and the wide availability of high-quality habitat in the study area and locality, it is unlikely the proposal would result in an adverse effect on the life cycle of these species such that a viable local population of these species would be placed at risk of extinction.

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,**

Not applicable to these threatened species.

In relation to the habitat of a threatened species or ecological community:

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

Approximately 1.11 ha of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. Works will be occurring along an existing section of trail which has partially regenerated. This habitat is likely to be utilised in a transient and opportunistic way by

these species and is unlikely to be heavily used for breeding purposes due to ongoing disturbance and the occurrence of more suitable habitat in the immediate study area and broader locality.

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that these mobile species cannot traverse and would not result in any isolation or fragmentation of species habitat.

There is a large area of high quality and well-connected habitat throughout the study area and locality. These areas contain large patches of high quality, structurally diverse and well-connected forest that likely provide ample viable habitat for these species to persist away from the proposed impacted area. The vegetation within the study area is not likely to provide significant value to these woodland bird species given the high availability of alternant habitat and subsequently the impacts of the proposal are unlikely to negatively affect the long-term survival of these birds within the locality.

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

The site does not support any declared Areas of Outstanding Biodiversity Value (formerly critical habitat).

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following Key Threatening Processes of relevance to these species have the potential to increase as a result of the proposed temporary road diversion of the Wolgan Rd along the Donkey Steps Trail if the appropriate measures are not implemented and adhered to:

- Clearing of native vegetation
- Removal of dead wood and dead trees
- Invasion of plant communities by perennial exotic grasses
- Infection of native plants by *Phytophthora cinnamomi*.
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales, pathogenic on plants of the family Myrtaceae.
- Anthropogenic climate change

Conclusion

Conclusion:

Based on consideration of the above criteria, the proposal is unlikely to have a significant effect on a local population of the **woodland bird** species listed above (if present) as:

- The removal of only 1.11 ha of low quality predominantly regrowth vegetation and up to twenty-five (25) mature eucalypts is unlikely to detrimentally impact on the availability of foraging resources for these species given the wide availability of highly connected, high

quality woodland available in the locality within various State Forests, National Parks and Nature Reserves.

- The loss of only thirteen (13) habitat trees (hollow-bearing trees, stags and trees containing nests) is unlikely to substantially reduce the availability of nesting sites for these species given the wide availability of habitat available in the locality.
- The proposal is unlikely to further increase existing habitat fragmentation so as to pose a barrier to movement of these species through the study area or locality or to isolate patches of habitat
- There are areas of significantly higher habitat quality within the study area and locality which is highly connected to the subject site and subsequently habitat to be removed by the proposal is unlikely to be important for the persistence of a viable local population of these species

Owls:

Vulnerable species: Barking Owl, *Nixon connivens*; Masked Owl, *Tyto novaehollandiae*; Powerful Owl, *Nixon strenua*; Sooty Owl, *Tyto tenebricosa*

These species have been grouped together based on similar habitat requirements.

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,

The above listed species of owl require open woodland and forest habitats with adjacent patches of clearing in close proximity to riparian vegetation for foraging with large to very large tree hollows for nesting sites.

Recent records occur for these species occur within the locality and they are likely to occur and persist throughout the wider area. As suitable habitat also occurs within the study area, the species may occur on occasion and utilise habitat resources intermittently, including foraging in more open areas near riparian vegetation and occupying appropriate sized hollows for nesting.

There are a number of habitat resources including hollow bearing trees, stags and mature eucalypts that require removal to allow for the construction of the proposal. This will result in a possible reduction in the availability of a small number of potential nesting and foraging habitat for these species. No evidence of nesting was observed during surveys within the study area, and generally hollows in the subject site were not large enough to support the species, however there may be nearby hollows subject to indirect impacts that could support the species

The subject site occurs along a previously cleared trail that has been subject to significant disturbances due to clearing for the installation of telecommunications infrastructure and damaged by the 2019/20 bushfire resulting in a loss of mature trees and habitat at the site, and a dominance of shrubby, immature regrowth along the track, and an incursion of exotic weed species. Subsequently, the subject site is unlikely to provide significant or important habitat for these species, especially given the availability of significantly higher quality habitat in the locality. Furthermore, given construction works will commence outside the key breeding times for these species (Winter and Spring), therefore

it is considered unlikely the proposal would have an adverse effect on the life cycle of these species such that a viable local population of these species would be placed at risk of extinction.

In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

- **iii. 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**
- **iv. 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,**

Not applicable to these threatened species.

In relation to the habitat of a threatened species or ecological community:

- **iv. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
- **v. 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**
- **vi. 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,**

Approximately **1.11 ha** of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. Hollow-bearing trees and mature eucalypts could be utilised by these species for perching and nesting resources. Given the wide availability of high-quality woodland habitat available in the locality, habitat available in the subject site is unlikely to provide important of significant habitat for these species.

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that these highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

There is a large area of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support these species. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth vegetation, and given the large availability of high quality vegetation in the locality. Given the high mobility of these species, and the wide availability of alternant resources in the study are and locality, it is unlikely that the removal of vegetation as a result of the proposal would negatively affect the long-term survival of these species.

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

The site does not support any declared registered areas of outstanding biodiversity.

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following listed Key threatening processes have the potential to occur or increase as a result of the proposal, if appropriate mitigation measures are not implemented:

- Loss of hollow bearing trees
- Clearing of native vegetation
- Removal of dead wood and dead trees
- Invasion of plant communities by perennial exotic grasses
- Infection of native plants by *Phytophthora cinnamomi*.
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales, pathogenic on plants of the family Myrtaceae.
- Anthropogenic climate change

Conclusion

Based on consideration of the above criteria, the proposal is unlikely to have a significant effect on a local population of the Barking Owl, Masked Owl, Powerful Owl and Sooty Owl (if present) as:

- The removal of only 1.11 ha of low quality predominantly regrowth vegetation and up to twenty-five (25) mature eucalypts is unlikely to detrimentally impact on the availability of woodland habitat for these species given the wide availability of highly connected, high quality woodland available in the locality within various State Forests, National Parks and Nature Reserves.
- The loss of only twelve (12) suitable habitat trees (hollow-bearing trees and stags) is unlikely to substantially reduce the availability of nesting and perching sites for these species given the wide availability of habitat available in the locality.
- The proposal is unlikely to further increase existing habitat fragmentation so as to pose a barrier to movement of these species through the study area or locality or to isolate patches of habitat
- There are areas of significantly higher habitat quality within the study area and locality which is highly connected to the subject site and subsequently habitat to be removed by the proposal is unlikely to be important for the persistence of a viable local population of these species

Arboreal Mammals (*hollow dependent species*): - Vulnerable species

Vulnerable species: Eastern Coastal Free-tailed Bat, *Micronomus norfolkensis*; Eastern False Pipistrelle, *Falsistrellus tasmaniensis*; Eastern Pygmy-possum, *Cercartetus nanus*; Greater Broad-nosed Bat, *Scoteanax rueppellii* – Vulnerable; Large-eared Pied Bat, *Chalinolobus dwyeri* –

Vulnerable; Spotted-tailed Quoll, *Dasyurus maculatus*; Squirrel Glider, *Petaurus norfolcensis*; Yellow-bellied Glider, *Petaurus australis*; Yellow-Bellied Sheathtail Bat, *Saccolaimus flaviventris*.

These species have been grouped together based on similar habitat requirements.

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,

The above listed species of mammal require forest and woodland habitat for foraging with tree hollows for nesting sites. Each species has specific requirements as to the location, type and size of these sites.

- **Micro bats (Eastern Coastal Free-tailed Bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, Large-eared Pied Bat, Yellow-Bellied Sheathtail Bat):** These species of microbat are all insectivorous, preferring moist or dry sclerophyll woodland or forest with riparian vegetation nearby. They all require tree hollows to nest and breed.
- **Gliders & Possums (Eastern Pygmy-Possum, Greater Glider, Squirrel Glider, Yellow-Bellied Glider):** This group of arboreal mammals prefer moist to dry sclerophyll woodland/forest, feeding on insects, nectar and pollen and requiring tree hollows to breed.
- **Spotted-Tailed Quoll:** The Spotted Tailed Quoll inhabits a range of environments in NSW including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Den study areas are in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces. Females occupy home ranges of up to 750 ha and males up to 3,500 ha, which are usually traversed along densely vegetated creek lines.

Recent records occur for these species occur within the locality and they are likely to occur and persist throughout the wider area. As suitable habitat also occurs within the study area, the species may occur on occasion and utilise habitat resources intermittently, including foraging in more open areas near riparian vegetation and occupying appropriate sized hollows for nesting.

There are a number of habitat resources including hollow bearing trees and stags that require removal to allow for the construction of the proposal. This will result in a reduction in the availability of possible roosting habitat for these species.

The subject site occurs along a previously cleared trail that has been subject to significant disturbances due to clearing for the installation of telecommunications infrastructure and damaged by the 2019/20 bushfire resulting in a loss of mature trees and habitat at the site, and a dominance of shrubby, immature regrowth along the track, and an incursion of exotic weed species. Subsequently, the **subject site** is unlikely to provide significant or important habitat for these species, especially given the availability of significantly higher quality habitat in the locality. As construction works for this proposal will commence outside the key breeding times for the majority of these species (Winter and Spring), with only a proportionately small number of potential roosting habitats to be affected, therefore, it is considered unlikely the proposal would have an adverse effect on the life cycle of these species such that a viable local population of these species would be placed at risk of extinction.

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,**

Not applicable to these threatened species.

In relation to the habitat of a threatened species or ecological community:

- **vii. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
- **viii. 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**
- **ix. 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,**

Approximately **1.11 ha** of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. Hollow-bearing trees, stags and mature eucalypts could be utilised by these species for foraging and roosting habitat. Given the wide availability of high-quality woodland habitat available in the locality, habitat available in the subject site is unlikely to provide important of significant habitat for these species.

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that these highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

There is a large area of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support these species. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth vegetation, and given the large availability of high quality vegetation in the locality. Given the mobility of these species, and the wide availability of alternant resources connected in the study are and locality, it is unlikely that the removal of vegetation as a result of the proposal would negatively affect the long-term survival of these species.

In addition, direct impacts to the species will be minimized through the implementation of a two-stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works.

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

The site does not support any declared registered areas of outstanding biodiversity.

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following listed Key threatening processes have the potential to occur or increase as a result of the proposal, if appropriate mitigation measures are not implemented:

- Loss of hollow bearing trees
- Clearing of native vegetation
- Removal of dead wood and dead trees
- Invasion of plant communities by perennial exotic grasses
- Infection of native plants by *Phytophthora cinnamomi*.
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales, pathogenic on plants of the family Myrtaceae.
- Anthropogenic climate change

Conclusion

Based on consideration of the above criteria, the proposal is unlikely to have a significant effect on a local population of the Eastern Coastal Free-tailed Bat, Eastern False Pipistrelle, Eastern Pygmy-possum, Greater Broad-nosed Bat, Large-eared Pied Bat, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Glider and Yellow-Bellied Sheathtail Bat, (if present) as:

- The removal of only 1.11 ha of low quality predominantly regrowth vegetation and up to twenty-five (25) mature eucalypts is unlikely to substantially reduce the availability of foraging resources for these species given the availability of high-quality woodland available in the locality within various State Forests, National Parks and Nature Reserves
- The loss of only twelve (12) suitable habitat trees (hollow-bearing trees and stags) is unlikely to substantially reduce the availability of roosting habitat for these species given the wide availability of similar habitat in the locality
- Direct impacts to the species will be minimized through the implementation of a two-stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works.

Arboreal mammals (*foraging only*):

Koala, *Phascolarctos cinereus* – Endangered.

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,

The Koala is an arboreal marsupial which spends most of its time in trees. It has a fragmented distribution throughout eastern Australia. It is limited to areas of preferred feed trees in eucalypt woodlands and forests. The size of their home range varies depending on the quality of habitat. Inhabit

eucalypt woodlands and forests. The Koala feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. They spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.

Local and recent records exist for the Koala, which likely occurs and persists in the study area and broader locality.

The subject site occurs along a previously cleared trail that has been subject to significant disturbances due to clearing for the installation of telecommunications infrastructure and damaged by the 2019/20 bushfire resulting in a loss of mature trees and habitat at the site, and a dominance of shrubby, immature regrowth along the track, and an incursion of exotic weed species. Subsequently, the **subject site** is unlikely to provide significant or important habitat for the Koala, especially given the availability of significantly higher quality habitat in the locality. Therefore, it is considered unlikely the proposal would have an adverse effect on the life cycle of the Koala such that a viable local population of the species would be placed at risk of extinction.

In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

- **vi. 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**
- **vii. 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,**

Not applicable to these threatened species.

In relation to the habitat of a threatened species or ecological community:

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

Approximately **1.11 ha** of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. Mature eucalypts, including hollow-bearing trees containing canopy could be utilised by these species for foraging habitat. Given the wide availability of high-

quality woodland habitat available in the locality, habitat available in the subject site is unlikely to provide important of significant habitat for the Koala.

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that these highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

There are large areas of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support the Koala. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth vegetation. Given the mobility of the species, and the wide availability of alternant resources connected in the study area and locality, it is unlikely that the removal of vegetation as a result of the proposal would negatively affect the long-term survival of these species.

In addition, direct impacts to the species will be minimized through the implementation of a two stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works.

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

The site does not support any declared Areas of Outstanding Biodiversity Value (formerly critical habitat).

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following Key Threatening Processes of relevance to these species have the potential to increase as a result of the proposed temporary road diversion of the Wolgan Rd along the Donkey Steps Trail if the appropriate measures are not implemented and adhered to:

- Clearing of native vegetation
- Removal of dead wood and dead trees
- Invasion of plant communities by perennial exotic grasses
- Infection of native plants by *Phytophthora cinnamomi*.
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales, pathogenic on plants of the family Myrtaceae.
- Anthropogenic climate change

Conclusion

- The removal of only 1.11 ha of low quality predominantly regrowth vegetation and up to twenty-five (25) mature eucalypts is unlikely to substantially reduce the availability of

foraging resources for the Koala given the availability of high-quality woodland available in the locality within various State Forests, National Parks and Nature Reserves

- Direct impacts to the species will be minimized through the implementation of a two-stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works.

Purple-Copper Butterfly, *Paralucia spinifera* – Endangered

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,

The Purple Copper Butterfly tends to be restricted to elevations above 900 m within the central tablelands of NSW approximately bounded by Oberon, Hartley and Bathurst. Occupies open woodland or open forest with a sparse understorey and only occurs where *Bursaria spinosa subsp. lasiophylla*. Its lifecycle relies on a mutualistic relationship with *Bursaria spinosa subsp. lasiophylla* and an ant species. This species has been recorded previously within the broader locality and limited scattered occurrences of preferred host plant species *Bursaria spinosa* was recorded within the study area. No observations of this species were made during surveys however given the local records, presence of host species, and altitude, it is possible this species could utilise resources within the study area.

Although this species has been recorded within the broader locality, the vegetation to be cleared is not likely to be favoured by these species for breeding purposes due to limited suitable habitat with only a few *Bursaria spinosa* host plants scattered throughout the study area, and due to along with ongoing disturbance by recent bushfires, excavation and clearing to install telecommunications services, and human and vehicle traffic. There are many large areas of preferred high-quality habitat located in the broader locality. These areas provide much more suitable habitat for these species to form a population which persists and breeds away from disturbance. There will be direct impacts to vegetation and the host plant species that supports the species, however, given the wide availability of alternate habitat in the study area and locality, and the generally limited impacts of the proposal, the proposed works are unlikely to impact these species such that it places them at further risk of extinction

In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

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

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,

Not applicable to these threatened species.

In relation to the habitat of a threatened species or ecological community:

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

(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

(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,

Approximately **1.11 ha** of native vegetation is to be directly impacted as part of the proposed works consisting of low to moderate quality native vegetation, comprised of predominantly eucalypts, acacias and flowering shrubs, including clearing of minor occurrences of host plant species *Bursaria spinosa*. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal.

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that these species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

There is a large area of preferred habitat immediately in all directions of the study area which contains high quality forest vegetation and provides ample viable habitat for these species to persist away from the proposed impacted area.

Works will be occur along a previously disturbed trail near an existing section of roadway and subsequently contains minimal host flora species as it is dominated by regrowth eucalyptus and acacia species. This habitat is likely to be utilised in a transient and opportunistic way by these species and is unlikely to be utilised for breeding purposes, and given there is a large area of preferred habitat connected to the subject site in all directions of the study area, containing high quality native woodland and forest vegetation suitable to suitable to support these species, it is unlikely that the removal of vegetation as a result of the proposal would negatively affect the long-term survival of these species.

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

The site does not support any declared Areas of Outstanding Biodiversity Value (formerly critical habitat).

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following Key Threatening Processes have the potential to increase as a result of the proposed temporary road diversion of Wolgan Rd via the Donkey Steps Trail if the appropriate measures are not implemented and adhered to:

- Loss of hollow bearing trees

- Clearing of native vegetation
- Removal of dead wood and dead trees
- Invasion of plant communities by perennial exotic grasses
- Infection of native plants by *Phytophthora cinnamomi*.
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales, pathogenic on plants of the family Myrtaceae.
- Anthropogenic climate change

Conclusion

Based on consideration of the above criteria, the proposal is unlikely to have a significant effect on a local population of the Purple-Copper Butterfly (if present) as:

- Dense regrowth habitat present in the subject site does not constitute preferred habitat for the species given that it prefers open, sparse woodland.
- The removal of a small number of isolated potential host species *Bursaria spinosa* is unlikely to substantially reduce the availability of movement or foraging resources for this species given the availability of high quality woodland available in the locality within various State Forests, National Parks and Nature Reserves.

Threatened Flora:

Vulnerable flora: Deane's Boronia, *Boronia deanei* and **Capertee Stringbark, *Eucalyptus cannoni*.**

Endangered flora: Small Pale Grass-Lily, *Caesia parviflora var, minor*

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,

Recent records occur for these species occur within the locality and they are considered likely to occur and persist throughout area. As suitable habitat also occurs within the study area and subject site, the species may also occur within the proposed impact area, and was either undetected due to the rapid nature of surveys or undetectable due to the time that surveys were committed.

The subject site occurs along a previously cleared trail that has been subject to significant disturbances due to clearing for the installation of telecommunications infrastructure and damaged by the 2019/20 bushfire resulting in a loss of mature trees and habitat at the site, and a dominance of shrubby, immature regrowth along the track, and an incursion of exotic weed species. Subsequently, the **subject site** is unlikely to provide significant or important habitat for these species, as previous disturbance and the presence of abundant shrubby regrowth means that these species are unlikely to persist along the track itself (the subject site). Therefore, it is considered unlikely the proposal would have an adverse effect on the life cycle of these species such that a viable local population of these species would be placed at risk of extinction.

In the case of **Capertee Stringbark (*Eucalyptus cannonii*),** if it were to occur along the track (abundant regrowth of stringybark eucalypts, which could not be reliably identified, were recorded), there exists

substantial regrowth immature and remnant mature individuals of Stringybark species within the surrounding area. Therefore any impacts to potential regrowth and a limited number of adult Stringybark species along the track would not significantly impact the species to an extent that any potential population would be placed at further risk of extinction.

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,

Not applicable to these threatened species.

In relation to the habitat of a threatened species or ecological community:

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

(iv) 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

(v) 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,

Approximately **1.11 ha** of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. This includes up to twenty-five (25) mature eucalypts

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along the disturbed existing track, and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality, and that has already occurred due to the construction of the original track. The gap created in vegetation is not substantial and is unlikely to interfere with abiotic functions such as seed dispersal or pollination, and subsequently would oy result in any further fragmentation or isolation of individuals or populations beyond that which already occurs.

There is a large area of higher quality woodland connected to the subject site in all directions of the study area, which contain higher quality, less disturbed habitat with a higher likelihood of supporting the threatened flora species discussed. Vegetation within the study area is unlikely to support these species given that it ihas previously been modified and disturbed and is dominated by juvenile and regrowth vegetation that smothers a variety of other native flora. Subsequently, it is unlikely that the the poposed impacts would negatively affect the long-term survival of these species in the locality.

Additionally, in the case of **Capertee Stringbark (*Eucalyptus cannonii***), as discussed above, if it were to occur along the track, there are substantial immature and mature individuals in the surrounding area and the long-term viability of the community is unlikely to be impacted by the removal of some

juvenile individuals present in the subject site, to an extent that the community would be placed at risk of extinction

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

The site does not support any declared registered areas of outstanding biodiversity.

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following listed Key threatening processes have the potential to occur or increase as a result of the proposal, if appropriate mitigation measures are not implemented:

- Loss of hollow bearing trees
- Clearing of native vegetation
- Removal of dead wood and dead trees
- Invasion of plant communities by perennial exotic grasses
- Infection of native plants by *Phytophthora cinnamomi*.
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales, pathogenic on plants of the family Myrtaceae.
- Anthropogenic climate change

Conclusion

Based on consideration of the above criteria, the proposal is unlikely to have a significant effect on a local population of Deane's Boronia, Capertee Stringbark and Small Pale Grass-Lily (if present) as:

- The removal of 1.11 ha of predominantly regrowth vegetation providing marginal habitat along an existing disturbed track is unlikely to impact on populations of these species that may be present within the locality due to the existing disturbed nature of the subject site and a lack of individuals present during surveys, though targeted sesonal surveys were not undertaken.
- In the case of the Capertee Stringybark, if it were to occur along the track (unable to identify stringybark species present), there are substantial numbers of juvenile and mature stringybarks of this species in the surrounding area, and the persistence of the species in the area is unlikely to be impacted such that the species is placed at further risk of extinction.

Appendix G- EPBC Act Significant Impact Criteria Assessments

The Significant Impact Criteria Assessments will be provided in the final report, however they concluded that a significant impact to these species is unlikely. Consequently, a Referral to the Minister is not warranted.

Significant Impact Criteria Assessments have been provided for threatened biota of concern to provide an indication of the potential level of impact of the proposal based on past records and habitats present. The following assessments have relied on species habitat information and records available via OEH Saving Our Species, DCCEEW SPRAT profiles unless otherwise stated.

The following species listed under the EPBC Act are included in this assessment:

Table 19 - Summary table of threatened species and/or TEC's requiring Significance Criteria Impact Assessments (EPBC Act)

Scientific Name	Common name	EPBC Act	Summary of Assessment of Significance
Amphibians (Frogs)			
Litoria littlejohni	Littlejohn's Tree Frog	V	No significant impact
Mixophyes balbus	Stuttering Frog	V	No significant impact
Cockatoos			
Callocephalon fimbriatum	Gang-gang Cockatoo	E	No significant impact
Calyptorhynchus lathami	Glossy-Black Cockatoo	V	No significant impact
Woodland Birds			
Pycnoptilus floccosus	Pilotbird	V	No significant impact
Anthochaera phrygia	Regent Honeyeater	CE	No significant impact
Insects			
Paralucia spinifera	Bathurst Copper Butterfly	V	No significant impact
Arboreal Mammals (Hollow dependent species)			
Petauroides volans	Greater Glider	E	No significant impact
Chalinolobus dwyeri	Large-eared Pied Bat	V	No significant impact
Dasyurus maculatus	Spotted-tailed Quoll	E	No significant impact
Mammals (Foraging only)			

Scientific Name	Common name	EPBC Act	Summary of Assessment of Significance
Phascolarctos cinereus	Koala	E	No significant impact
Flora			
Boronia deanei	Deane's Boronia	V	No significant impact

The Significant Impact Criteria Assessment concluded that a significant impact to these species is unlikely. Consequently, a Referral to the Minister is not warranted.

Littlejohn's Tree Frog, *Litoria littlejohni* – Vulnerable; Stuttering Frog, *Mixophyes balbus* – Vulnerable.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

Lead to a long-term decrease in the size of an important population of a species,

One (1) record for each of these species exists within the locality and suitable habitat occurs within the study area consisting of four (4) creek-lines being crossed by the proposal. The impact to this suitable habitat will be limited to an area of approximately 6 meters by 6 metres (**36 square metres**) for each creek crossing and will be limited to culvert construction and short-term localised sedimentation.

The implementation of safeguards and management measures as outlined in Section 6 are designed to minimize impacts on biodiversity and aquatic habitats and features, and subsequently aim to protect habitat suitable for these species.

These impacts are unlikely to lead to a long-term decrease in the size of an important population of these species.

Reduce the area of occupancy of an important population,

The habitat to be removed, as discussed above is very minimal in relation to the potential habitat in the broader locality above and below these creek-lines. Impacts of the proposal include the loss and disturbance of 36 square meters of habitat, and the risk of sedimentation and contamination during construction. In addition, the disturbances associated with operation of the proposed roadway may also impact the species, however the formalization of crossings with culverts would likely reduce this.

Given the small impacts of the proposal, and the implementation of safeguards and management measures as outlined in Section 6, it is unlikely that these impacts will reduce the area of occupancy of an important population of these species.

Fragment an existing important population into two or more populations,
The introduction of culverts along with the construction and operation of a roadway through the potential habitat of these species will cause minimal, temporary fragmentation during construction and minor ongoing disturbance during operation of the roadway. This fragmentation of habitat will be limited to 36 square metres across four (4) creek crossings. The installation of culverts during construction would allow for the passage of water, and subsequently the movement of specie through the aquatic system, and subsequently impacts of fragmentation would be temporary and restricted to construction.

Given the minor impacts of the proposal to small areas as discussed, it is unlikely to fragment an existing important population into two or more populations.

Adversely affect habitat critical to the survival of a species,
No areas of habitat deemed 'critical' to the species are mapped as occurring the study area.

Although suitable habitat occurs within the study area, no known records exist within the study area. The impact areas are small relative to the length of the creek-lines, and higher quality habitat exists within protected areas in the locality including the Wolgan River around 400m east and downstream of the impacted creek-lines. The habitat to be removed is considered marginally suitable and very minimal in relation to the potential habitat in the broader locality above and below these creek-lines. The potential impacts are limited to temporary sedimentation during construction, and disturbances associated with the operation of the proposed roadway. It is unlikely that these impacts will adversely affect habitat critical to the survival of these species.

Disrupt the breeding cycle of an important population,
Limited suitable breeding habitat occurs, and no known records exist within the study area. The impact areas are small relative to the length of the creek-lines, and higher quality habitat exists within protected areas in the locality including the Wolgan River around 400m east and downstream of the impacted creek-lines.

Impacts of the proposal would be minimal, localized to a small (36 square metres across four sites) area and short in duration. Subsequently, there are ample available breeding sites for the species outside of the immediate impact area.

Additionally, pre-clearance surveys will investigate any potential breeding sites within the study area prior to impacts occurring. Subsequently, therefore it is unlikely that these impacts will disrupt the breeding cycle of an important population of these species.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

The proposal would result in the temporary disturbance and permanent modification of 36 square metres of potential habitat for these species.

Although suitable habitat occurs within the study area, no known records exist within the study area. Higher quality habitat exists within protected areas in the nearby locality including the Wolgan River around 400m east and downstream of these impacted creek-lines.

The habitat to be removed is considered marginally suitable and very minimal in relation to the potential habitat in the broader locality above and below these creek-lines. The proposal will modify the potential habitat within the study area, however, these impacts are limited to temporary sedimentation during construction, and disturbances associated with the operation of the proposed roadway.

Given the small impacts of the proposal, and the implementation of safeguards and management measures as outlined in Section 6, it is unlikely that these impacts will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that these species is likely to decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,

The existing track present within the subject site has already undergone previous disturbance. Given the small impacts of the proposal, and the implementation of safeguards and management measures as outlined in Section 6, it is unlikely that the proposal would result in invasive species harmful to these frog species establishing within their habitat.

Introduce disease that may cause the species to decline,

No evidence of existing disease (i.e Chytrid fungus) was present within the study area during surveys. Environmental safeguards that form part of the Proposal are aimed at minimising or avoiding the possibility of disease being introduced to the study area are a result of the proposed works. Therefore, the implementation of mitigation measures as outlined in Section 6 would decrease the likelihood of diseases that may Impact the species becoming established as a result of the proposed works.

Interferes substantially with the recovery of the species.

Large tracts of suitable habitat occur within the broader locality within large wilderness and conservation areas. The proposal will result in impacts to only about 36 square metres of potential creekline habitat suitable for the species. Given the small amount of impacts proposed to already disturbed habitat, and the implementation of safeguard and management measures outlined in Section 6, it is therefore determined that the proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that the Stuttering Frog and Littlejohn's Tree Frog will be significantly impacted by the proposed works. However, adherence to Environmental safeguards that form part of this proposal will ensure direct and indirect impacts to these species is avoided or minimised.

Glossy-Black Cockatoo, *Calyptorhynchus lathami* – Vulnerable.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it would:

Lead to a long-term decrease in the size of an important population of a species,

Local and recent records occur for this species, and they are likely to occur and persist in the locality and broader locality, as suitable habitat occurs within the study area, and broader locality

No important populations of this species are known to occur in the locality. There are a number of habitat features including hollow bearing trees, stags and feed trees within the subject site that will be impacted by the proposal. This will result in a reduction in the availability of possible nesting and foraging habitat for this species. Although some habitat would be impacted, the subject site occurs along a previously cleared trail that has been subject to significant disturbances due to clearing for the installation of telecommunications infrastructure and damaged by the 2019/20 bushfire resulting in a loss of mature trees and

habitat at the site, and a dominance of shrubby, immature regrowth along the track, and an incursion of exotic weed species. Subsequently, the **subject site** is unlikely to provide significant or important habitat for this species, especially given the availability of significantly higher quality habitat in the locality.

Given the relatively small areas of vegetation to be removed, with large expanses of contiguous remnant vegetation present within the locality, the proposal is deemed unlikely to affect the life cycle of this species such that a viable important population is likely to be placed at risk of extinction.

Reduce the area of occupancy of an important population,

There is a large area of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support this species. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth vegetation, and given the large availability of high quality vegetation in the locality. Given the high mobility of this species, and the wide availability of alternant resources in the study are and locality, it is unlikely that the removal of only 1.11 ha of predominantly regrowth vegetation will reduce the area of occupancy of the species given the wide extent of habitat available.

Fragment an existing important population into two or more populations,

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that this highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

Adversely affect habitat critical to the survival of a species,

The land to be cleared is predominantly already disturbed, as discussed above. Large expanses of suitable habitat occur within the broader locality. Therefore, given the wide availability of alternant habitat, the proposal is unlikely to adversely affect habitat that is critical to the survival of this species.

Disrupt the breeding cycle of an important population,

Up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. This includes nine (9) hollow-bearing trees which may provide nesting resources for this species.

Direct impacts to breeding habitat will be minimized through the implementation of a two stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works. If this species is identified as breeding within the

subject site at the time of vegetation clearing, the trees will be retained until fledging of juveniles is complete.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

Approximately **1.11 ha** of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. This includes nine (9) hollow-bearing trees. Hollow-bearing trees and mature eucalypts could be utilised by this species for foraging and/or nesting resources.

Given the minor impacts of the proposal in the context of available habitat in the surrounding area, it is unlikely that the subject site provides important habitat for this species, and subsequently, it is deemed unlikely that the proposal is unlikely to modify, destroy, isolate or decrease the availability of quality habitat such that it places this species into further decline.

Result in invasive species that are harmful to vulnerable species becoming established in the vulnerable species' habitat,

The study area was observed to contain moderate levels of weed invasion during surveys. Provided environmental safeguards that form part of this Proposal are strictly adhered to, no further invasive species are expected to become established as a result of the proposed works.

Introduce disease that may cause the species to decline,

No evidence of existing disease was present within the study area during surveys. Environmental safeguards that form part of the Proposal are aimed at minimising or avoiding the possibility of disease being introduced to the study area are a result of the proposed works. Therefore, as long as mitigation measures are strictly adhered to, no diseases are anticipated to become established as a result of the proposed works.

Interferes substantially with the recovery of the species.

Given that impacts to potential breeding habitat are avoided, as discussed above, it is determined that the proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that the Glossy Black Cockatoo will be significantly impacted by the proposed works. However, the potential for breeding habitat to be utilised in the subject site is possible, and it is critical that the Environmental Safeguards that form part of this proposal, including the two-stage clearing process, are adhered to as this will ensure direct and indirect impacts to this species are avoided or minimised.

Gang-gang Cockatoo, *Callocephalon fimbriatum* – Endangered

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

Lead to a long-term decrease in the size of a population

Local and recent records occur for this species, and it is likely to occur and persist in the locality and broader locality, as suitable habitat occurs within the study area, and broader locality

No important populations of this species are known to occur in the locality. There are a number of habitat features including hollow bearing trees, stags and feed trees within the subject site that will be impacted by the proposal. This will result in a reduction in the availability of possible nesting and foraging habitat for this species. Although some habitat would be impacted, the subject site occurs along a previously cleared trail that has been subject to significant disturbances due to clearing for the installation of telecommunications infrastructure and damaged by the 2019/20 bushfire resulting in a loss of mature trees and habitat at the site, and a dominance of shrubby, immature regrowth along the track, and an incursion of exotic weed species. Subsequently, the **subject site** is unlikely to provide significant or important habitat for this species, especially given the availability of significantly higher quality habitat in the locality.

Given the relatively small areas of vegetation to be removed, with large expanses of contiguous remnant vegetation present within the locality, the proposal is deemed unlikely to affect the life cycle of this species such that a viable important population is likely to be placed at risk of extinction.

Reduce the area of occupancy of the species,

There is a large area of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support this species. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth vegetation, and given the large availability of high quality vegetation in the locality. Given the high mobility of this species, and the wide availability of alternant resources in the study are and locality, it is unlikely that the removal of only 1.11 ha of predominantly regrowth vegetation will reduce the area of occupancy of the species given the wide extent of habitat available.

Fragment an existing population into two or more populations,

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that this highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

Adversely affect habitat critical to the survival of a species,

The land to be cleared is predominantly already disturbed, as discussed above. Large expanses of suitable habitat occur within the broader locality. Therefore, given the wide availability of alternant habitat, the proposal is unlikely to adversely affect habitat that is critical to the survival of this species.

Disrupt the breeding cycle of a population,

Up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. This includes nine (9) hollow-bearing trees which may provide nesting resources for this species.

Direct impacts to breeding habitat will be minimized through the implementation of a two stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works. If this species is identified as breeding within the subject site at the time of vegetation clearing, the trees will be retained until fledging of juveniles is complete.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

Approximately **1.11 ha** of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. This includes nine (9) hollow-bearing trees. Hollow-bearing trees and mature eucalypts could be utilised by this species for foraging and/or nesting resources.

Given the minor impacts of the proposal in the context of available habitat in the surrounding area, it is unlikely that the subject site provides important habitat for this species, and subsequently, it is deemed unlikely that the proposal is unlikely to modify, destroy, isolate or decrease the availability of quality habitat such that it places this species into further decline.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat,

The study area was observed to contain moderate levels of weed invasion during surveys. Provided environmental safeguards that form part of this Proposal are strictly adhered to, no further invasive species are expected to become established as a result of the proposed works.

Introduce disease that may cause the species to decline,

No evidence of existing disease was present within the study area during surveys. Environmental safeguards that form part of the Proposal are aimed at minimising or avoiding the possibility of disease being introduced to the study area are a result of the proposed

works. Therefore, as long as mitigation measures are strictly adhered to, no diseases are anticipated to become established as a result of the proposed works.

Interferes substantially with the recovery of the species.

Given that impacts to potential breeding habitat are avoided, as discussed above, it is determined that the proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that the Gang Gang Cockatoo will be significantly impacted by the proposed works. However, the potential for breeding habitat to be utilised in the subject site is possible, and it is critical that the Environmental safeguards that form part of this proposal, including the two-stage clearing process are adhered to as this will ensure direct and indirect impacts to this species are avoided or minimised.

Pilotbird, *Pycnoptilus floccosus* – Vulnerable

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it would:

Lead to a long-term decrease in the size of an important population of a species,

No important population of this species has been recorded within the study area. The woodland birds listed above all have confirmed records within the locality in the last 10 years and are likely to occur utilise habitat resources identified within the study area to survive and reproduce.

Up to **1.11 ha** of native vegetation will be directly impacted as part of works, comprised of predominantly regrowth and disturbed vegetation along the track. This could cause a reduction in the availability of possible nesting and foraging habitat for this species, however no evidence of nesting by any of this species was observed during surveys within the study area, although targeted surveys were not undertaken. Additionally, vegetation in the study are is highly connected to large tracts of contiguous habitat within conservation areas in the broader locality, which provides high quality habitat for this species to persist and breed.

Given the relatively small areas of vegetation to be removed, with tracts of contiguous remnant vegetation present within the locality, the proposal is deemed unlikely to affect the life cycle of this species such that a viable important population is likely to be placed at risk of extinction.

Reduce the area of occupancy of the species,

There are large areas of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support this species. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth

vegetation, and given the large availability of high quality vegetation in the locality. Given the high mobility of this species, and the wide availability of alternant resources in the study are and locality, it is unlikely that the removal of only 1.11 ha of predominantly regrowth vegetation will reduce the area of occupancy of the species given the wide extent of habitat available.

Fragment an existing population into two or more populations,

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that this highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

Adversely affect habitat critical to the survival of a species,

The land to be cleared is predominantly already disturbed, as discussed above. Large expanses of suitable habitat occur within the broader locality. Therefore, given the wide availability of alternant habitat, the proposal is unlikely to adversely affect habitat that is critical to the survival of this species.

Disrupt the breeding cycle of an important population,

Up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. Mature trees and shrubby regrowth have the potential to contain nests of this species. No nests were observed at the time of the surveys.

Direct impacts to breeding habitat will be minimized through the implementation of a two stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works. If this species are identified as breeding within the subject site at the time of vegetation clearing, the trees will be retained until fledging of juveniles is complete.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

Approximately 1.11 ha of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal.

Given the minor impacts of the proposal in the context of available habitat in the surrounding area, it is unlikely that the subject site provides important habitat for this species, and subsequently, it is deemed unlikely that the proposal is unlikely to modify, destroy, isolate or decrease the availability of quality habitat such that it places this species into further decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,

The study area was observed to contain moderate levels of weed invasion during surveys. Provided environmental safeguards that form part of this Proposal are strictly adhered to, no further invasive species are expected to become established as a result of the proposed works.

Introduce disease that may cause the species to decline,

No evidence of existing disease was present within the study area during surveys. Environmental safeguards that form part of the Proposal are aimed at minimising or avoiding the possibility of disease being introduced to the study area are a result of the proposed works. Therefore, as long as mitigation measures are strictly adhered to, no diseases are anticipated to become established as a result of the proposed works.

Interferes substantially with the recovery of the species.

Given that impacts to potential breeding habitat are avoided, as discussed above, it is determined that the proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that the Pilot Bird or Reagent Honeyeater will be significantly impacted by the proposed works. However, the potential for breeding habitat to be utilised in the subject site is possible, and it is critical that the Environmental safeguards that form part of this proposal, including the two-stage clearing process are adhered to as this will ensure direct and indirect impacts to this species are avoided or minimised.

Regent Honeyeater, *Anthochaera Phrygia* – Critically Endangered.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it would:

Lead to a long-term decrease in the size of a population of a species,

No important population of this species has been recorded within the study area. The woodland birds listed above all have confirmed records within the locality in the last 10 years and are likely to occur utilise habitat resources identified within the study area to survive and reproduce.

Up to **1.11 ha** of native vegetation will be directly impacted as part of works, comprised of predominantly regrowth and disturbed vegetation along the track. This could cause a reduction in the availability of possible nesting and foraging habitat for this species, however no evidence of nesting by any of this species was observed during surveys within the study area, although targeted surveys were not undertaken. Additionally, vegetation in the study are is highly connected to large tracts of contiguous habitat within conservation areas in the broader locality, which provides high quality habitat for this species to persist and breed.

Given the relatively small areas of vegetation to be removed, with tracts of contiguous remnant vegetation present within the locality, the proposal is deemed unlikely to affect the life cycle of this species such that a viable important population is likely to be placed at risk of extinction.

Reduce the area of occupancy of the species,

There are large areas of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support this species. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth vegetation, and given the large availability of high quality vegetation in the locality. Given the high mobility of this species, and the wide availability of alternant resources in the study are and locality, it is unlikely that the removal of only 1.11 ha of predominantly regrowth vegetation will reduce the area of occupancy of the species given the wide extent of habitat available.

Fragment an existing population into two or more populations,

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that this highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

Adversely affect habitat critical to the survival of a species,

The land to be cleared is predominantly already disturbed, as discussed above. Large expanses of suitable habitat occur within the broader locality. Therefore, given the wide availability of alternant habitat, the proposal is unlikely to adversely affect habitat that is critical to the survival of this species.

Disrupt the breeding cycle of a population,

While no Key Breeding Areas for the species are identified in the subject site or study area, they occur to the north in the Capertee Valley. It is likely that the species breeding habitat could extend into the locality and study area on occasion.

Up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. Mature trees and shrubby regrowth have the potential to contain nests of this species. No nests were observed at the time of the surveys.

Direct impacts to potential breeding habitat will be minimized through the implementation of pre-clearing surveys and a two-stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

Approximately 1.11 ha of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs along an existing cleared track is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal.

Given the minor impacts of the proposal in the context of available habitat in the surrounding area, it is unlikely that the subject site provides important habitat for this species, and subsequently, it is deemed unlikely that the proposal is unlikely to modify, destroy, isolate or decrease the availability of quality habitat such that it places this species into further decline.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat,

The study area was observed to contain moderate levels of weed invasion during surveys. Provided Environmental Safeguards that form part of this Proposal are strictly adhered to, no further invasive species are expected to become established as a result of the proposed works.

Introduce disease that may cause the species to decline,

No evidence of existing disease was present within the study area during surveys. Environmental safeguards that form part of the Proposal are aimed at minimising or avoiding the possibility of disease being introduced to the study area are a result of the proposed works. Therefore, as long as mitigation measures are strictly adhered to, no diseases are anticipated to become established as a result of the proposed works.

Interferes substantially with the recovery of the species.

While no Key Breeding Areas for the species are identified in the subject site or study area, they occur to the north in the Capertee Valley. It is likely that the species breeding habitat could extend into the locality and study area on occasion.

Given that impacts to potential breeding habitat are avoided, as discussed above, it is determined that the proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that the Regent Honeyeater will be significantly impacted by the proposed works. However, the potential for breeding habitat to be utilised in the subject site is possible, and Environmental Safeguards that form part of this proposal, including preclearing surveys and the two-stage clearing process, are to be adhered to as this will ensure any potential direct and indirect impacts to this species are avoided or minimised.

Bathurst Copper Butterfly/Purple Copper Butterfly, *Paralucia spinifera* – Vulnerable.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it would:

Lead to a long-term decrease in the size of an important population of a species,

No important population of this species has been recorded within the study area.

This species has been recorded previously within the broader locality and limited scattered occurrences of preferred host plant species *Bursaria spinosa* was recorded within the study area. No observations of this species were made during surveys however given the local records, presence of host species, and altitude, it is possible this species could utilise resources within the study area.

Although this species has been recorded within the broader locality, the vegetation to be cleared is not likely to be favored by this species for breeding purposes due to limited suitable habitat with only a few *Bursaria spinosa* host plants scattered throughout the study area, and due to along with ongoing disturbance by recent bushfires, excavation and clearing to install telecommunications services, and human and vehicle traffic. There are many large areas of preferred high-quality habitat located in the broader locality. These areas provide much more suitable habitat for this species to form a population which persists and breeds away from disturbance. There will be direct impacts to vegetation and the host plant species that supports the species, however, given the wide availability of alternate habitat in the study area and locality, and the generally limited impacts of the proposal, the proposed works are unlikely to result in a decrease in an important population of the species.

Reduce the area of occupancy of an important population of the species,

Approximately **1.11 ha** of native vegetation is to be directly impacted as part of the proposed works consisting of low to moderate quality native vegetation, comprised of predominantly eucalypts, acacias and flowering shrubs, including clearing of minor occurrences of host plant species *Bursaria spinosa* along a previously disturbed trail near an existing section of roadway. Large areas of preferred habitat surrounding the study area contain high quality vegetation and provides ample viable habitat for this species to persist away from the proposed impacted area. Subsequently, the proposal would result in only a minor reduction of potential habitat for the species in the context of the large availability of high-quality habitat in the surrounding area.

Fragment an existing population into two or more populations,

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that this species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

Adversely affect habitat critical to the survival of a species,

The land to be cleared is predominantly already disturbed, as discussed above. Large expanses of suitable habitat occur within the broader locality. Therefore, given the wide availability of alternant habitat, the proposal is unlikely to adversely affect habitat that is critical to the survival of this species.

Disrupt the breeding cycle of an important population,

The species relies on the host plant *Bursaria spinosa* for breeding. Breeding occurs throughout Spring. There were limited numbers of this plant recorded in the subject site due to the heavy dominance of regrowth vegetation as a result of previous disturbance. Given works will occur outside key breeding times for this species (Spring), therefore, the proposal is unlikely to disrupt a breeding population of this species such that it puts a viable population of this species at further risk of extinction.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

Approximately 1.11 ha of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. This includes the removal of a small number of *Bursaria spinosa* plants scattered in the subject site.

Given the minor impacts of the proposal in the context of available habitat in the surrounding area, it is unlikely that the subject site provides important habitat for this species, and subsequently, it is deemed unlikely that the proposal is unlikely to modify, destroy, isolate or decrease the availability of quality habitat such that it places this species into further decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,

The study area was observed to contain moderate levels of weed invasion during surveys. Provided environmental safeguards that form part of this Proposal are strictly adhered to, no further invasive species are expected to become established as a result of the proposed works.

Introduce disease that may cause the species to decline,

No evidence of existing disease was present within the study area during surveys. Environmental safeguards that form part of the Proposal are aimed at minimising or avoiding the possibility of disease being introduced to the study area are a result of the proposed works. Therefore, as long as mitigation measures are strictly adhered to, no diseases are anticipated to become established as a result of the proposed works.

Interferes substantially with the recovery of the species.

Given that impacts to potential breeding habitat are avoided, as discussed above, it is determined that the proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that the Purple-Copper Butterfly (if present) will be significantly impacted by the proposed works.

Vulnerable arboreal Mammals (hollow dependent):

Large-eared Pied Bat, *Chalinolobus dwyeri* – Vulnerable

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it would:

Lead to a long-term decrease in the size of an important population of a species,

Local and recent records occur for this species, and it is likely to occur and persist in the locality and broader locality, as suitable habitat occurs within the study area, and broader locality

No important populations of this species are known to occur in the locality. There are a number of habitat features including hollow bearing trees, stags and feed trees within the subject site that will be impacted by the proposal. This will result in a reduction in the availability of possible nesting and foraging habitat for this species. Although some habitat would be impacted, the subject site occurs along a previously cleared trail that has been subject to significant disturbances due to clearing for the installation of telecommunications infrastructure and damaged by the 2019/20 bushfire resulting in a loss of mature trees and habitat at the site, and a dominance of shrubby, immature regrowth along the track, and an incursion of exotic weed species. Subsequently, the **subject site** is unlikely to provide significant or important habitat for this species, especially given the availability of significantly higher quality habitat in the locality.

Given the relatively small areas of vegetation to be removed, with large expanses of contiguous remnant vegetation present within the locality, the proposal is deemed unlikely to affect the life cycle of this species such that a viable important population is likely to be placed at risk of extinction.

Reduce the area of occupancy of the species,

The proposal will result in the removal of **1.11 ha** of predominantly regrowth vegetation, and up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts.

There is a large area of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support this species. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth vegetation, and given the large availability of high quality vegetation in the locality. Given the high mobility of this species, and the wide availability of alternant resources in the study are and locality, it is unlikely that impacts of the proposal will reduce the area of occupancy of the species given the wide extent of habitat available.

Fragment an existing important population into two or more populations,

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that this highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

Adversely affect habitat critical to the survival of a species,

The land to be cleared is predominantly already disturbed, as discussed above. Large expanses of suitable habitat occur within the broader locality. Therefore, given the wide availability of alternant habitat, the proposal is unlikely to adversely affect habitat that is critical to the survival of this species.

Disrupt the breeding cycle of an important population,

Up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. This includes nine (9) hollow-bearing trees which may provide roosting/ denning resources for this species.

Direct impacts to breeding habitat will be minimized through the implementation of a two-stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

Approximately **1.11 ha** of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. This includes nine (9) hollow-bearing trees. Hollow-bearing trees and mature eucalypts could be utilised by this species for foraging and/or nesting resources.

Given the minor impacts of the proposal in the context of available habitat in the surrounding area, it is unlikely that the subject site provides important habitat for this species, and subsequently, it is deemed unlikely that the proposal is unlikely to modify, destroy, isolate or decrease the availability of quality habitat such that it places this species into further decline.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat,

The study area was observed to contain moderate levels of weed invasion during surveys. Provided environmental safeguards that form part of this Proposal are strictly adhered to, no further invasive species are expected to become established as a result of the proposed works.

Introduce disease that may cause the species to decline,

No evidence of existing disease was present within the study area during surveys. Environmental safeguards that form part of the Proposal are aimed at minimising or avoiding the possibility of disease being introduced to the study area are a result of the proposed works. Therefore, as long as mitigation measures are strictly adhered to, no diseases are anticipated to become established as a result of the proposed works.

Interferes substantially with the recovery of the species.

Given that impacts to potential breeding habitat are avoided, as discussed above, it is determined that the proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that the Large-eared Pied Bat will be significantly impacted by the proposed works. However, the potential for breeding habitat to be utilised in the subject site is possible, and Environmental Safeguards that form part of this proposal, including pre-clearing surveys and the two-stage clearing process are to be adhered to ensure potential direct and indirect impacts to this species are avoided or minimised.

Endangered arboreal mammals (hollow dependent):

Greater Glider, *Ptetauroides Volans* – Endangered; Spotted-tailed Quoll, *Dasyurus maculatus* – Endangered.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it would:

Lead to a long-term decrease in the size of a population of a species,

Local and recent records occur for these species, and they are likely to occur and persist in the locality and broader locality, as suitable habitat occurs within the study area, and broader locality

No important populations of these species are known to occur in the locality. There are a number of habitat features including hollow bearing trees, stags and feed trees within the subject site that will be impacted by the proposal. This will result in a reduction in the availability of possible nesting and foraging habitat for these species. Although some habitat would be impacted, the subject site occurs along a previously cleared trail that has been subject to significant disturbances due to clearing for the installation of telecommunications infrastructure and damaged by the 2019/20 bushfire resulting in a loss of mature trees and habitat at the site, and a dominance of shrubby, immature regrowth along the track, and an

incursion of exotic weed species. Subsequently, the **subject site** is unlikely to provide significant or important habitat for these species, especially given the availability of significantly higher quality habitat in the locality.

Given the relatively small areas of vegetation to be removed, with large expanses of contiguous remnant vegetation present within the locality, the proposal is deemed unlikely to affect the life cycle of this species such that a viable important population is likely to be placed at risk of extinction.

Reduce the area of occupancy of the species,

The proposal will result in the removal of **1.11 ha** of predominantly regrowth vegetation, and up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts.

There is a large area of preferred habitat connected to the subject site in all directions of the study area, which contain high quality native woodland and forest vegetation suitable to suitable to support these species. Vegetation within the study area is unlikely to be important to the species given that it is comprised of disturbed and predominantly juvenile and regrowth vegetation, and given the large availability of high quality vegetation in the locality. Given the high mobility of these species, and the wide availability of alternant resources in the study are and locality, it is unlikely that impacts of the proposal will reduce the area of occupancy of the species given the wide extent of habitat available.

Fragment an existing population into two or more populations,

Given the limited direct impacts of the proposal, which is restricted to the clearing of predominantly juvenile vegetation along an existing track and the creation of a gap of a maximum of 6m wide, the proposal would not result in any additional fragmentation of habitat beyond what already occurs throughout the locality. The proposal would not create any gaps in habitat that these highly mobile species cannot traverse, and would not result in any isolation or fragmentation of species habitat.

Adversely affect habitat critical to the survival of a species,

The land to be cleared is predominantly already disturbed, as discussed above. Large expanses of suitable habitat occur within the broader locality. Therefore, given the wide availability of alternant habitat, the proposal is unlikely to adversely affect habitat that is critical to the survival of this species.

Disrupt the breeding cycle of a population,

Up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. This includes nine (9) hollow-bearing trees which may provide roosting/ denning resources for these species.

Direct impacts to breeding habitat will be minimized through the implementation of a two stage clearing process (outlined in Section 6) to minimize the likelihood of fauna injury and death during vegetation clearing works. Any potential habitat trees with the potential to support these species must undergo the two-stage clearing process to reduce potential impacts to the species.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

Approximately **1.11 ha** of predominantly immature native regrowth vegetation comprised of eucalypts, acacias and flowering shrubs is to be directly impacted as part of the proposed works. In addition to regrowth vegetation up to thirteen (13) hollow-bearing trees, nest trees and stags (habitat trees) and twenty-five (25) mature eucalypts were recorded within or immediately adjacent to the subject site and would require removal. This includes nine (9) hollow-bearing trees. Hollow-bearing trees and mature eucalypts could be utilised by these species for foraging and/or nesting resources.

Given the minor impacts of the proposal in the context of available habitat in the surrounding area, it is unlikely that the subject site provides important habitat for these species, and subsequently, it is deemed unlikely that the proposal is unlikely to modify, destroy, isolate or decrease the availability of quality habitat such that it places this species into further decline.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat,

The study area was observed to contain moderate levels of weed invasion during surveys. Provided environmental safeguards that form part of this Proposal are strictly adhered to, no further invasive species are expected to become established as a result of the proposed works.

Introduce disease that may cause the species to decline,

No evidence of existing disease was present within the study area during surveys. Environmental safeguards that form part of the Proposal are aimed at minimising or avoiding the possibility of disease being introduced to the study area are a result of the proposed works. Therefore, as long as mitigation measures are strictly adhered to, no diseases are anticipated to become established as a result of the proposed works.

Interferes substantially with the recovery of the species.

Given that impacts to potential breeding habitat are avoided, as discussed above, it is determined that the proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that the Greater Glider or Spotted-tailed Quoll will be significantly impacted by the proposed works. However, the potential for breeding habitat to be utilised in the subject site is possible, and Environmental Safeguards that form part of this

proposal, including pre-clearing surveys and the two-stage clearing process, are to be adhered to in order to ensure potential direct and indirect impacts to these species are avoided or minimised.

Arboreal Mammal (foraging):

Koala, *Phascolarctos cinereus* - Endangered.

An action is likely to have a significant impact on an endangered or critically endangered species if there is a real chance or possibility that it would:

Lead to a long-term decrease in the size of a population of a species,

Four (4) records for this species occur within a 10km radius of the study area, with no records occurring within the study area or immediate surrounds. This species was not recorded during surveys, however targeted surveys were not undertaken. Forest within the study area and surrounding area had been recently burnt within the 2019/2020 bushfires, with associated die back of canopy species throughout a large proportion of the study area. Koala have the potential to utilise habitat resources within the study area opportunistically for foraging resources at some point within their lifecycle. Approximately 1.30 ha of largely regenerating sapling eucalypt and acacia species will be removed, with a small number of larger individual trees as a result of the proposed works. Large areas of remnant forest abut the study area with connectivity to National Parks and State Forests within the immediate locality.

Given the relatively small areas of vegetation to be removed consisting primarily of regenerating saplings, shrubs and groundcovers, with tracts of contiguous remnant vegetation present within the locality, the proposal is deemed unlikely to lead to a long-term decrease of an important population within the locality.

Reduce the area of occupancy of the species,

Although up to **1.11 ha** of native vegetation will be directly impacted as part of works, this vegetation is predominantly regrowth within the footprint of a previously formed trail and thus is likely only utilised transiently by Koala. The vegetation to be cleared is well connected with large tracts of contiguous favored habitat within conservation areas in the broader locality, which provides additional suitable habitat for this species to persist and breed away from human disturbance. Thus, it is deemed the Proposal is unlikely to reduce the area of occupancy of this species to a significant extent.

Fragment an existing population into two or more populations,

The Proposal will result in a narrow linear clearing footprint approximately 6m in width across an expanse of largely existing trail. Vegetation on both sides of the study are connects to larger patches of native vegetation. It is likely that Koala utilising the study area would form part of a population occupying a broader area of the locality, and can traverse existing barriers such as the adjacent Wolgan Road. The Proposal is therefore deemed unlikely to fragment an existing population of Koala into two or more populations.

Adversely affect habitat critical to the survival of a species,

1.11 ha of predominately regrowth acacia, eucalyptus and shrubs will be removed with only a small number of larger potential feed trees to be impacted. No Koala records occur within the study area, and large tracts of suitable habitat are present within the surrounding landscape in adjacent conservation areas which would provide important habitat for this species within the locality. Therefore, the Proposal is unlikely to adversely affect habitat that is critical to the survival of this species.

Disrupt the breeding cycle of a population,

Koalas bred between July to January, with works to be undertake during this time. Construction works will be localised to a narrow strip (subject site) within a larger remnant patch of native forest. Koalas utilising the study area for breeding can easily move away from disturbance if present during construction. It is therefore determined that the proposal is unlikely to disrupt the breeding cycle of this population to an extent where it impacts detrimentally on a local population.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

Approximately **1.11 ha** of predominately regrowth native vegetation will occur, with the removal of a small number of mature trees along a narrow linear subject site of 6m wide. The impact to this vegetation is unlikely to impact the foraging/feeding ability/success of the Koala persisting within the broader locality, as this species is highly mobile and large tracts of suitable remnant habitat occurs within the broader locality. Therefore, it is deemed unlikely that the Proposal will modify, destroy, isolate or decrease the availability of quality habitat such that it places this species into further decline.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat,

The study area was observed to contain moderate to low levels of weed invasion within areas affected by previous clearing and recent fire events during surveys. Movement or introduction of these weeds may occur through ground disturbance and machinery movement within the study area during construction, and through vehicle movement during the operational phase of the Proposal. Provided environmental safeguards that form part of this Proposal are strictly adhered to, no further invasive species are expected to become established as a result of the proposed works beyond existing levels.

Introduce disease that may cause the species to decline,

No evidence of existing disease was present within the study area during surveys. Environmental safeguards that form part of the Proposal are aimed at minimising or avoiding the possibility of disease being introduced to the study area are a result of the proposed works. Therefore, as long as mitigation measures are strictly adhered to, no diseases are anticipated to become established as a result of the proposed works.

Interferes substantially with the recovery of the species.

Large tracts of suitable habitat occur within the broader locality within large wilderness and conservation areas. The Proposal will result in the removal of 1.11 ha of predominately regenerating vegetation along a previously cleared track. It is therefore determined that the proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that Koala will be significantly impacted by the proposed works. However, adherence to Environmental Safeguards that form part of this proposal will ensure potential direct and indirect impacts to this species is avoided or minimised.

Flora:

Deane's Boronia, *Boronia deanei* - Vulnerable.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it would:

Lead to a long-term decrease in the size of an important population of a species,

No important population of this species has been recorded within the study area. One (1) record of this species occur within 10km of the study area, approximately 6 km to the south east of the study area on the Newnes Plateau.

The proposal will see the removal of up to **1.11 ha** of native vegetation containing small areas of potentially suitable habitat for this species with damp heathy areas and along creek lines. However, this species was not observed to be occurring within the subject site during surveys, though targeted surveys were not undertaken. Given the relatively small areas of vegetation to be removed, with tracts of contiguous remnant vegetation present within the locality, the proposal is deemed unlikely to lead to a long-term decrease in the size of an important population of this species within the area.

Reduce the area of occupancy of an important population,

One (1) record for this species occurs within a 10km radius of the study area. The proposal will impact on approximately **1.11 ha** of previously cleared regenerating forest, containing areas of potential suitable habitat for this species within damp areas and creeklines. Large areas of potentially suitable habitat for this species occur within the surrounding area. Given the relatively small area of potentially suitable habitat to be impacted as a result of this proposal, and the availability suitable habitat within the immediate vincinty including National park located in broader locality, it is deemed the Proposal is unlikely to reduce the area of occupancy of this species to a significant extent.

Fragment an existing important population into two or more populations,

One (1) record for this species occurs within a 10km radius of the study area. The proposal will impact on approximately **1.11 ha** of previously cleared regenerating forest along a narrow linear subject site, containing areas of potential suitable habitat for this species within damp areas and creeklines. Pollinators and seed dispersal of this species are unlikely to be impacted by this small level of localised fragmentation (6m wide maximum extent). The Proposal is therefore deemed unlikely to fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species,

The Proposal occurs within a forest area adjacent Wolgan Road. No previous records for this species occur within the study area or immediate vicinity. Large tracts of suitable habitat for this species occur within the broader locality within nearby National Park areas and State Forest reserves where local records are located. Therefore, the Proposal is unlikely to adversely affect habitat that is critical to the survival of this species.

Disrupt the breeding cycle of an important population,

No records for this species occur within the study area, with only small areas of potentially suitable habitat to be impacted be the proposal. Works are to commence in late November/early December, at the end of the main flowering time for this species (Sept – Nov). Movement of pollinators will not be disrupted within the study area due to construction works. It is therefore determined that the proposal is unlikely to disrupt the breeding cycle of this population.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,

Approximately **1.11 ha** of native vegetation containing small areas of potentially suitable habitat for this species occurs within the subject site, with large areas of potentially suitable contiguous habitat within the study area and surrounding locality, including multiple protected and wilderness areas. Impacts to surrounding vegetation outside the immediate impact footprint are likely to be limited to indirect impacts including dust and noise during construction. Linear (6m wide) impacts are unlikely to fragment the available habitat such that it leads to a decline in the species. Therefore, it is deemed unlikely that the Proposal will modify, destroy, isolate or decrease the availability of quality habitat such that it places this species into further decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,

The study area was observed to contain moderate to low levels of weed invasion within areas affected by previous clearing and recent fire events during surveys. Movement or introduction of these weeds may occur through ground disturbance and machinery movement within the study area during construction, and through vehicle movement during the operational phase of the Proposal. Provided environmental safeguards that form part of this Proposal are strictly adhered to, no further invasive species are expected to become established as a result of the proposed works beyond existing levels.

Interfere substantially with the recovery of the species,

No impacts to known populations of this species will occur as part of the Proposal. No records for this species occur within the study area, and no individuals were recorded as occurring within the subject site during surveys, however targeted surveys were not undertaken. One (1) record exist for this species within the broader locality, within Newnes State Forest. Large tracts of potentially suitable habitat occur within the broader locality. It is therefore determined that the Proposal is unlikely to substantially interfere with the recovery of this species.

Conclusion

Given the above, it is deemed unlikely that Deane's Boronia will be significantly impacted by the proposed works. In addition, Environmental Safeguards that form part of this proposal will ensure any potential direct and indirect impacts to this species are avoided or minimised.

Appendix H - BOM Daily Weather Observation

Marrangaroo, New South Wales
November 2022 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Tu	8.5	13.5	29.8			NNW	57	00:33	8.7	79		WNW	13		10.7	69		WNW	11	
2	We	0.8	10.4	13.0			WNW	52	11:20	4.2	83		WNW	15		9.0	53		W	20	
3	Th	3.0	14.7	0.2			SSW	31	08:42	7.1	77		WSW	11		13.2	53		SW	15	
4	Fr	5.6	14.2	0			ENE	22	08:17	10.8	73		NE	6		12.5	67		ENE	6	
5	Sa	4.6	18.2	0			ENE	26	09:07	13.3	63		NNE	9		16.7	58		ENE	9	
6	Su	4.4	18.9	2.6			NE	19	18:20	13.0	75		WSW	2		17.0	54		NNW	2	
7	Mo	5.2	19.7	0			E	26	15:59	13.4	88		NE	2		18.7	44		E	11	
8	Tu	6.3	20.3	1.8			SW	28	13:32	14.4	64		E	7		18.7	47		ESE	9	
9	We	3.1	19.7	0			E	24	16:40	14.5	62		E	6		17.5	44		SE	11	
10	Th	5.9	20.8	0			N	20	17:15	13.6	57		NE	4		19.1	46		N	6	
11	Fr	4.8	19.3	0			NNW	24	10:16	16.8	56		NW	6		14.5	83		NW	6	
12	Sa	6.0	24.4	0.6			NE	20	16:12	18.7	69		NW	4		17.8	73		ENE	7	
13	Su	10.4	21.0	6.2			NNW	44	17:05	16.2	84		NNW	6		20.1	75		NNW	19	
14	Mo	11.9	19.2	70.6			WNW	52	16:49	14.5	64		W	17		16.5	54		WNW	19	
15	Tu	8.1	17.9	0			W	33	15:13	13.5	68		WSW	9		15.9	50		WSW	13	
16	We	4.1	11.0	0			SW	46	12:04	7.6	61		SW	15		7.5	73		SW	17	
17	Th	-0.6	17.0	0			SW	19	12:41	9.9	64		S	7		14.2	40		SSE	4	
18	Fr	3.1	18.9	0			NNE	20	17:01	11.0	65		SE	6		17.6	38		SSW	9	
19	Sa	5.5	23.0	0			NNW	28	10:49	14.1	69		NNW	4		21.1	40		NNW	13	
20	Su	12.8	17.2	8.0			W	52	08:33	15.8	58		W	19		15.1	50		W	19	
21	Mo	9.2	14.3	0			WSW	48	16:37	10.9	67		W	15		11.0	69		WSW	20	
22	Tu	3.6	14.3	2.2			W	44	00:45	6.0	66		W	17		12.5	50		W	17	
23	We	5.6	19.0	0			NW	39	12:23	11.4	65		SW	17		17.8	49		W	13	
24	Th	3.5		0						13.3	66		SW	7							
Statistics for the first 24 days of November 2022																					
Mean		5.6	17.7							12.2	68			9		15.4	55			12	
Lowest		-0.6	10.4							4.2	56		#	2		7.5	38		NNW	2	
Highest		12.8	24.4	70.6			NNW	57		18.7	88		W	19		21.1	83		#	20	
Total				135.0																	

Observations were drawn from Marrangaroo (Defence) {station 063308}

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