LODGE
ENVIRONMENTAL

Date: 24 January 2020
Project Code: LE1113

FLORA AND FAUNA ASSESSMENT

6 FLINDERS ROAD
SOUTH NOWRA
PREPARED FOR
SHOALHAVEN WATER

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Project Name:

6 Flinders Road, South Nowra – Flora and Fauna Assessment

Project Code:

LE1113

Document Tracking:

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Record of Distribution

Copies	Report No. & File Name	Status	Effective	Prepared for:
1 x PDF	LE1113 6 Flinders Rd, South Nowra FFA v1.docx	Rev.1	24 January 2020	Shoalhaven Water

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Glossary of Terms

Abbreviation	Description
APZ	Asset Protection Zone
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BC Reg	*Biodiversity Conservation Regulation 2017*
BOS	Biodiversity Offset Scheme
DA	Development Application
DCP	Development Control Plan
DotEE	Commonwealth Department of the Environment and Energy
DPIE	Department of Planning, Industry and Environment
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EEC	Endangered Ecological Community
EP&A Act	*NSW Environmental Planning and Assessment Act 1979*
EPBC Act	*Commonwealth Environment Protection and Biodiversity Conservation Act 1999*
FM Act	*Fisheries Management Act 1994*
KFH	Key Fish Habitat
LEP	Local Environment Plan
LGA	Local Government Area
LLS	Local Land Service
MNES	Matter of National Environmental Significance
NP&W Act	*National Parks and Wildlife Act* 1974
NV Act	*Native Vegetation Act 2003*
PCT	Plant Community Type
POEO Act	*Protection of the Environment Operations Act 1997*
REF	Review of Environmental Factors
RF Act	*Rural Fires Act 1997*
RFS	Rural Fire Services
SEE	Statement of Environmental Effects
SEPP	State Environmental Planning Policy
VMP	Vegetation Management Plan
WM Act	*Water Management Act 2000*

EXECUTIVE SUMMARY

Lodge Environmental Pty Ltd was engaged by Emap Consulting, on behalf of Shoalhaven Water, to prepare this Flora and Fauna Assessment Report (FFA) to support a DA for the construction of a depot building to include workshop and office facilities at 6 Flinders Rd, South Nowra Lot 72/-/DP1032397. The proposal would be submitted under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). This report assesses the potential impacts to threatened ecological values listed under the Biodiversity Conservation Act 2016 (BC Act) and the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Field survey identified a range of ecological values in the Subject Site including; exotic grasslands, native plantings and remnant trees associated with a threatened ecological community. These ecological values presented some habitat features that are considered to form potential habitat for listed threatened fauna species. No threatened flora or fauna, under the BC Act or the EPBC Act, were recorded within the Subject Site.

A range of mitigation measures relating to vegetation removal, ongoing management, augmentation of habitat and sedimentation and erosion control have been recommended to allow for an ecologically sensitive approach to the proposal.

A number of Tests of Significance consistent with section 7.3 of the BC Act were applied with respect to listed species which could utilise the sites habitat features. The Tests of Significance concluded that the proposal is unlikely to constitute a significant impact on any of these species or ecological communities. The EPBC Act Significant Impact Criteria was not applied as the proposal is not expected to affect any MNES.

There will be no impact on areas of mapped Biodiversity Value, nor will there be an impact on native vegetation above the relevant impact threshold.

The preparation and submission of a BDAR, or referral to the Commonwealth, is not required.

The findings as part of this assessment support the construction of a depot building to include workshop and office facilities at 6 Flinders Rd, South Nowra Lot 72/-/DP1032397, subject to the implementation of the recommendations contained within this report.

1.0 INTRODUCTION

Lodge Environmental were commissioned by Emap Consulting, on behalf of Shoalhaven Water, to prepare this Flora and Fauna Assessment Report (FFA) to support a DA for the construction of a depot building to include workshop and office facilities at 6 Flinders Rd, South Nowra Lot 72/-/DP1032397.

This report describes the native vegetation, threatened species, populations and communities and associated habitat features which were recorded within the property address in the context of an impact assessment. This report is based on information obtained through data searches and field survey. The legislative context, methods used, and recommendations are included within this report.

1.1 PROJECT DESCRIPTION

This report will assist in informing a Development Application (DA) associated with the construction of a depot building to include workshop and office facilities summarised in **Table 1** and depicted in **Figure 1** and **Figure 2**.

Table 1: Proposal details summary

Address:	6 Flinders Rd, South Nowra
Lot/Section/Plan No:	Lot 72/-/DP1032397
Council:	Shoalhaven City Council
Land Zoning:	IN1: General Industrial
Proposed development (Proposal):	Depot building to include workshop and office facilities with associated APZ (**Figure 3**)
Lot Size:	3.4 ha
Minimum Lot Size:	N/A
Relevant BOS native vegetation impact threshold	0.5 ha
Subject Site:	The Subject Site is herein defined as the area that would be directly affected as a result of the proposal
Study Area:	The Study Area is herein defined as the existing Lot 72/-/DP1032397

1.2 SITE DESCRIPTION

The Study Area is 3.2 km south west of the Nowra City Centre. Access is obtained from Flinders Road. The land is predominantly cleared and dominated by exotic grasses. Native plantings line

the southern and western borders of the Study Area with the remaining remnant native vegetation consisting of only scattered trees.

1.3 OBJECTIVES

This report presents an assessment of possible impacts associated with the proposal at the Study Area and is based on a field investigation, a literature review of previous studies undertaken in the region, the consultation of relevant databases and a consideration of the objectives of Section 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), the State *Biodiversity Conservation Act 2016* (BC Act), the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and any relevant State Environmental Planning Policies (SEPP).

The environmental impacts of the development have been assessed via the Test of Significance pursuant to Part 7 of the BC Act and Part 7 of the *Biodiversity Conservation Regulation 2017*, the Matters of National Environmental Significance (MNES) under the EPBC Act, and the relevant clauses within the Shoalhaven Local Environment Plan (LEP 2014) and Shoalhaven Development Control Plan (DCP 2014). The direct and indirect ongoing impacts of the development are addressed in this FFA.

Figure 1 Locality of Study area (Emap Consulting 2019)

Figure 2 Existing Site Plan (Emap Consulting 2019)

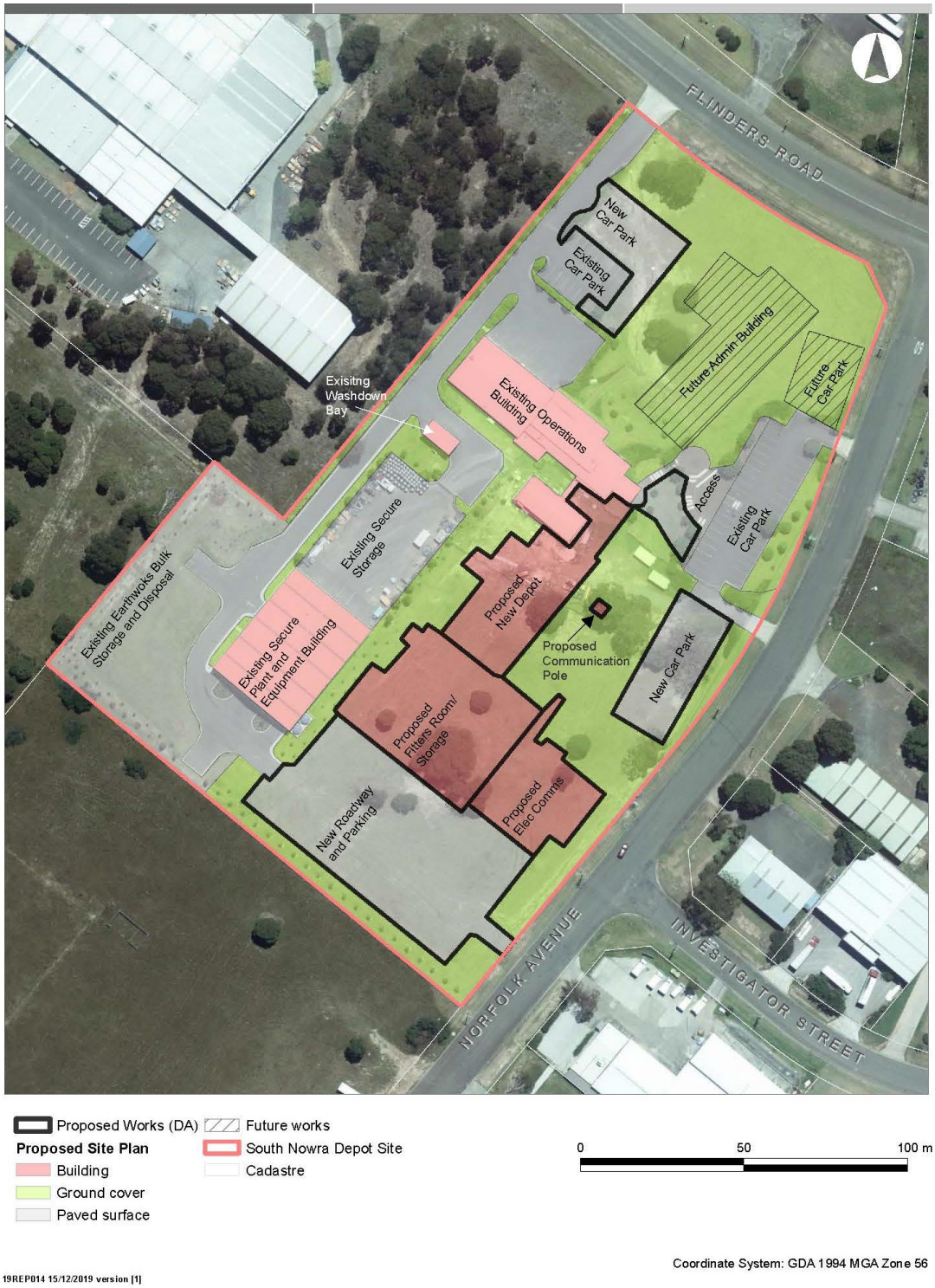

Figure 3 Proposed Site Plan (Emap Consulting 2019)

2.0 LEGISLATIVE CONTEXT

2.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The NSW EP&A Act is the principal planning legislation for the state, providing a framework for the overall environmental planning, and development assessment process. Various legislative instruments, such as the BC Act, NSW *Water Management Act 2000* (WM Act) and NSW *Rural Fires Act 2007* (RF Act) are integrated with the EP&A Act and have been reviewed below where relevant.

2.2 BIODIVERSITY CONSERVATION ACT 2016

The NSW BC Act aims to slow the decline of threatened species, populations and communities listed under the Act. The BC Act is integrated with the EP&A Act and requires consideration of whether a development (Part 4 of the EP&A Act) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

The schedules of the BC Act lists species, populations and communities as endangered or vulnerable. All developments, land use changes or activities need to be assessed to determine if they will have an unacceptable impact on species, populations or communities listed on these schedules.

The potential impact of the development on any threatened species, populations or communities is assessed through application of an Test of Significance (AoS) under Section 7.3 of the BC Act at the development application stage. If the impacts on the area are found to be 'significant', a Biodiversity Development Assessment Report (BDAR) would be required as would concurrence from the Chief Executive of the NSW Office of Environment & Heritage (DPIE) including application of the Biodiversity Assessment Methodology (BAM) and entering into the Biodiversity Offset Scheme (BOS). A BDAR would also be deemed necessary if the proposed subdivision were to involve clearance of vegetation mapped on the State Biodiversity Values Map (BVM), or involve native vegetation clearance above the thresholds tables within the BC Act (**Table 2**).

Table 2: Offset scheme thresholds - area criteria

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme applies
Less than 1 ha	0.25 ha or more
1 ha, and less than 40 ha	0.5 ha or more
40 ha, and less than 1,000 ha	1 ha or more
1,000 ha or greater	2 ha or more

2.3 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The Commonwealth EPBC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. Under this Act an action will require approval from the Minister for the Environment if the action has, will have, or is likely to have, a significant impact on a MNES. MNES include listed threatened species and ecological communities, migratory species and wetlands of international importance protected under international agreements. Where applicable, the assessment criteria relevant to this Act must be drawn upon to determine whether there would be a significant impact on these species and hence whether referral to the Federal Environmental Minister is required.

2.4 LOCAL PLANNING INSTRUMENTS

2.4.1 Shoalhaven Local Environment Plan 2014

The Shoalhaven Local Environment Plan 2014 (LEP) is the principle planning instrument for the SCC LGA. The LEP sets out the planning framework and establishes the requirements for the use and development of land in the LGA. The LEP provides broad direction with regard to what types of development are permitted within specific land use zones.

2.4.2 Shoalhaven Development Control Plan 2014

The Shoalhaven Development Control Plan 2014 (DCP) aims to make detailed local provisions for all land within the LGA. Specifically, the DCP provides detailed construction, building and environmental controls for the types permitted land use described in the LEP. Environmental controls address issues such as biodiversity, bushfire prone land, trees and vegetation.

3.0 METHODS

3.1 DATA AND LITERATURE REVIEW

Data records and relevant literature pertaining to the ecology of the Study Area and surrounding areas were reviewed. The material reviewed included:

- NSW BioNet, Atlas of NSW Wildlife database search (10 km) (Accessed 15 December 2019)
- DPIE threatened species profile database (DPIE 2019)
- EPBC Act Protected Matter Search Tool (10 km) (Accessed 15 December 2019) (DotEE 2019a)
- Review of the State Biodiversity Values Map (Accessed 15 December 2019)
- Biometric Vegetation Type Mapping (DPIE 2016)
- NSW Government Property Report (Accessed 15 December 2019)
- relevant legislative documents
- aerial photography

A review of the databases allowed for the production of a list of threatened species and communities that may occur within the Study Area (**Appendix A**). Likelihood of occurrences for threatened species, endangered populations and communities in the Study Area were made based on location of database records, the likely presence or absence of suitable habitat on the site, and knowledge of the species' ecology. The likelihood of occurrence was stratified using a rating of "known", "high", "moderate" or "low" likelihood. Those species considered to have a considerable likelihood of occurrence (following site validation) were then identified as either potentially "affected" by the proposal or not, with those potentially affected therefore requiring a significance assessment.

3.2 FIELD SURVEY

To address the FFA the following survey methods were undertaken on the 18th December 2019 by ecologists Jack Talbert and Samuel Laming:

- Identification of aboveground vascular plant species and vegetation communities present within the site. Where boundaries differed from those mapped (DPIE 2013) they were modified using spatial apps during the site assessment
- search for signs of threatened species, observe and record significant flora and fauna – threatened and migratory species, other incidental fauna observations
- observe and record current disturbance and threats (e.g. weeds, trampling, litter)
- identifying potential habitat for threatened fauna species/populations (e.g. hollow-bearing trees (HBTs), creeks, boulders etc)
- recording presence of environmental weeds

- taking reference photographs of the entire site
- Final on-site vegetation community assessment was based on analysis of site location, aspect, condition and validated against DPIE Bionet Vegetation Classification (https://www.environment.nsw.gov.au/NSWVCA20PRapp/search/pctsearch.aspx).

3.3 SURVEY WEATHER

The weather during the field surveys is summarised in **Table 3**. Observations were drawn from Nowra RAN Air Station AWS {station 068072}.

Table 3 Weather conditions during field survey

Survey Date	Temperature	Dominant Wind (km/h)	Rainfall	Humidity	Cloud Cover
18/12/2019	12.8 – 34.9	33 E	0	49	0

3.4 SURVEY LIMITATIONS

Survey at any single point of time may be outside of the optimal survey period for some flora and fauna species. It is therefore possible that some species may not have been detected due to their seasonal geographic variation. Cryptic species may not have been obvious. However, habitat assessments were conducted to further predict the likelihood of species occurrence at the site. A conservative approach was applied in the assumption of the presence of species that could potentially occur within the site area. In this regard, the survey is considered adequate for the purposes of this report. Unless otherwise specified, targeted survey was conducted as part of the field survey.

4.0 DESKTOP REVIEW

4.1 BIODIVERSITY VALUES MAPPING

A review of the State Biodiversity Values Map was conducted on the 15th December 2019. There are no mapped biodiversity values (BV) within the Study Area.

4.2 PLANT COMMUNITY TYPE MAPPING

A review of vegetation mapping that covers the Study Area (DPIE 2013) identified two vegetation communities within the Study area (**Figure 3**);

- **SR592** *Red Bloodwood - Blackbutt - Spotted Gum shrubby open forest on coastal foothills, southern Sydney Basin*
- **SR642** *Spotted Gum - Grey Ironbark – Woollybutt grassy open forest on coastal flats, southern Sydney Basin and South East Corner*

Figure 4 Mapped Vegetation Communities by DPIE 2013 (Emap Consulting 2019)

4.3 THREATENED SPECIES

A review of the DPIE and Department of the Environment and Energy (DEE) databases identified threatened flora and fauna listed under the BC Act and/or the EPBC Act that have been previously

recorded, or are considered to have habitat, within 10 km of the Study Area (**Figure 5**). This initial compilation of potentially occurring species informed the site survey, providing an indication of which species required most consideration within the Study Area. An assessment of the likelihood of occurrence of threatened flora and fauna species within the Subject Site is available in **Appendix A** and was used to guide the field survey methodology.

4.3.1 Flora

The following threatened flora species were identified as having a moderate to high potential prior to field survey:

- *Acacia pubescens* (Downy Wattle)
- *Triplarina nowraensis* (Nowra Heath Myrtle)

4.3.2 Fauna

The following fauna were identified as having a medium to high potential prior to the field survey.

- Regent Honeyeater (*Anthochaera phrygia*)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
- Gang-gang Cockatoo (*Callocephalon fimbriatum*)
- Glossy Black Cockatoo (*Calyptorhynchus lathami*)
- Large-eared Pied Bat (*Chalinobolus dwyeri*)
- Varied Sittella (*Daphoenositta chrysoptera*)
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
- Little Lorikeet (*Glossopsitta pusilla*)
- Little Eagle (*Hieraaetus morphnoides*)
- Square-tailed Kite (*Lophoictinia isura*)
- Powerful Owl (*Ninox strenua*)
- Yellow-bellied Glider (*Petaurus australis*)
- Scarlet Robin (*Petroica boodang*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)
- Eastern Freetail-bat (*Mormopterus norfolkensis*)
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)
- Greater Broad-nosed Bat (*Scoteanax rueppellii*)

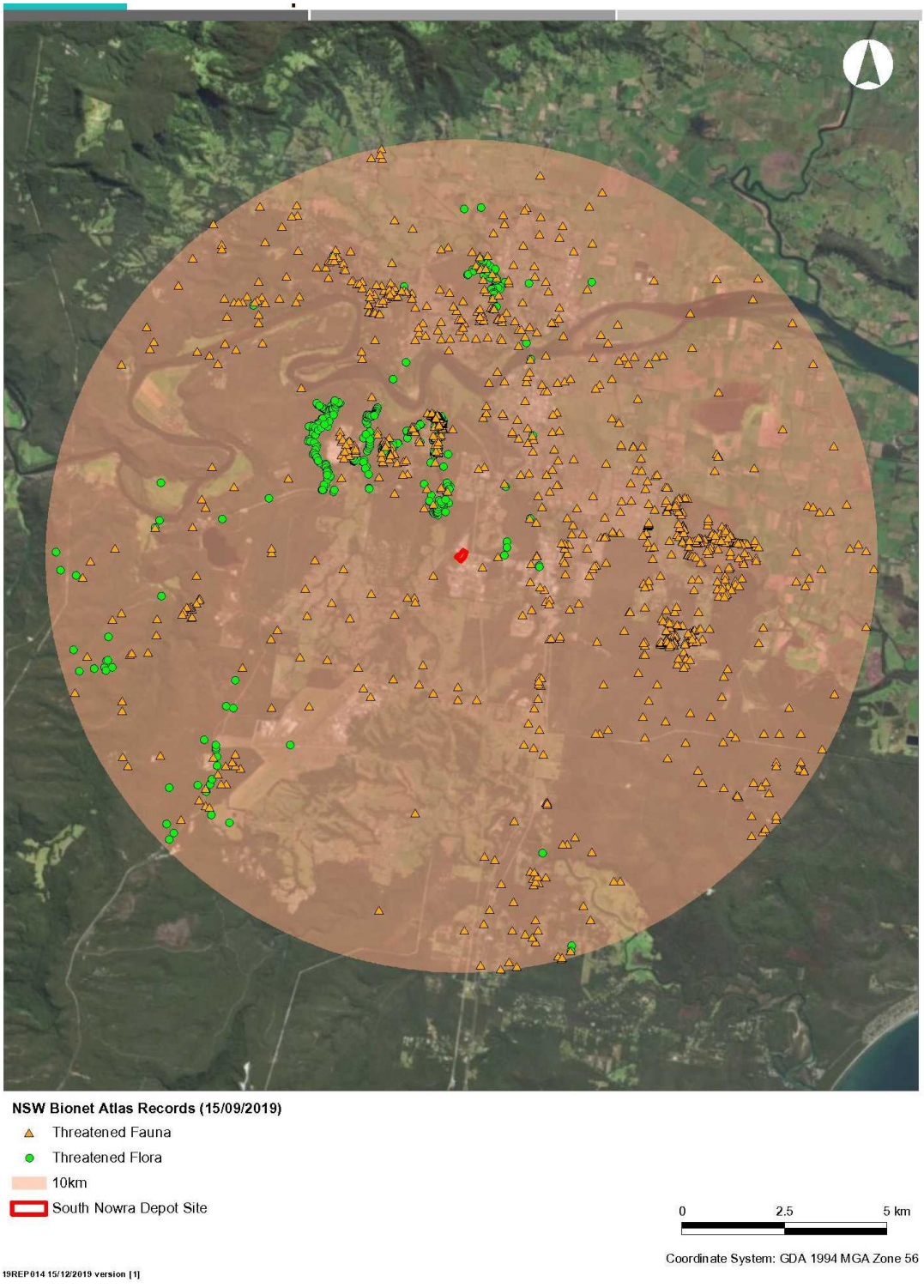

Figure 5: Threatened Species Records (Emap Consulting 2019)

4.4 ADDITIONAL LOCAL PROVISIONS AND ZONING

A review of the Shoalhaven LEP (2014) identifies the Study Area as covered by IN1 zoned land. No additional local provisions are mapped over the Study area.

5.0 FIELD SURVEY RESULTS

5.1 EXISTING ENVIRONMENT

The environment of the Study area can be characterised by cleared land across the majority of the lot with areas of exotic grassland or bare ground/dirt. Native plantings are present throughout the study area primarily dominated by Brush box (*Lophostemon confertus*). Remnant native vegetation exists only as scattered trees including; *Corymbia maculata*; *Eucalyptus paniculata* subsp. *paniculata*; *Eucalyptus longifolia* and dead *Allocasuarina littoralis*.

Existing site offices, work sheds, machines and vehicles are surrounded by planted exotic and native species interspersed with large patches of bare earth.

The age cohort of the majority of the remnant canopy trees was estimated at 50 years, with large eucalypts present, two of which have developed hollows suitable for birds and arboreal mammals (**Figure 6**).

The tree cover within the Subject Site is relatively sparse but could be expected to facilitate the movement and foraging of more mobile native fauna species between the Subject Site and wider locality, particularly to the east and west. In total, two Hollow Bearing Trees (HBTs) were recorded within the Subject Site.

The Subject Site is considered to provide the following fauna habitat:

- Intact canopy suitable for foraging by highly mobile arboreal mammals and birds
- HBTs suitable for nesting or roosting by woodland birds or arboreal mammals. The HBTs were small to medium in size

5.2 VEGETATION COMMUNITIES

The field inspection recorded three vegetation types as mapped in **Figure 6,** which included:

- Cleared land/exotic grassland/exotic landscaping – No PCT
- Native landscaping – No PCT
- PCT 1212: Spotted Gum - Grey Ironbark - Woollybutt grassy open forest on coastal flats, southern Sydney Basin Bioregion and South East Corner Bioregion

Figure 6 Validated vegetation communities mapped by Lodge Environmental (2020)

Cleared land/exotic grassland/exotic landscaping – No PCT

The majority of the site is characterised by Cleared land/exotic grassland/exotic landscaping. Where the ground did not consist of bare dirt, various exotic weeds and grasses were present; *Cenchrus clandestinus* (Kikuyu Grass), *Gamochaeta purpurea* (Purple Cudweed), *Lactuca serriola* (Prickly Lettuce), *Plantago lanceolata* (Plantain), and *Trifolium repens* (White Clover) (**Figure 7**).

No threatened flora species were recorded within the vegetation type.

Figure 7: Cleared land/exotic grassland/exotic landscaping – No PCT

Native landscaping – No PCT

Native landscaping has been introduced across the property boundaries, amongst garden beds and surrounding car parks and internal roads (**Figure 8**). The ground stratum contained a mixture of various cultivated introduced and native plants including *Lomandra multiflora* (Many-flowered Mat-rush), *Agapathus praecox* subsp. *orientalis* (Lily of the Nile), *Agave attenuata* (Foxtail Agave), *Agrostis cappillaris* (Browntop Bent), *Dianella caerulea* (Blue Flax-lily) and *Dietes iridioides* (Fairy Iris). Mid stratum amongst the landscaping consisted of including *Melaleuca sieberi*, *Banksia spinulosa* (Hairpin Banksia), *Buxus sempervirens* (English Box), *Callistemon citrinus* (Crimson Bottlebrush), *Callistemon salignus* (Bottlebrush), *Callistemon viminalis* (Dwarf Bottlebrush*),* *Coleonema pulchellum* (Confetti Bush), *Corymbia ficifolia* (Red-flowering Gum), *Exocarpus cupressiformis* (Cherry Ballart), *Grevillia banksia* x *Grevillia pteridifolia* (Grevillia 'Honey Gem'), *Doryanthes excelsa* (Gymea Lily), and *Westringia* sp. (Native Rosemary). The dominant landscaped border trees were *Lophostemon confertus* (Queensland Box) with *Syncarpia glomulifera*

(Turpentine) *Melaleuca linariifolia* (Flax-leaved Paperbark), *Melaleuca ericifolia* (Swamp Paperbark) *Cinnamomum camphora* (Camphor Laurel) and *Platanus* x *acerifolia* (London Plane Tree).

No threatened flora species were recorded within the vegetation type.

Figure 8: Native landscaping – No PCT

PCT 1212: Spotted Gum - Grey Ironbark - Woollybutt grassy open forest on coastal flats, southern Sydney Basin Bioregion and South East Corner Bioregion – Poor condition

Table 4 provides a justification of the determination for this PCT within the Study Area, with an image shown in **Figure 9**.

Table 4: PCT Justification Table

Spotted Gum - Grey Ironbark - Woollybutt grassy open forest on coastal flats, southern Sydney Basin Bioregion and South East Corner Bioregion – Poor condition	
PCT ID	1212
Vegetation formation	Wet Sclerophyll Forests (Grassy sub-formation)
Vegetation class	Southern Lowland Wet Sclerophyll Forests
Generic description	Open or tall open forest with open shrub layer and prominent grassy groundcover.; Landscape Position: Occurs on loamy soils on coastal lowlands below 60m in the Jervis Bay hinterland and Murramarang area.

Condition on site	Poor condition		
Survey effort	Random meander, no plots		
PCT Justification: Expected Species by Stratum (Bold denotes species present within Subject Land patch)	Upper Stratum: ***Corymbia maculata*** ***Eucalyptus paniculata subsp. paniculate*** ***Eucalyptus longifolia*** *Eucalyptus Botryoides* ***Allocasuarina littoralis (dead)*** *Eucalyptus pilularis*	Mid Stratum: *Billardiera scandens* *Glycine clandestine* *Hibbertia aspera* *Leucopogon juniperinus* *Notelaea longifolia*	Ground Stratum: *Brunoniella pumilio* ***Dianella caerulea*** *Dichondra repens* *Entolasia stricta* *Lepidosperma laterale* ***Lomandra longifolia*** *Oplismenus imbecillis* *Pratia purpurascens;* *Schelhammera undulata* *Imperata cylindrica var. major* *Lagenifera stipitata*
TEC Status	Listed BC Act Endangered: River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.		

Figure 9: Spotted Gum - Grey Ironbark - Woollybutt grassy open forest on coastal flats, southern Sydney Basin Bioregion and South East Corner Bioregion – Poor condition

This vegetation community occurs on loamy soils on coastal lowlands below 60m in the Jervis Bay hinterland and Murramarang area. The canopy of this PCT is generally dominated by *Corymbia*

maculata; Eucalyptus paniculata subsp. paniculata; Eucalyptus longifolia; Eucalyptus botryoides; Allocasuarina littoralis; Eucalyptus pilularis.

This PCT is associated with the Threatened Ecological Community - Listed BC Act Endangered: River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

This PCT was present within the Study Area as scattered retained trees across the Subject Site (**Figure 9**). It was recorded in a poor condition and has undergone a history of severe clearance and thinning. The determination of this vegetation occurrence is based on the dominant native canopy species within this area being *Eucalyptus paniculata* (Grey Ironbark), *Corymbia maculata* (Spotted Gum) and to a lesser extent by *Eucalyptus longifolia* (Woollybutt). The determination of this PCT was based almost entirely on the presence of these dominant canopy species, since the midstorey and understorey have been removed from most areas. In a few places where remnant canopy species occur, key midstorey species including *Dianella caerulea* (Blue Flax-lily) and *Lomandra longifolia* (Spiny-headed Mat-rush). The trees were persisting above cleared ground, with a dominance of exotic species *Cenchrus clandestinus* (Kikuyu Grass), *Gamochaeta purpurea* (Purple Cudweed), *Lactuca serriola* (Prickly Lettuce), *Plantago lanceolata* (Plantain), and *Trifolium repens* (White Clover).

No threatened species were identified within this vegetation type within the Subject Site.

5.3 FLORA

A total of 37 flora species were recorded within the Study Area during the site inspection (27 natives and 10 exotic). A species list is provided in **Appendix B**.

5.3.1 Threatened Flora Species

There were no threatened flora species identified within the Subject Site.

5.4 FAUNA

A total of 8 fauna species were identified within the Study Area. A species list is included in **Appendix C**.

Targeted fauna surveys were not conducted as part of this assessment nor are they considered necessary.

5.4.1 Threatened Fauna Species

No threatened fauna species were identified within the study area across the field surveys.

In general, the habitat potential of the Subject Site for specialist native species, such as listed threatened species, is low to moderate. The remnant native trees (two of which contain hollows) and native plantings is considered to provided potential habitat for the following threatened fauna species:,

- Large-eared Pied Bat (*Chalinobolus dwyeri*)

- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)
- Eastern Freetail-bat (*Mormopterus norfolkensis*)
- Grey-headed Flying-fox (*Pteropus poliocephalus)*
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)
- Greater Broad-nosed Bat (*Scoteanax rueppellii*)
- Regent Honeyeater (*Anthochaera phrygia*)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
- Gang-gang Cockatoo (*Callocephalon fimbriatum*)
- Glossy Black Cockatoo (*Calyptorhynchus lathami*)
- Varied Sittella (*Daphoenositta chrysoptera*)
- Little Lorikeet (*Glossopsitta pusilla*)
- Little Eagle (*Hieraaetus morphnoides*)
- Square-tailed Kite (*Lophoictinia isura*)
- Scarlet Robin (*Petroica boodang*)
- Powerful Owl (*Ninox strenua*)

5.4.2 Koala SEPP 44

The Koala SEPP requires consideration within the SCC LGA. This SEPP aims to encourage the conservation and management of natural vegetation that provides habitat for Koalas to ensure a permanent, free living population over their present range and reverse the current trend of the koala population decline. A development application affecting one hectare or more, in an identified local government area, must be assessed under SEPP 44.

The Koala SEPP requires two key considerations throughout the assessment:

1. Is the land potential koala habitat (where potential habitat means areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component).

The native trees for removal do not consist of at least 15% of those species listed under Schedule 2 (**Table 5**).

2. Is the land core koala habitat (where core koala habitat means an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population)?

Although there are two Koala records within 10 km of the Study Area, these records are either quite old (>20 years) or located in highly disturbed urban areas. No signs of Koalas were recorded within the Subject Site, such as scratch marks or scats. The land has not been assessed as core Koala habitat, as there are no signs of a resident population in the immediate surrounds of the Subject Site.

No Koala Feed Tree specie as listed in **Table 4** were recorded within the Study area.

Table 5: Koala Feed Tree Species (SEPP 44)

Scientific Name	Common Name
Eucalyptus tereticornis	Forest red gum
Eucalyptus microcorys	Tallowwood
Eucalyptus punctata	Grey Gum
Eucalyptus viminalis	Ribbon or manna gum
Eucalyptus camaldulensis	River red gum
Eucalyptus haemastoma	Broad leaved scribbly gum
Eucalyptus signata	Scribbly gum
Eucalyptus albens	White box
Eucalyptus populnea	Bimble box or poplar box
Eucalyptus robusta	Swamp mahogany

6.0 IMPACT ASSESSMENT

6.1 SUMMARY OF IMPACTS

6.1.1 Direct impacts

Figure 10 depicts the Subject Site and the various associated impacts assessed within this report and **Table 6** provides a breakdown of the direct impact areas.

The impact imposed by the proposed development on the mapped native vegetation is below the Biodiversity Offset Scheme entrance impact threshold of 0.5 ha.

The vegetation to be impacted by the proposal is associated with a TEC and therefore an AoS has been prepared in **Appendix D**.

The proposed construction has been sited within a property which has been subject to historic clearance and ongoing degradation of remnant vegetation. The proposed structures make use of the existing poor condition vegetation.

No threatened flora is to be impacted by the proposal.

Table 6: Summary of direct impacts considered within this assessment

Vegetation Type	Clearance Totals (ha)
Cleared land/exotic grassland/exotic landscaping	1.15
Native landscaping	0.11
PCT 1212: PCT 1212: Spotted Gum - Grey Ironbark - Woollybutt grassy open forest on coastal flats, southern Sydney Basin Bioregion and South East Corner Bioregion – Poor condition	0.13
Total Native Vegetation Impact	***0.24***
Comparison to BOS entry threshold	The native vegetation impact threshold for the lot, being 3.4 ha in size, is **0.5 ha**. The **total impact of 0.24 ha** of native vegetation is **below the impact threshold** and **does not trigger BOS entry.**

Table 7 lists the 17 threatened species identified as having the potential to occupy the Subject Site to some degree throughout their lifecycle, and whether an AoS is necessary.

Table 7: Threatened species to be considered to have a likelihood of occurrence in the Subject Site

Common Name	Scientific Name	Listing		Habitat association	Likelihood of occurrence in Subject Site prior to survey	Habitat associations relevant in Subject Site	5-part Test Requirement
		BC Act	EPBC Act				
Regent Honeyeater	*Anthochaera phrygia*	CE	CE	Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	Low	Specific feed trees for the species present on site (*Corymbia maculata*) with historic records within 10km of the Study area.	Yes – Taking a conservative approach a Test of Significance has been prepared for this species
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V		The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris	Moderate	Mature remnant eucalypts have the potential to provide suitable nesting habitat and associated foraging habitat	Yes
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V		Prefers tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests during summer, these being at higher altitudes. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, or in dry forest in coastal areas.	Moderate	1 medium sized hollow within remnant patch of trees has the potential to provide breeding habitat for the species. In addition to surrounds providing foraging habitat.	Yes

Common Name	Scientific Name	Listing		Habitat association	Likelihood of occurrence in Subject Site prior to survey	Habitat associations relevant in Subject Site	5-part Test Requirement
		BC Act	EPBC Act				
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V		In NSW, widespread along coast and inland to the southern tablelands and central western plains, with a small population in the Riverina. Open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur.	Moderate	1 medium sized hollow within remnant patch of trees has the potential to provide breeding habitat for the species	Yes
Varied Sittella	*Daphoenositta chrysoptera*	V		Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Moderate	Foraging and nesting potential in remnant native vegetation	Yes
Little Lorikeet	*Glossopsitta pusilla*	V		Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Roosts in treetops	Moderate	Foraging and nesting potential in 1 small hollow within the remnant native vegetation	Yes
Little Eagle	*Hieraaetus morphnoides*	V		Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used.	Moderate – Although there is a moderate likelihood that Square-tailed Kites may occur within the Study area, this would be likely due to fly overs and foraging. No critical habitat in the form of nests are present across the site. Foraging habitat is not considered critical in relation to the broader landscape	Foraging and nesting potential in remnant native vegetation	Yes – Taking a conservative approach a Test of Significance has been prepared for this species

Common Name	Scientific Name	Listing		Habitat association	Likelihood of occurrence in Subject Site prior to survey	Habitat associations relevant in Subject Site	5-part Test Requirement
		BC Act	EPBC Act				
Square-tailed Kite	*Lophoictinia isura*	V		Typically inhabits coastal forested and wooded lands of tropical and temperate Australia. In NSW it is often associated with ridge and gully forests dominated by Eucalyptus longifolia, Corymbia maculata, E. elata, or E. smithii.	Moderate – Although there is a moderate likelihood that Square-tailed Kites may occur within the Study area, this would be likely due to fly overs and foraging. No critical habitat in the form of nests are present across the site. Foraging habitat is not considered critical in relation to the broader landscape	Foraging and nesting potential in remnant native vegetation	Yes – Taking a conservative approach a Test of Significance has been prepared for this species
Powerful Owl	*Ninox strenua*	V		The Powerful Owl occupies wet and dry eucalypt forests and rainforests. It may inhabit both un-logged and lightly logged forests as well as undisturbed forests where it usually roosts on the limbs of dense trees in gully areas. Large mature trees with hollows at least 0.5 m deep are required for nesting. Tree hollows are particularly important for the Powerful Owl because a large proportion of the diet is made up of hollow-dependent arboreal marsupials.	Moderate – Although there is a moderate likelihood that Powerful Owls may occur within the Study area, this would be likely due to fly overs and foraging. No critical habitat in the form of large hollows are present across the site. Foraging habitat is not considered critical in relation to the broader landscape	Foraging potential in remnant native vegetation	Yes – Taking a conservative approach a Test of Significance has been prepared for this species
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V	Cave-roosting bat that forages in timbered woodland and dry sclerophyll forest	Moderate	Foraging and roosting potential in remnant native vegetation	Yes

Common Name	Scientific Name	Listing		Habitat association	Likelihood of occurrence in Subject Site prior to survey	Habitat associations relevant in Subject Site	5-part Test Requirement
		BC Act	EPBC Act				
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V		Prefers moist habitats with trees larger than 20m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Moderate	Foraging and roosting potential in remnant native vegetation	Yes
Eastern Coastal Free-tailed Bat	*Micronomus norfolkensis*	V		Hollow-roosting bat that forages in dry eucalypt forests and woodlands.	Moderate	Foraging and roosting potential in remnant native vegetation	Yes
Eastern Bent-winged Bat	*Miniopterus orianae oceanensis*	V		Occurs from Victoria to Queensland, on both sides of the Great Dividing Range.. They occur in a broad range of habitats including rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands.	Moderate	Foraging potential in remnant native vegetation	Yes
Southern Myotis	*Myotis macropus*	V		Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	Moderate	Foraging and roosting potential in remnant native vegetation	Yes
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests.	Moderate	Feed tree present on site. Spotted Gum is a known feed tree for the species in the local area	Yes
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V		Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.	Moderate	Foraging and roosting potential in remnant native vegetation	Yes

Common Name	Scientific Name	Listing		Habitat association	Likelihood of occurrence in Subject Site prior to survey	Habitat associations relevant in Subject Site	5-part Test Requirement
		BC Act	EPBC Act				
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V		Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest. Roosts in tree hollows and buildings.	Moderate	Foraging and roosting potential in remnant native vegetation	Yes

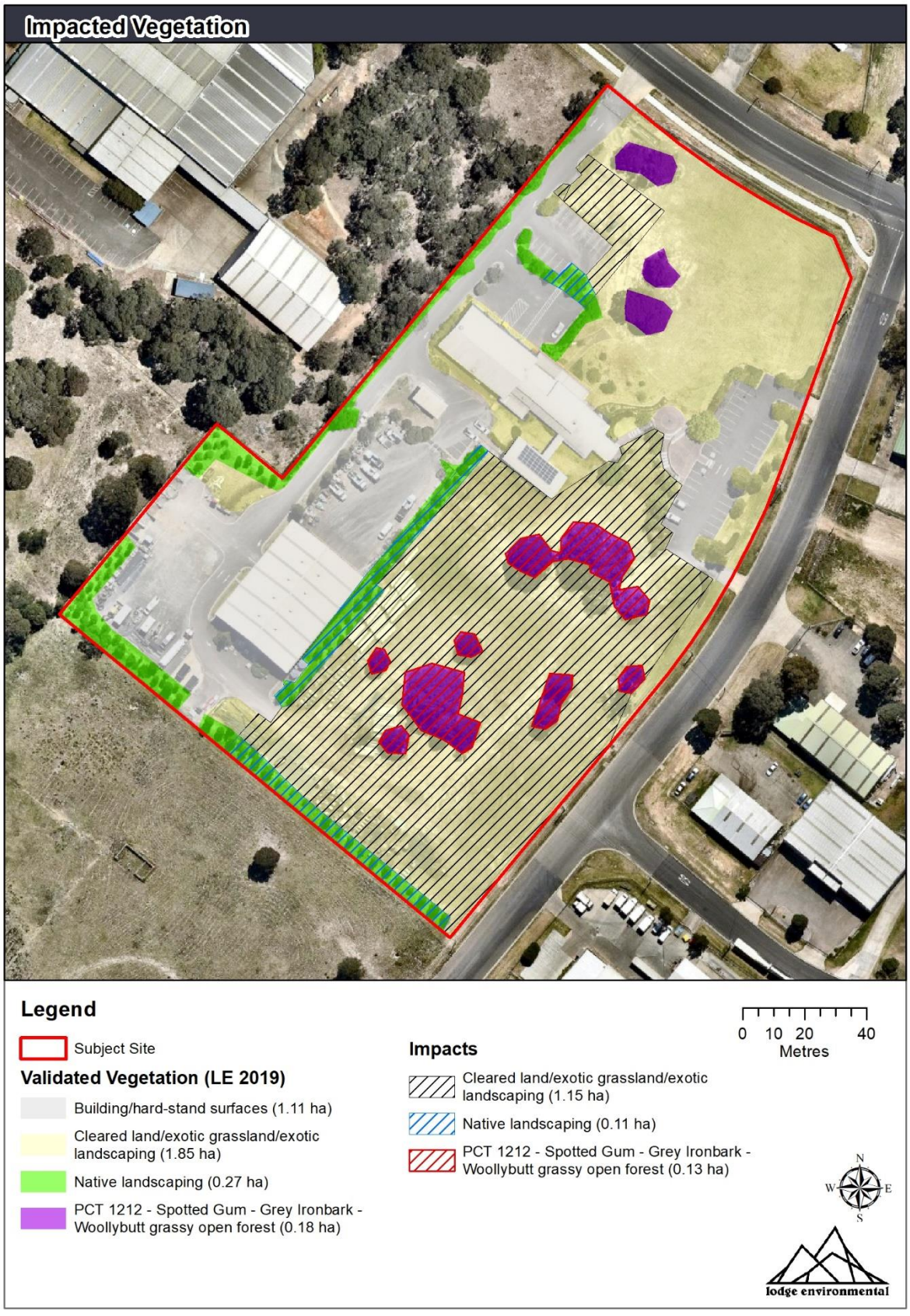

Figure 10 Impact areas considered within this report (Lodge Environmental 2020)

6.1.2 Indirect impacts

The proposal has the potential to result in the following indirect impacts:

- increased edge effects (including spread of weeds) due to the increase in access and site usage to the remaining vegetation adjacent to the North West of the study area.

6.1.3 Key threatening processes

The following key threatening process listed under the BC Act is associated with the proposal

- clearing of native vegetation

6.2 ASSESSMENT OF ADDITIONAL LOCAL PROVISIONS

Zoning

All proposed works are to be contained within land mapped as IN1 General Industrial. The proposal is permitted with consent within the IN1 areas and is in not in contradiction to the objectives of IN1.

6.3 SIGNIFICANCE ASSESSMENTS

6.3.1 Test of Significance under the EP&A Act and BC Act

Assessments using the criteria provided under the EP&A Act (i.e. Test of Significance (ToS)) must be taken into account by consent or determining authorities when considering a development proposal or development application. This enables a decision to be made as to whether there is likely to be a significant impact on the species and hence if entry into the Biodiversity Offset Scheme (BOS) is required.

The results of the field survey have been used to inform whether significance assessments are required and for which listed species and communities. Significance assessments have been undertaken and are provided in **Appendix D**.

After undertaking the AoS, the proposal, under its current layout, is not considered to have any significant impact on threatened species, ecological communities or populations such that a viable local population will be placed at risk of extinction.

6.3.2 EPBC Act Significant Impact Guidelines

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where MNES may be affected. The process includes the application of Significant Impact Criteria for listed threatened species and ecological communities that represent a MNES that will be impacted as a result of the proposed action. Significant impact guidelines that outline a number of criteria have been developed by the Commonwealth, to provide assistance in conducting the assessment and help decide whether or not a referral to the Commonwealth is required.

The results of the field survey have been used to inform whether significance impact guidelines are required and for the Grey-headed Flying-fox (*Pteropus poliocephalus*). As a result a Significance impact criteria assessment has been undertaken and are provided in **Appendix E**.

After undertaking the assessment, it is considered there will be no significant impact to MNES (threatened and migratory species) as a result of the proposal.

6.4 BOS TRIGGER ASSESSMENT

6.4.1 Biodiversity Values Map

The Biodiversity Values Map does not affect any area for the proposed development.

6.4.2 Native vegetation impacted

The native vegetation impact threshold for the proposed development is 0.5 ha. The total impact of 0.24 ha of native vegetation is below the impact threshold and does not trigger BOS entry.

6.4.3 Threatened species, populations or communities

The proposal will not result in a significant impact upon any species, populations or communities listed under State or Commonwealth legislation provided the proposal is approved as defined within this assessment, and all recommendations and mitigation measures herein are adhered to.

6.4.4 Serious and Irreversible Impacts

The proposal does not trigger the BOS and as such, SAIIs do not apply.

6.4.5 BOS Entry Determination

Entry into the Biodiversity Offset Scheme is not required.

7.0 RECOMMENDATIONS AND MITIGATION MEASURES

This report assesses the removal of the small area of vegetation within the Subject Site only. The following recommendations are provided to mitigate and minimise potential impacts to threatened and non-threatened vegetation communities, flora and fauna that could result from the proposed action:

Vegetation Removal

- Reduce vegetation clearance as much as possible
- Care must be taken when moving equipment near vegetation to be retained. If works appear to encroach on retained vegetation, advice from a qualified Arborist should be gained to infer appropriate tree protection measures
- The works should not encroach onto any of the native vegetation to be retained in the Study Area. Clear signage should be used to clearly delineate the impact areas from retention areas

Habitat Augmentation

- The follow procedure for felling of the 2 HBTs should be undertaken:
    - a suitably licensed ecologist (who is vaccinated for Australian Bat Lyssavirus) is to be engaged to supervise the removal of the HBTs in order to minimise the chance of harm to fauna, and to rescue or relocate any fauna displaced during the clearing process
    - Check the HBT disturbance area for fauna before clearing and scare off or remove any fauna before commencing clearance
    - remove the non-HBTs prior to removal of the HBTs
    - leave the HBTs standing for at least one night after other non-HBT clearing to allow any fauna the opportunity to remove themselves after site disturbance
    - after clearing, re-check the site to ensure no fauna have become trapped or injured during clearing operations. Any fauna found should be moved to adjacent habitat
    - before felling the HBTs, tap trunk using heavy machinery to scare fauna from the hollows. Repeat several times. The aim is to 'substantially' shake the tree and encourage fauna to exit
    - carefully fell the HBT by gently lowering the tree to the ground using an excavator arm fitted with grapples. Alternatively, arrange for qualified tree surgeons to fell the HBT using chainsaws and pulleys
    - after felling the tree, thoroughly check the tree for fauna in the case that any have become trapped or injured during clearing operations. Any fauna should be safely moved into adjacent habitat
    - if taking the tree down in stages, the non-hollow bearing branches should be removed before the hollow bearing branches are removed

  - fell trees into the already disturbed areas to avoid damaging adjacent vegetation
  - take care when moving equipment near vegetation to be retained
  - logs from felled trees should be distributed into areas of vegetation so that they can continue to provide habitat for fauna such as terrestrial reptiles and mammals
  - relocate woody debris to areas where they will not contribute a fire hazard
  - provide written evident to Council in order to document that a suitable qualified person was engaged for the tasks listed above.
- To compensate for the removal of 2 HBTs, nest boxes are to be installed on a two for one basis for any natural hollow removed by the development.

Sediment and Erosion Control

- Drainage should be controlled in the impact areas consistent with the *Protection of the Environment Operations Act 1997* requirements to avoid impacts on downstream habitats and threatened ecological communities.
- Adequate erosion and sediment control measures should be in place at all times during construction in accordance with best practice guidelines (Landcom 2004), including:
  - sediment fencing
  - vehicle and machinery movement confined to designated work areas
  - consideration given to weather, with works stopped if the onset of heavy rain is deemed likely to cause soil erosion or soil structure damage

8.0 CONCLUSION

Through the completion of the surveys conducted as part of this report, no threatened flora or fauna were recorded within the Subject Site. Impacts are to occur to a small amount of native vegetation that does constitute a TEC, however, these impacts have been determined to be not significant.

The native vegetation proposed for removal was considered to contain potential habitat for the below listed threatened fauna. Similarly, these impacts have been determined to be not significant.

- Large-eared Pied Bat (*Chalinobolus dwyeri*)
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)
- Eastern Freetail-bat (*Mormopterus norfolkensis*)
- Grey-headed Flying-fox (*Pteropus poliocephalus)*
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)
- Greater Broad-nosed Bat (*Scoteanax rueppellii*)
- Regent Honeyeater (*Anthochaera phrygia*)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
- Gang-gang Cockatoo (*Callocephalon fimbriatum*)
- Glossy Black Cockatoo (*Calyptorhynchus lathami*)
- Varied Sittella (*Daphoenositta chrysoptera*)
- Little Lorikeet (*Glossopsitta pusilla*)
- Little Eagle (*Hieraaetus morphnoides*)
- Square-tailed Kite (*Lophoictinia isura*)
- Scarlet Robin (*Petroica boodang*)
- Powerful Owl (*Ninox strenua*)

This Flora and Fauna Assessment has adequately considered threatened species and communities in the context of the proposed development at the Subject Site by:

- conducting field survey
- adopting the precautionary principle in the assessment of threatened species
- designating appropriate recommendations to minimise potential impacts to threatened species that may transiently occur on the site as well as any other fauna

The assessments contained within this report have determined that the proposed development is unlikely to have a significant effect on the listed communities or species or their habitat in accordance with the EP&A Act, BC Act and EPBC Act provided the recommendations contained in this report are adhered to.

There will not be an impact on any mapped areas of Biodiversity Value, nor will there be an impact on native vegetation above the relevant impact threshold.

Therefore, the preparation and submission of a BDAR or referral to the Commonwealth is not required.

9.0 REFERENCES

- DotEE (2019a). *Protected Matters Report using coordinates* --34.90769 150.58087 °
- DotEE (2019b) *Species Profile and Threats Database SPRAT. Accessed 15 December 2019. Available at https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl*
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- Office of Environment and Heritage (DPIE) (2019b). *Threatened species profiles. Accessed 15 December 2019. Available at http://www.threatenedspecies.environment.nsw.gov.au/index.aspx*
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10.0 LIMITATIONS

This report and the associated services performed by Lodge Environmental are in accordance with the scope of services set out in the contract between Lodge Environmental and the Client. The scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to Site.

Lodge Environmental derived the data in this report primarily from visual inspections, and, limited survey and analysis made on the dates indicated. In preparing this report, Lodge Environmental has relied upon, and presumed accurate, certain information provided by government authorities, the Client and others identified herein. The report has been prepared on the basis that while Lodge Environmental believes all the information in it is deemed reliable and accurate at the time of preparing the report, it does not warrant its accuracy or completeness and to the full extent allowed by law excludes liability in contract, tort or otherwise, for any loss or damage sustained by the Client arising from or in connection with the supply or use of the whole or any part of the information in the report through any cause whatsoever.

The data, findings, observations, conclusions and recommendations in the report are based solely upon the state of the Site at the time of the investigation. The passage of time, manifestation of latent conditions or impacts of future events (e.g. changes in legislation, scientific knowledge, land uses, etc) may render the report inaccurate. In those circumstances, Lodge Environmental shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of the report.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between Lodge Environmental and the Client. Lodge Environmental accepts no liability or responsibility whatsoever and expressly disclaims any responsibility for or in respect of any use of or reliance upon this report by any third party or parties.

It is the responsibility of the Client to accept if the Client so chooses any recommendations contained within and implement them in an appropriate, suitable and timely manner.

Appendices

Appendix A: Threatened flora and fauna likelihood table

Common Name	Scientific Name	Legislation		Habitat Associations	Area present (ha)	Further Significance Assessment Undertaken
		BC Act	EPBC Act			
Ecological Communities						
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions: PCT 1,212 Spotted Gum - Grey Ironbark - Woollybutt grassy open forest		**E**	**-**	**This EEC is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. Grazing, changes to hydrology, soil salinity and fire history are known to influence the composition and structure of the understorey in addition to the introduction to exotic shrubs and other disturbances.**	**0.13**	**Yes**
Plants						
Bynoe's Wattle	*Acacia bynoeana*	E1	V	Semi prostrate shrub growing in central eastern NSW spanning from the Hunter District, west to the Blue Mountains and south to the Southern Highlands. Grows in a variety of communities including; Southern Tableland Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests, Coastal Valley Grassy Woodlands and Sydney Coastal Heaths. Prefers open, slightly disturbed sites on sandy soils.	Low	No
Downy Wattle	***Acacia pubescens***	**V**	**V**	**A shrub primarily confined to the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers at Barden Ridge, Oakdale and Mountain Lagoon. Grows in Cooks/River Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland, usually within roadside and bushland remnants. Grows on shale, sandstone, alluvium and gravely soils, often including ironstone.**	**Moderate**	**No, not detected on site**
Thick-lipped Spider-orchid	*Caladenia tessellata*	E	V	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. Also open heathland habitat. Flowers September to November	Low	No

Leafless Tongue Orchid	*Cryptostylis hunteriana*	V,P,2	V	Occurs in a range of communities, including swamp-heath and woodland. Larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black She-Oak (Allocasuarina littoralis). Flowers November to February.	Low	No
White-flowered Wax Plant	*Cynanchum elegans*	E	E	Restricted to eastern NSW, from Brunswick Heads on the north coast to Gerroa in the Illawarra region, and as far west as Merriwa in the upper Hunter River valley. Dry rainforest; littoral rainforest; Leptospermum laevigatum-Banksia integrifolia subsp. integrifolia (Coastal Tea-tree– Coastal Banksia) coastal scrub; Eucalyptus tereticornis (Forest Red Gum) or Corymbia maculata (Spotted Gum) open forest and woodland; and Melaleuca armillaris (Bracelet Honeymyrtle) scrub.	Low	No
Albatross Mallee	*Eucalyptus langleyi*	E2,V	V	Occurs on skeletal soils on rocky sloping Nowra Sandstone outcrops along Bomaderry Creek.	Low	No
Ettrema Mallee	*Eucalyptus sturgissiana*	V		Usually grows as an emergent in low shrub-heath. Grows on sandy, swampy soils.	Low	No
Tangled Bedstraw	*Galium australe*	E1		Straggling, inter-twining herb with an extant population in Nadgee Nature Reserve and historically recorded at Nowra and Narooma. Grows in a variety of communities including North Coast Wet Sclerophyll Forests, South Coast Sands Dry Sclerophyll Forests, Eastern Riverine Forests, Coastal Valley Grassy Woodlands and Coastal Headland Heaths.	Low	No
Bauer's Midge Orchid	*Genoplesium baueri*	E1,P,2	E	Terrestrial orchid with 13 populations totalling 200 plants distributed between Ulladulla and Port Stephens. Grows on moss gardens in a variety of communities including Sydney Coastal Dry sclerophyll Forests, Sydney Coastal Heaths, Sydney Montane Heaths, Southern Lowland Wet Sclerophyll Forests and Sydney Hinterland Dry Sclerophyll Forests. Grows on sandstone substrates	Low	No
East Lynne Midge-orchid	*Genoplesium vernale*	V	V	Grows in dry sclerophyll woodland and forest extending from close to the coast to the adjoining coastal ranges. Confined to areas with well-drained shallow soils of low fertility, often occurring near the crests of ridges and on low rises where the ground cover is more open and sedge dominated rather then being shrubby.	Low	No

Small-flower Grevillea	*Grevillea parviflora subsp. Parviflora*	V	V	Low spreading to erect shrub sporadically distributed throughout the Sydney Basin, most notably in the Picton, Appin and Bargo regions, in the Cessnock - Kurri Kurri area and isolated populations from Putty to Wyong and Lake Macquarie. Grows in Shale Sandstone Transition Forest, Kurri Sand Swamp Woodland, Coymbia maculata - Angophora costata Open Forest in the Dooralong Area, Sydney Sandstone Ridgetop Woodland at Wedderburn and Cooks River/Castlereagh Ironbark Forest at Kemps Creek. Grows in sandy or light clay soils including tertiary alluviums over thin shales and lateritic ironstone gravels.	Low	No
Wingless Raspwort	*Haloragis exalata subsp. Exalata*	V	V	Small to medium sized shrub found growing in four scattered areas in eastern NSW including the central coast, south coast and north western slopes. Species grows in damp, shaded areas in riparian zones in a variety of communities including South East Dry Sclerophyll Forests, Coastal Floodplain Wetlands, Montane Bogs and Fens and Northern Warm Temperate Rainforests.	Low	No
	Hibbertia puberula	E1		Shrublet with a distribution extending from Wollemi National Park south to Morton National Park and the south coast near Nowra. Grows in a variety of communities including Southern Tableland Dry Sclerophyll Forests, Sydney Coastal Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests, Coastal Heath Swamps, Coastal Valley Grassy Woodlands and Sydney Coastal Heaths. Grows on sandy soils, occasionally on clay soils.	Low	No
	Hibbertia stricta subsp. furcatula	E1		Upright, small shrub restricted to two populations, one in the southern edges of Sydney and the other near Nowra on the mid-South Coast of NSW. Grows on upper slopes and above the Woronora River Gorge escarpment in a variety of communities including South East Dry Sclerophyll Forests, Sydney Coastal Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests, and Southern Lowland Wet Sclerophyll Forests. Sydney population grows at or near the interface between the Hawkesbury Sandstone and Lucas Heights soil landscapes, in gravelly loam or clay soils. Nowra population grows on sandstone substrates in sandy soils.	Low	No

Illawarra Irene	*Irenepharsus trypherus*	E	E	Hairless, annual or perennial herb recorded from 18 sites from Kiama, Shellharbour, Shoalhaven, Tallaganda, Wingecarribee and Wollongong. Grows on steep rocky slopes near cliff lines and ridge tops including rock crevices and on narrow benches in Dry Rainforests, Subtropical Rainforests, Northern Warm Temperate Rainforests, Southern Tableland Wet Sclerophyll Forests, North Coast Wet Sclerophyll Forests and Southern Escarpment Wet Sclerophyll Forests.	Low	No
Biconvex Paperbark	*Melaleuca biconvexa*	V	V	Scattered and dispersed populations of this species are found between Jervis Bay and Port Macquarie. It occurs in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	Low	No
Deane's Paperbark	*Melaleuca deanei*	V	V	Medium sized shrub found growing in two distinct populations in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas along with a few outliers at Springwood and in the Wollemi National Park, Yalwal and the Central Coast regions. Grows in ridgetop woodland in a variety of communities including Sydney Coastal Dry Sclerophyll Forests, South East Dry Sclerophyll Forests, Sydney HInterland Dry Sclerophyll Forests, Coastal Valley Grassy Woodlands, Sydney Coastal Heaths. Grows on sandstone substrates in alluvial soils.	Low	No
Knotweed	*Persicaria elatior*	V	V	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Low	No
Spiked Rice-flower	*Pimelea spicata*	E1	E	Small erect or spreading shrub with populations occurring in two disjunct areas, one occurring on the Cumberland Plain from Marayong and Prospect Reservoir south to Narellan and Douglas Park, and the other occuring in the Illawarra from Landsdowne to Shellharbour and north Kiama. Grows in Maritime Grasslands and Coastal Valley Grassy Woodlands including Cumberland Plain Woodlands and Moist Shale Woodlands within the Cumberland Basin and in Coast Banksia Open Woodland Coastal Grasslands in the Illawarra region. Grows on well structured clay soils.	Low	No

Cotoneaster Pomaderris	*Pomaderris cotoneaster*	E	E	Shrub of medium size with a varied distribution with records from the Nungatta areas, northern Kosciuszko National Park, Tantawangalo area in South-East Forests National Park and adjoining freehold land, Badgery's Lookout near Tallong, Bungonia State Conservation Area, Yerranderie area, Kanangra-Boyd National Park, Canyonleigh area and Ettrema Gorge in Morton National Park. Grows amongst rocks adjacent to creeks, rocky forested slopes and in steep gullies between sandstone cliffs in a variety of communities including Central Gorge Dry Sclerophyll Forests, South East Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests, Subalpine Woodlands, Southern Tableland Wet Sclerophyll Forests. Grows in skeletal soils or deep friable soils.	Low	No
Jervis Bayy Leek Orchid	*Prasophyllum affine*	E	E	Grows on poorly drained grey clay soils that support low heathland and sedgeland communities.	Low	No
Illawarra Greenhood	*Pterostylis gibbosa*	E1,P, 2	E	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. Near Nowra, the species grows in an open forest of Spotted Gum (Corymbia maculata), Forest Red Gum and Grey Ironbark (E. paniculata). Flowers September to October.	Low	No
	Pterostylis ventricosa	E4A, P,2		More open areas of tall coastal eucalypt forest often dominated by one or more of the following tree species:- Terpentine, Spotted Gum, Grey Ironbark, Blackbutt, White Stringybark, Scribbly Gum and Sydney Peppermint.	Low	No
	Pterostylis vernalis	E4A, P,2	CE	Pterostylis vernalis grows in open sites around moss gardens in shallow soil over sandstone sheets or moss gardens on heavy laterite associated soils, in heath and dry heathy forest/woodland.	Low	No
Eastern Underground Orchid	*Rhizanthella slateri*	V	E	Little known, however 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 located only when the soil is disturbed.	Low	No
Scrub Turpentine	*Rhodamnia rubescens*	E4A		Shrub to small tree, Scrub turpentine occurs in coastal districts north from Batemans bay, NSW to inland of Bundaberg in Queensland. Littoral, warm temperate and subtropical rainforest on volcanic and sedimentary soils.	Low	No
	Solanum celatum	E1		Medium sized erect shrub restricted to an area from Wollongong to south of Nowra and west of Bungonia. Found growing on hills, slopes, disturbed sites and rainforest	Low	No

				clearings in Central Gorge Dry Sclerophyll Forests, Dry Rainforests and North Coast Wet Sclerophyll Forests.		
Magenta Lilly Pilly	*Syzygium paniculatum*	E1	V	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest.	Low	No
Kangaloon Sun Orchid	*Thelymitra kangaloonica*	CE	CE	Only known from the southern tablelands of NSW in the Moss Vale / Kangaloon / Fitzroy Falls area where it occurs in swamps in sedgelands. late October and early November.	Low	No
Austral Toadflax	*Thesium australe*	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	Low	No
Nowra Heath Myrtle	***Triplarina nowraensis***	**E1**	**E**	**There are five known populations of Nowra Heath Myrtle. Three of these form a cluster to the immediate west of Nowra. A fourth, much smaller population is found 18km south-west of Nowra in the Boolijong Creek Valley. The fifth population is located north of the Shoalhaven River on the plateau above Bundanon. Occurs on poorly drained, gently sloping sandstone shelves or along creek lines underlain by Nowra Sandstone.**	**Moderate**	**No, not detected on site.**
Swamp Everlasting	*Xerochrysum palustre*	not listed	V	Small erect herb, endemic to south-eastern Australia with a distribution spanning south-eastern NSW through Victoria to north-eastern Tasmania. Found growing at elevations of up to 1300 metres although more commonly found at elevations under 500 metres in lowland swamps. Grows in cracking black clay soils.	Low	No
Bomaderry Zieria	*Zieria baeuerlenii*	E1	E	Small shrub restricted to 43 small populations dispersed in six discrete clusters found in a single location on both sides of Bomaderry Creek, north-west of Nowra. Found growing in shrubland on a rocky plateau amongst sandstone boulders in Sydney Hinterland Dry Sclerophyll Forests. Grows in skeletal sandy loam soils over sandstone substrates.	Low	No
Aves						
Regent Honeyeater	*Anthochaera phrygia*	E4A, P	CE	Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	**Low – Although Spotted Gum (*Corymbia maculata*) are present across the site. These individual trees are quire exposed and not considered critical in**	**Yes – Taking a conservative approach an Test of Significance has been prepared for this species**

					relation to the broader landscape.	
Fork-tailed Swift	*Apus pacificus*	P	C,J,K	Almost exclusively aerial (foraging). The Fork-tailed Swift breeds in Asia but migrates to Australia from September to April. Individuals or flocks can be observed hawking for insects at varying heights from only a few metres from the ground and up to 300 metres high.	Low	No
Wedge-tailed Shearwater	*Ardenna pacificus*	P	J	Pelagic, marine bird known from tropical and subtropical waters.	Not Applicable	No
Short-tailed Shearwater	*Ardenna tenuirostris*	P	J,K	Pelagic, marine bird.	Not Applicable	No
Dusky Woodswallow	***Artamus cyanopterus cyanopterus***	**V,P**		**The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris**	**Moderate – Foraging and potential nesting habitat**	**Yes**
Australasian Bittern	*Botaurus poiciloptilus*	E1,P	E	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.).	Low	No
Bush Stone-curlew	*Burhinus grallarius*	E1,P		The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range. Occurs in lightly timbered open forest and woodland, or partly cleared farmland with remnants of woodland, with a ground cover of short sparse grass and few or no shrubs where fallen branches and leaf litter are present.	Low	No
Sharp-tailed Sandpiper	*Calidris acuminata*	P	C,J,K	Inland waters or coastal species	Not Applicable	No
Red Knot	*Calidris canutus*	Not listed	E	Mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs.	Not Applicable	No

Curlew Sandpiper	*Calidris ferruginea*	E	CE	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts	Not Applicable	No
Pectoral Sandpiper	*Calidris melanotos*	P	J,K	Scarce, but regular visitor, usually recorded in summer from November to March. Widespread but scattered records in Australia. Usually found in fresh to saline wetlands, floodplains, swamps, estuaries and lagoons, sometimes with emergent or fringing vegetation such as grass.	Not Applicable	No
Great Knot	*Calidris tenuirostris*	V	CE	Mainly found on intertidal mudflats, sandflats and sandy beaches.	Not Applicable	No
Gang-gang Cockatoo	***Callocephalon fimbriatum***	**V,P, 3**		**Prefers tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests during summer, these being at higher altitudes. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, or in dry forest in coastal areas.**	**Moderate – Foraging habitat in addition to one potential HBT**	**Yes**
Glossy Black-Cockatoo	***Calyptorhynchus lathami***	**V,P, 2**		**In NSW, widespread along coast and inland to the southern tablelands and central western plains, with a small population in the Riverina. Open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur.**	**Moderate – Foraging habitat in addition to one potential HBT**	**Yes**
Greater Sand Plover	*Charadrius leschenaultii*	V	V	Entirely coastal in NSW, foraging on intertidal sand and mudflats in estuaries and roosting during high tide on sandy beaches or rocky shores. Individuals have been recorded on inshore reefs, rock platforms, small rocky islands and sand cays on coral reefs, within Australia. Occasional sightings have also occurred on near-coast saltlakes, brackish swamps, shallow freshwater wetlands and grassed paddocks.	Not Applicable	No
Lesser Sand Plover	*Charadrius mongolus*	V	E	In Australia, the species is known to favour coastal environs including beaches, mudflats and mangroves. Within NSW, individuals have been observed on intertidal sand and mudflats in estuaries or roosting on sandy beaches or rocky shores at high tide.	Not Applicable	No
Spotted Harrier	*Circus assimilis*	V,P		The Spotted Harrier is found throughout Australia but rarely in densely forested and wooded habitat of the escarpment and coast. Preferred habitat consists of open and wooded country with grassland nearby for hunting. Habitat types include open grasslands, acacia and mallee remnants, spinifex, open shrublands, saltbush, very open woodlands, crops and similar low vegetation. The Spotted Harrier is more common in drier	Low	No

				inland areas, nomadic part migratory and dispersive, with movements linked to the abundance of prey species. Nesting occurs in open or remnant woodland and unlike other harriers, the Spotted Harrier nests in trees.		
Varied Sittella	***Daphoenositta chrysoptera***	**V,P**		**Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland.**	**Moderate**	**Yes**
Eastern Bristlebird	*Dasyornis brachypterus*	E	E	Dense, low vegetation including heath and open woodland with a heath understorey.	Low	No
Antipodean Albatross	*Diomedea antipodensis*	V	V	Marine, pelagic and aerial	Not Applicable	No
Gibson's Albatross	*Diomedea antipodensis gibsoni*	V	V	Marine, pelagic and aerial	Not Applicable	No
Southern Royal Albatross	*Diomedea epomophora*	Not listed	V	Marine, pelagic and aerial	Not Applicable	No
Wandering Albatross	*Diomedea exulans*	E	V	Marine, pelagic and aerial	Not Applicable	No
Northern Royal Albatross	*Diomedea sanfordi*	Not listed	E	Marine, pelagic and aerial	Not Applicable	No
White-fronted Chat	*Epthianura albifrons*	V,P		The White-fronted Chat is found in damp open habitats, particularly wetlands containing saltmarsh areas that are bordered by open grasslands or lightly timbered lands. Along the coastline, they are found in estuarine and marshy grounds with vegetation less than 1 m tall. The species is also observed in open grasslands and sometimes in low shrubs bordering wetland areas. Inland, the species is often observed in open grassy plains, saltlakes and saltpans that are along the margins of rivers and waterways.	Low	No
Black Falcon	*Falco subniger*	V,P		Widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions.	Low	No

Latham's Snipe	*Gallinago hardwickii*	P	C,J,K	Typically found on wet soft ground or shallow water with good cover of tussocks. Often found in wet paddocks, seepage areas below dams.	Low	No
Little Lorikeet	***Glossopsitta pusilla***	**V,P**		**Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species.** **Roosts in treetops**	**Moderate – Foraging habitat in addition to one potential HBT**	**Yes**
Painted Honeyeater	*Grantiella picta*	V	V	Inhabits Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests.	Low	No
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V,P	C	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea.	Low	No
Little Eagle	***Hieraaetus morphnoides***	**V,P**		**Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used.**	**Moderate – Although there is a moderate likelihood that Square-tailed Kites may occur within the Study area, this would be likely due to fly overs and foraging. No critical habitat in the form of nests are present across the site. Foraging habitat is not considered critical in relation to the broader landscape**	**Yes – Taking a conservative approach an Test of Significance has been prepared for this species**
White-throated Needletail	*Hirundapus caudacutus*	P	V, C,J,K	Almost exclusively aerial. Takes insects on wing over a range of habitat types. Recorded most often above wooded areas, including open forest and rainforest	Low	No
Caspian Tern	*Hydroprogne caspia*	P	C,J	Usually coastal, with a preference for sheltered estuaries, inlets, bays, harbours, lagoons with muddy or sandy shores. Keeps close inshore, not out beyond reef line. Also extends well inland on fresh or salt lakes, temporary floodwaters, large rivers, reservoirs, sewage ponds.	Not Applicable	No

Black Bittern	*Ixobrychus flavicollis*	V,P		The Black Bittern is found along the coastal plains within NSW, although individuals have rarely being recorded south of Sydney or inland. It inhabits terrestrial and estuarine wetlands such as flooded grasslands, forests, woodlands, rainforests and mangroves with permanent water and dense waterside vegetation.	Low	No
Swift Parrot	*Lathamus discolor*	E1,P, 3	CE	On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.	Low – Although Spotted Gum (*Corymbia maculata*) are present across the site. These individual trees are exposed and not considered critical in relation to the broader landscape. **There are no records of the species within a 10km radius**	No
Bar-tailed Godwit	*Limosa lapponica*	P	C,J,K	Coastal species, usually inhabiting intertidal sandflats, spits and banks. Less frequently found in mudflats, estuaries, coastal lagoons and harbours.	Low	No
Bar-tailed Godwit (baueri)	*Limosa lapponica baueri*	Not listed	V	The bar-tailed godwit (western Alaskan) occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays.	Low	No
Bar-tailed Godwit (menzbieri)	*Limosa lapponica menzbieri*	Not listed	CE	The bar-tailed godwit (northern Siberian) occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays.	Low	No
Black-tailed Godwit	*Limosa limosa*	V,P	C,J,K	The Black-tailed Godwit is a migratory wading bird that breeds in Mongolia and Eastern Siberia and flies to Australia for the southern summer, arriving in August and leaving in March.	Not Applicable	No
Square-tailed Kite	***Lophoictinia isura***	**V,P, 3**		**Typically inhabits coastal forested and wooded lands of tropical and temperate Australia. In NSW it is often associated with ridge and gully forests dominated by Eucalyptus longifolia, Corymbia maculata, E. elata, or E. smithii. Individuals appear to occupy large hunting ranges of more than 100 km2. They require large living trees for breeding, particularly near water with surrounding woodland /forest close by for foraging habitat. Nest sites**	**Moderate – Although there is a moderate likelihood that Square-tailed Kites may occur within the Study area, this would be likely due to fly overs and foraging. No critical**	**Yes – Taking a conservative approach an Test of Significance has been prepared for this species**

				are generally located along or near watercourses, in a tree fork or on large horizontal limbs.	**habitat in the form of nests are present across the site. Foraging habitat is not considered critical in relation to the broader landscape**	
Southern Giant Petrel	*Macronectes giganteus*	E	E	The Southern Giant-Petrel is a marine species found throughout the Antarctic to subtropical waters occasionally venturing to inshore waters.	Not Applicable	No
Northern Giant Petrel	*Macronectes halli*	V	V	Marine, pelagic species found mainly in subantarctic waters.	Not Applicable	No
Orange-bellied Parrot	*Neophema chrysogaster*	CE	CE	A single breeding population of fewer than 200 individuals occurs in a narrow coastal strip of south-west Tasmania. Adult birds depart Tasmania for the mainland in February. The first adults begin leaving the mainland for Tasmania in September with the last birds having departed by November. It is a coastal species inhabiting saltmarshes, sedgeplains, coastal dunes, pastures, shrublands and moorlands, generally within 10 km of the coast.	Not Applicable	No
Turquoise Parrot	*Neophema pulchella*	V,P,3		Occurs in open woodlands and eucalypt forests with a ground cover of grasses and understorey of low shrubs. Generally found in the foothills of the Great Divide, including steep rocky ridges and gullies. Nest in hollow-bearing trees, either dead or alive; also in hollows in tree stumps. Prefer to breed in open grassy forests and woodlands, and gullies that are moist.	Low	No
Barking Owl	*Ninox connivens*	V,P,3		Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas.	Low	No
Powerful Owl	***Ninox strenua***	**V,P, 3**		**The Powerful Owl occupies wet and dry eucalypt forests and rainforests. It may inhabit both un-logged and lightly logged forests as well as undisturbed forests where it usually roosts on the limbs of dense trees in gully areas. Large mature trees with hollows at least 0.5 m deep are required for nesting. Tree hollows are particularly important for the Powerful Owl because a large proportion of the diet is made up of hollow-dependent arboreal marsupials.**	**Moderate – Although there is a moderate likelihood that Powerful Owls may occur within the Study area, this would be likely due to fly overs and foraging. No critical habitat in the form of large hollows are present across the**	**Yes – Taking a conservative approach an Test of Significance has been prepared for this species**

					site. Foraging habitat is not considered critical in relation to the broader landscape	
Eastern Curlew	*Numenius madagascariensis*	P	CE,C,J,K	The eastern curlew takes an annual migratory flight to Russia and north-eastern China to breed, arriving back home to Australia in August to feed on crabs and molluscs in intertidal mudflats.	Not Applicable	No
Whimbrel	*Numenius phaeopus*	P	C,J,K	Occurs in intertidal mudflats of sheltered coasts. Also in estuaries, mangroves, coral clays and exposed reefs. Roosts in trees and mangroves.	Not Applicable	No
Fairy Prion	*Pachyptila turtur subantarctica*	Not listed	V	Fairy Prions (including other subspecies) are often beachcast on the south-eastern coast of Australia, and are commonly seen offshore over the continental shelf and over pelagic waters.	Not Applicable	No
Eastern Osprey	*Pandion cristatus*	V,P,3		Found in coastal waters, inlets, estuaries and offshore islands. Occasionally found 100 km inland along larger rivers. It is water-dependent, hunting for fish in clear, open water. The Osprey occurs in terrestrial wetlands, coastal lands and offshore islands. It is a predominantly coastal species, generally using marine cliffs as nesting and roosting sites. Nests can also be made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Not Applicable	No
Scarlet Robin	***Petroica boodang***	**V,P**		**The Scarlet Robin inhabits dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. During autumn and winter it moves to more open and cleared areas. The Scarlet Robin forages amongst logs and woody debris for insects. The nest is an open cup of plant fibres and cobwebs, sited in the fork of a tree.**	**Moderate**	**Yes**
Pink Robin	*Petroica rodinogaster*	V,P		The Pink Robin is found in dense, forests and treefern gullies. During the winter months the Pink Robin disperses north (as far up as the central coast of NSW) and west (as far as the ACT area) into more open forests, woodlands and scrublands. The diet consists mainly of spiders and insects.	Low	No

Glossy Ibis	*Plegadis falcinellus*	P	C	Terrestrial wetlands, and occasionally wet grasslands and sheltered marine habitats. Forage in shallow water over soft substrate or on grassy or muddy verges of wetlands, preferring those providing variety of water depths; avoid dry ground.	Not Applicable	No
Superb Fruit-Dove	*Ptilinopus superbus*	V,P		The Superb Fruit Dove ranges from northern NSW to as far south as Moruya. It is found in rainforests, closed forests (including mesophyll vine forests) and sometimes in eucalypt and acacia woodlands with fruit-bearing trees. It forages in the canopy of fruiting trees such as figs and palms.	Low	No
Australian Painted Snipe	*Rostratula australis*	E1,P	E	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. They prefer freshwater wetlands, but have been recorded in brackish waters. Forages on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Low	No
Australian Fairy Tern	*Sternula nereis nereis*	Not listed	V	The Fairy Tern nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. This species will also frequent embayments, estuarine habitats, wetlands and mainland coastlines.	Not Applicable	No
Freckled Duck	*Stictonetta naevosa*	V,P		The Freckled Duck breeds in permanent fresh swamps that are heavily vegetated. Found in fresh or salty permanent open lakes, especially during drought. Often seen in groups on fallen trees and sand spits.	Low	No
Buller's Albatross	*Thalassarche bulleri*		V	Marine and pelagic	Not Applicable	No
Northern Buller's Albatross	*Thalassarche bulleri platei*		V	Marine and pelagic	Not Applicable	No
Shy Albatross	*Thalassarche cauta cauta*	V	V	Marine and pelagic	Not Applicable	No
White-capped Albatross	*Thalassarche cauta steadi*		V	Marine and pelagic	Not Applicable	No
Chatham Albatross	*Thalassarche eremita*		E	Marine and pelagic	Not Applicable	No
Campbell Albatross	*Thalassarche impavida*		V	Marine and pelagic	Not Applicable	No
Black-browed Albatross	*Thalassarche melanophris*		V	Marine and pelagic	Not Applicable	No
Salvin's Albatross	*Thalassarche salvini*		V	Marine and pelagic	Not Applicable	No

Hooded Plover	*Thinornis rubricollis*	E4A, P	V	In south-eastern Australia Hooded Plovers prefer broad sandy beaches, with a wide wave-wash zone for feeding, beachcast seaweed, and sparsely vegetated sand-dunes for shelter and nesting. Hooded Plovers are also found on tidal bays and estuaries, rock platforms, rocky or sand-covered reefs, near-coastal saline and freshwater lakes and lagoons, often with saltmarsh.	Not Applicable	No
Common Greenshank	*Tringa nebularia*	P	C,J,K	Widely distributed throughout a range of inland wetlands and sheltered coastal habitats. Occurs in habitats with varying salinity.	Not Applicable	No
Marsh Sandpiper	*Tringa stagnatilis*	P	C,J,K	Inhabits permanent or ephemeral wetlands, including swamps, billabongs, lagoons, saltmarshes and estuaries. Forages at the edge of wetlands in shallow water.	Not Applicable	No
Masked Owl	*Tyto novaehollandiae*	V,P,3		Open forest with a sparse mid-storey layer, but with patches of dense low ground cover.	Low	No
Sooty Owl	*Tyto tenebricosa*	V,P,3		Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	Low	No
Mammals						
Australian Fur-seal	*Arctocephalus pusillus doriferus*	V,P		Marine species	Not Applicable	No
Eastern Pygmy-possum	*Cercartetus nanus*	V,P		Broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (Pseudocheirus peregrinus) dreys or thickets of vegetation	Low	No
Large-eared Pied Bat	***Chalinolobus dwyeri***	**V,P**	**V**	**Cave-roosting bat that forages in timbered woodland and dry sclerophyll forest**	**Moderate**	**Yes**
Spotted-tailed Quoll	*Dasyurus maculatus*	V,P	E	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Low	No
Eastern False Pipistrelle	***Falsistrellus tasmaniensis***	**V,P**		**Prefers moist habitats with trees larger than 20m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.**	**Moderate**	**Yes**
Southern Brown	*Isoodon obesulus obesulus*	E1,P	E	Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only	Low	No

Bandicoot (eastern)				found in heath or open forest with a heathy understorey on sandy or friable soils.		
Parma Wallaby	*Macropus parma*	V,P		Occurs in wet and dry sclerophyll forest with a thick, shrubby understorey associated with grassy patches. They may also occur in rainforest but prefer the wet sclerophyll forest (Strahan, 1995 134 /id). This species feed on grasses and herbs (Strahan, 1995 134 /id).	Low	No
Eastern Coastal Free-tailed Bat	***Micronomus norfolkensis***	**V,P**		**Hollow-roosting bat that forages in dry eucalypt forests and woodlands.**	**Moderate**	**Yes**
Little Bent-winged Bat	*Miniopterus australis*	V,P		Occurs from Northern Queensland to the Hawkesbury River near Sydney. Roost sites encompass a range of structures including caves, tunnels and stormwater drains. Young are raised by the females in large maternity colonies in caves in summer. Shows a preference for well timbered areas including rainforest, wet and dry sclerophyll forests, Melaleuca swamps and coastal forests. The Little Bentwing bat forages for small insects (such as moths, wasps and ants) beneath the canopy of densely vegetated habitats.	Low – No records of the species exist within a 10km radius	No
Eastern Bent-winged Bat	***Miniopterus orianae oceanensis***	**V**		**Occurs from Victoria to Queensland, on both sides of the Great Dividing Range. Forms large maternity roosts (up to 100,000 individuals) in caves and mines in spring and summer. Individuals may fly several hundred kilometres to their wintering sites, where they roost in caves, culverts, buildings, and bridges. They occur in a broad range of habitats including rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands. Has a fast, direct flight and forages for flying insects (particularly moths) above the tree canopy and along waterways.**	**Moderate**	**Yes**
Southern Myotis	***Myotis macropus***	**V,P**		**Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.**	**Moderate**	**Yes**
Greater Glider	*Petauroides volans*	P	V	It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species.	Low	No
Yellow-bellied Glider	*Petaurus australis*	V,P		Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	Low – Although extensive records are throughout	No

					the locality, habitat within the study area is not suitable for the species	
Squirrel Glider	*Petaurus norfolcensis*	V,P		Generally occurs in dry sclerophyll forests and woodlands but is absent from dense coastal ranges in the southern part of its range. Requires abundant hollow-bearing trees and a mix of eucalypts, banksias and acacias. Within a suitable vegetation community at least one species should flower heavily in winter and one species of eucalypt should be smooth barked.	Low	No
Brush-tailed Rock-wallaby	*Petrogale penicillata*	E1,P	V	Habitats containing numerous ledges, caves and crevices are favoured by this species.	Low	No
Koala	*Phascolarctos cinereus*	V,P	V	Open eucalypt forest and woodland, containing a variety of 'preferred' feed trees	Low	No
Long-nosed Potoroo	*Potorous tridactylus*	V,P	V	Inhabits coastal heath and dry and wet sclerophyll forests with dense cover which provides diurnal sheltering sites and protection from predators, whilst foraging in adjacent, open areas.	Low	No
New Holland Mouse	*Pseudomys novaehollandiae*	P	V	Open heathland, open woodland with a heathland understorey and vegetated sand dunes.	Low	No
Grey-headed Flying-fox	***Pteropus poliocephalus***	**V,P**	**V**	**Occur in subtropical and temperate rainforests, tall sclerophyll forests.**	**Moderate**	**Yes**
Yellow-bellied Sheathtail-bat	***Saccolaimus flaviventris***	**V,P**		**Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.**	**Moderate**	Yes
Greater Broad-nosed Bat	***Scoteanax rueppellii***	**V,P**		**Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest. Roosts in tree hollows and buildings.**	**Moderate**	Yes
White-footed Dunnart	*Sminthopsis leucopus*	V,P		Coastal dune vegetation, coastal forest, tussock grassland and sedgeland, heathland, woodland and forest. Favours vegetation communities with an open understorey structure	Low	No
Frogs						
Giant Burrowing Frog	*Heleioporus australiacus*	V,P	V	Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks. Can also occur within shale outcrops within sandstone formations. Known from wet and dry forests and montane woodland in the southern part range. Individuals can be found around sandy creek banks or foraging along ridge-tops during or directly after heavy rain. Males	Low	No

				often call from burrows located in sandy banks next to water. Spends the majority of its time in non-breeding habitat 20-250m from breeding sites.		
Green and Golden Bell Frog	*Litoria aurea*	E1,P	V	Most existing locations for the species occur as small, coastal, or near coastal populations, with records occurring between south of Grafton and northern VIC. The species is found in marshes, dams and stream sides, particularly those containing bullrushes or spikerushes. Preferred habitat contains water bodies that are unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks , although the species has also been recorded from highly disturbed areas including disused industrial sites, brick pits, landfill areas and cleared land.	Low – Although extensive records are throughout the locality, habitat within the study area is not suitable for the species	No
Littlejohn's Tree Frog	*Litoria littlejohni*	V,P	V	Occurs in wet and dry sclerophyll forests and heath communities associated with sandstone outcrops between 280 and 1000 m. Littlejohn' s Tree Frog prefers permanent and semi-permanent rock flowing streams, but individuals have also been collected from semi-permanent dams with some emergent vegetation.	Low	No
Stuttering Frog	*Mixophyes balbus*	E	V	This species is usually associated with mountain streams, wet mountain forests and rainforests. It rarely moves very far from the banks of permanent forest streams, although it will forage on nearby forest floors. Eggs are deposited in leaf litter on the banks of streams and are washed into the water during heavy rains.	Low	No
Reptiles						
Loggerhead Turtle	Caretta caretta	E	E	Marine species	Not Applicable	No
Green Turtle	Chelonia mydas	V,P	V	Marine species	Not Applicable	No
Leatherback Turtle	Dermochelys coriacea	E	E	Marine species	Not Applicable	No
Hawksbill Turtle	Eretmochelys imbricata	Not listed	V	Marine species	Not Applicable	No

Broad-headed Snake	Hoplocephalus bungaroides	E1,P, 2	V	Mainly occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer.	Low	No
Flatback Turtle	Natator depressus	Not liste d	V	Marine species	Not Applicable	No
Key. V=Vulnerable, E=Endangered, Ep=Endangered Population, CE=Critically Endangered, C, J or K=Migratory (Letters refer to bilateral migratory agreements between Japan, China and Korea). P = Protected. Species habitat associations have been informed predominantly from DPIE (2019b) and DotEE (2019) species profiles.						

Appendix B: Flora Species List

Scientific name	Common name	Native	Exotic
Acacia falcifomis	Broad-leaved Hickory	Yes	
Agapanthus praecox subsp. orientalis	African lily, Lily of the Nile		Yes
Agave attenuata	Foxtail Agave	Yes (landscaped garden)	
Amyema	Mistletoe	Yes	
Austrodanthonia tenuior	Wallaby Grass	Yes	
Banksia spinulosa	Hairpin Banksia	Yes (landscaped garden)	
Buxus sempervirens	English Box		Yes
Callistemon citrinus	Crimson Bottlebrush	Yes (landscaped garden)	
Callistemon salignus	Bottlebrush	Yes (landscaped garden)	
Callistemon viminalis	Dwarf Bottlebrush	Yes (landscaped garden)	
Cenchrus clandestinus	Kikuyu Grass		Yes
Cinnamomum camphora	Camphor Laurel		Yes
Coleonema pulchellum	Confetti Bush		Yes
Corymbia ficifolia		Yes (landscaped garden)	
Corymbia maculata	Spotted Gum	Yes	
Dianella caerulea	Blue Flax-lily	Yes (landscaped garden)	
Dietes iridioides	Diestes, Fairy Iris		Yes
Doryanthes excelsa	Gymea Lily	Yes (landscaped garden)	
Eucalyptus longifolia	Woollybutt	Yes	
Eucalyptus paniculata	Grey Ironbark	Yes	
Exocarpus cupressiformis	Cherry Ballart	Yes	
Ficinia nodosa	Knobby Club-rush	Yes	

Gamochaeta purpurea	Purple Cudweed	Yes (landscaped garden)	
Grevillia banksia x Grevillia pteridifolia	Grevillia 'Honey Gem' cultivar	Yes (landscaped garden)	
Hypochaeris radicata	Catsear, Flatweed	Yes (landscaped garden)	
Lactuca serriola	Prickly Lettuce		Yes
Lomandra multiflora	Many-flowered Mat-rush	Yes (landscaped garden)	
Lophostemon confertus	Queensland Box	Yes (landscaped garden)	
Melaleuca decora	White-feather Honeymyrtle	Yes (landscaped garden)	
Melaleuca ericifolia	Swamp Paperbark	Yes (landscaped garden)	
Melaleuca linariifolia	Flax-leaved Paperbark, Budjur (Gadigal)	Yes (landscaped garden)	
Melaleuca sieberi		Yes (landscaped garden)	
Plantago lanceolata	Lamb' s Tongues, Plantain		Yes
Platanus x acerifolia	London Plane tree		Yes
Syncarpia glomulifera	Turpentine	Yes (landscaped garden)	
Trifolium repens	White Clover		Yes
Westringia sp		Yes (landscaped garden)	

Appendix C: Fauna Species List

Class Name	Scientific Name	Common Name
Bird	*Anthochaera chrysoptera*	Little Wattlebird
	Corvus coronoides	Australian Raven
	Manorina melanocephala	Noisy Miner
	Platycercus eximius	Eastern Rosella
	Trichoglossus moluccanus	Rainbow Lorikeet
	Rhipidura leucophyrs	Willie Wagtail
Reptiles	*Lampropholis guichenoti*	Garden Skin
	Intellagama lesueurii	Water dragon

Appendix D: Tests of Significance

PCT 1212: River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Vegetation mapped within the study area was identified as the PCT 1212: Spotted Gum - Grey Ironbark - Woollybutt grassy open forest on coastal flats, southern Sydney Basin Bioregion and South East Corner Bioregion. This PCT is associated with the Endandgered Ecological Community: River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, as such this test of significance has been prepared.

River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include Eucalyptus tereticornis (forest red gum), E. amplifolia (cabbage gum), Angophora floribunda (rough-barked apple) and A. subvelutina (broad-leaved apple). Eucalyptus baueriana (blue box), E. botryoides (bangalay) and E. elata (river peppermint) may be common south from Sydney, E. ovata (swamp gum) occurs on the far south coast, E. saligna (Sydney blue gum) and E. grandis (flooded gum) may occur north of Sydney, while E. benthamii is restricted to the Hawkesbury floodplain. A layer of small trees may be present, including Melaleuca decora, M. styphelioides (prickly-leaved teatree), Backhousia myrtifolia (grey myrtle), Melia azaderach (white cedar), Casuarina cunninghamiana (river oak) and C. glauca (swamp oak). Scattered shrubs include Bursaria spinosa, Solanum prinophyllum, Rubus parvifolius, Breynia oblongifolia, Ozothamnus diosmifolius, Hymenanthera dentata, Acacia floribunda and Phyllanthus gunnii. The groundcover is composed of abundant forbs, scramblers and grasses including Microlaena stipoides, Dichondra repens, Glycine clandestina, Oplismenus aemulus, Desmodium gunnii, Pratia purpurascens, Entolasia marginata, Oxalis perennans and Veronica plebeia . Grazing, changes to hydrology, soil salinity and fire history are known to influence the composition and structure of the understorey in addition to the introduction to exotic shrubs and other disturbances.

The proposed development would remove 0.13 ha of River-flat Eucalypt Forest in poor condition. In reference to the Biometric vegetation types of the Shoalhaven, Eurobodalla and Bega Valley local government areas (VIS_ID 3900) occurrence of this community is extensive within the locality of the Study area with the remnant patches to be removed not representing a significant total size or linkage between areas of native vegetation.

a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable - Not a threatened species

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

i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

The proposed development will remove a total of 0.13ha of River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions. In reference to the Biometric vegetation types of the Shoalhaven, Eurobodalla and Bega Valley local government areas (VIS_ID 3900) occurrence of this community is extensive within the locality of the Study area. The proposed 0.13ha to be removed is made up of relatively small patches when compared to the surrounding areas of vegetation. Furthermore, these patches do not form any integral linkage between areas of bushland and were identified as a condition class of poor. This is considered a minor disturbance to the community and is unlikely to adversely affect extent of the community within the locality such that it would be placed at risk of extinction.

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,

The River-flat Eucalypt Forest in the study area was present in poor condition. The patches of the community contained a disturbed midstorey and groundcover layer. These patches and did not contain any species unique to the patch or the locality. The species identified in the River-flat Eucalypt Forest to be removed are likely to be well represented within the surrounding mapped areas of River-flat Eucalypt Forest that would be retained within the local occurrence. The proposal is unlikely to substantially modify the composition of the community such that it is placed at risk of extinction.

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

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

The proposal would remove of 0.13 ha of River-flat Eucalypt forest in poor condition.

The patches to be removed exist as isolated patches within the already highly disturbed study area. A majority of the patches of River-flat Eucalypt Forest to be removed are already isolated from other areas of the community in the local landscape. Removal of these patches would not result in significant fragmentation or isolation of the community.

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 River-flat Eucalypt Forest to be removed is in poor condition. The areas to be removed did not contain any species that are unique to the patch or the locality. Some patches lacked structural

integrity and complexity. The areas that were isolated could not form part of a larger patch due to existing hardstand infrastructure, including roads and existing buildings. Removal of these patches would not result in fragmentation or isolation of the community. The impacts to the surrounding areas of this vegetation would not inhibit pollination or seed dispersal and therefore, would be unlikely to adversely impact the community.

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

There are no areas of outstanding biodiversity value in the study area.

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

Three key threatening processes are associated with the proposal:

- clearing of native vegetation
- alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands
- invasion of native plant communities by exotic perennial grasses.

Although the proposal would clear 0.13 ha of native vegetation, these patches are considered to be a poor representation of the community and are not considered to form a significant portion or role in the continuing existence of this vegetation community. The proposal is unlikely to exacerbate the impacts of this key threatening process

Conclusion

The proposal is unlikely to constitute a significant impact on River-flat Eucalypt Forest given the following:

- the proposal would remove of 0.13 ha of River-flat Eucalypt forest in poor condition
- the proposal would not be impacting this vegetation community within the local occurrence
- where the community was present in poor condition it did not represent the community in all structural layers
- the proposal would not fragment or isolate any areas of the community
- the proposal would not substantially modify the composition of the community.

A Species Impact Statement or BDAR is not recommended with respect to the potentially affected species.

Threatened Woodland Birds

The following nine woodland bird species have been grouped together as they are considered to have similar foraging and roosting habitat requirements. Where substantial differences exist, the species have been discussed separately.

The proposed minor vegetation clearance will require a maximum clearance of 0.24 ha of vegetation considered potential foraging habitat, including 2 HBTs, for the below listed bird species.

- Regent Honeyeater (*Anthochaera Phrygia*) – Critically Endangered (BC Act)

The Regent Honeyeater is a striking and distinctive, medium-sized, black and yellow honeyeater with a sturdy, curved bill. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak.

Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast.

There are 2 records for this species within a 10 km radius of the Subject Land (DPIE 2019). There is potential that the Subject Land is used occasionally by this species for foraging only, although it is unlikely that individuals of this species are dependent upon resources in the Subject Land.

- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) - Vulnerable (BC Act)

Dusky woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range.

It primarily inhabits dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris.

Depending on location and local climatic conditions (primarily temperature and rainfall), the dusky woodswallow can be resident year round or migratory. In NSW, after breeding, birds migrate to the north of the state and to southeastern Queensland, while Tasmanian birds migrate to southeastern NSW after breeding.

They are known to nest is an open, cup-shape, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass, rootlets or infrequently horsehair, occasionally unlined. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead.

There are 8 records for this species within a 10 km radius of the Subject Land (DPIE 2019). There is potential that the Subject Land is used occasionally by this species for foraging only, although it is unlikely that individuals of this species are dependent upon resources in the Subject Land.

- Gang-gang Cockatoo (*Callocephalon fimbriatum*) – Vulnerable (BC Act)

These birds are primarily slate-grey, with the males easily identified by their scarlet head and wispy crest, while females have a grey head and crest and feathers edged with salmon pink on the underbelly.

In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.

The species favours old growth forest and woodland attributes 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.

There are 4 records for this species within a 10 km radius of the Study Area (DPIE 2019). There is potential that the subject site is used occasionally by this species, although it is unlikely that individuals of this species are dependent upon resources in the subject site.

- Glossy Black Cockatoo (*Calyptorhynchus lathami*) – Vulnerable (BC Act)

The Glossy Black-Cockatoo is a small brown-black cockatoo with a massive, bulbous bill and a short crest. Males have a prominent red tail panel, while that of females is yellow to orange-red.

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.

Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.

There are 131 records for this species within a 10 km radius of the Study Area (DPIE 2019). There is potential that the subject site is used occasionally by this species, although it is unlikely that individuals of this species are dependent upon resources in the subject site.

- Varied Sittella (*Daphoenositta chrysoptera*) - Vulnerable (BC Act)

The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades.

The Varied Sittella inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.

It is known to build a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.

There are 1 records for this species within a 10 km radius of the Subject Land (DPIE 2019). There is potential that the Subject Land is used occasionally by this species for foraging only, although it is unlikely that individuals of this species are dependent upon resources in the Subject Land.

- Little Lorikeet (*Glossopsitta pusilla*) – Vulnerable (BC Act)

The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are

common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs.

The Little Lorikeet forages primarily in the canopy of open Eucalyptus forest and woodland, but will also utilise Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity and will use isolated flowering trees in open country, roadside remnants and urban areas. The species roosts in treetops and hollow bearing limbs, often distant from feeding areas and are used repeatedly for decades.

The Little Lorikeet is a gregarious species, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries. Nesting season extends from May to September.

There are 2 records for this species within a 10 km radius of the Study Area (DPIE 2019). There is potential that the Study Area is used occasionally by this species, although it is unlikely that individuals of this species are dependent upon resources in the subject site.

- Little Eagle (*Hieraaetus morphnoides*)

The Little Eagle is most abundant in lightly timbered areas with open areas nearby providing an abundance of prey species. It has often been recorded foraging in grasslands, crops, treeless dune fields, and recently logged areas.

The Little Eagle nests in tall living trees within farmland, woodland and forests. They rarely nest in isolated trees.

There are 2 records for this species within a 10 km radius of the Study Area (DPIE 2019). There is potential that the Study Area is used occasionally by this species, although it is unlikely that individuals of this species are dependent upon resources in the subject site.

- Square-tailed Kite (*Lophoictinia isura*)

Typically inhabits coastal forested and wooded lands of tropical and temperate Australia. In NSW it is often associated with ridge and gully forests dominated by Eucalyptus longifolia, Corymbia maculata, E. elata, or E. smithii. Individuals appear to occupy large hunting ranges of more than 100 km2.

They require large living trees for breeding, particularly near water with surrounding woodland /forest close by for foraging habitat. Nest sites are generally located along or near watercourses, in a tree fork or on large horizontal limbs.

There are 23 records for this species within a 10 km radius of the Study Area (DPIE 2019). There is potential that the Study Area is used occasionally by this species, although it is unlikely that individuals of this species are dependent upon resources in the subject site.

- Powerful Owl (*Ninox strenua*) – Vulnerable (BC Act)

The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. 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 suggesting occupancy prior to land clearing. Now at low densities throughout most of its eastern range, rare along the Murray River and former inland populations may never recover.

The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species 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 *Syncarpia glomulifera*, *Allocasuarina littoralis*, *Acacia melanoxylon*, *Angophora floribunda*, *Exocarpus cupressiformis* and a number of eucalypt species.

Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.

There are 15 records for this species within a 10 km radius of the Subject Land (DPIE 2019). There is potential that the Subject Land is used occasionally by this species for foraging only, although it is unlikely that individuals of this species are dependent upon resources in the Subject Land.

- Scarlet Robin (*Petroica boodang*) - Vulnerable (BC Act)

The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter.

The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps.

Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding.

There are 4 records for this species within a 10 km radius of the Subject Land (DPIE 2019). There is potential that the Subject Land is used occasionally by this species for foraging only, although it is unlikely that individuals of this species are dependent upon resources in the Subject Land.

f. 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,

Impacts that are considered to impact on the life cycle of a species relates to impacts on stages of reproduction, growth, development, ageing and death. Woodland birds forage widely and migrate as a state wide population for breeding purposes.

Impacts from the proposed action on the above listed woodland birds relates to the loss of potential foraging for all species and 2 HBTs (1 small and 1 medium) which has the potential to provide habitat for Gang-gang and Glossy Black Cockatoos as well as Little Lorikeets. The development would result in the removal of 0.24 ha of potential foraging and nesting habitat. The vegetation to be removed is considered less favourable compared to the surrounding woodland which contains all layers of vegetation and is located further from disturbance (i.e. the dwellings and roads). The areas of potential foraging habitat represent a very small amount of some 15,700 ha of more consolidated woodland which exists within a 10 km radius of the site

(Google Earth 2019). The woodland bird species are highly mobile and would utilise the foraging resources within the site occasionally at most.

The relative impact is expected to be very small given the surrounding 15,700 ha of woodland considered for potential foraging habitat within 10 kms and the fact that the species all are considered to be highly mobile across NSW. The removal of 0.24 ha foraging habitat is unlikely to impact these species' life cycle such that they are placed at risk of extinction. The maximum impact from the site would therefore occur to 0.0015% of the potential foraging/movement habitat within a 10 km radius. The development is not likely to have an adverse effect on the life cycle of the species such that a viable population of the species is likely to be placed at risk of extinction.

g. 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 – not an endangered ecological community.

h. 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

The development would result in the removal of 0.24 ha of potential habitat. This impact represents 0.0015% of the existing vegetation within the surrounding 10 km.

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

The impact from the proposal would not fragment or isolate any potential habitat from other areas of habitat as the proposed impact is to occur within a small clearing with impacts only to occur to a small area of remnant vegetation. The layout of the proposal will not dissect or fragment any vegetation and areas of potential habitat.

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

Important habitat relates to the stages of a species life cycle and reproductive success. The 0.24 ha of potential habitat for removal is not considered important to the long-term survival or reproductive success of the species considering they are able to utilise habitat state-wide. It is considered to represent poor quality habitat within the study area, and only 0.0015% of the remaining extent of available potential habitat within 10 km. This small area of potential habitat would not be important to the long-term survival of the species in the locality.

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

There are no areas of outstanding biodiversity value in the Subject Site.

j. 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 threatened process.

There is one key threatening process, as listed in Schedule 4 of the BC Act, of relevance to the proposed vegetation clearance:

- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee to list the key threatening process)

The removal of 0.24 ha of native vegetation is considered a small disturbance, particularly in relation to the surrounding habitat and high mobility of these species. Therefore, it is considered unlikely that the proposed vegetation removal would exacerbate any key threatening processes to such an extent that they would place any local populations of the species at risk of extinction.

Conclusion

The proposal will directly affect a maximum area of 0.24 ha of native vegetation to be cleared. The vegetation exists as remnant trees in an already disturbed area. Even if the species did use the trees for intermittent use, the localised nature of the vegetation removal and the presence of abundant suitable foraging and sheltering resources in the surrounding area, indicate that the proposed action is *unlikely* to have a significant impact on woodland bird species such that it would put a local population of any of the species at risk of extinction or substantially isolate any areas of potential habitat.

In summary:

- proposed habitat clearance is very small (0.24 ha)
- these species are highly mobile and forage widely
- no confirmed nests are proposed to be impacted
- nest boxes are recommended to replace any hollows removed
- Mitigation measures are required and will be conducted at a 2:1 ratio
- no species were recorded during survey
- the habitat to be removed will not isolate or fragment other foraging or nesting resources
- potential foraging habitat for these species will remain throughout the locality (approximately 15,700 ha of existing forest)

A Species Impact Statement or BDAR is not recommended with respect to the potentially affected species.

Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable (BC Act)

Grey-headed Flying-fox is listed as a vulnerable species under the BC Act. It is generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. It occurs in subtropical and temperate rainforests, tall sclerophyll forests and

woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops and has been recorded as travelling long distances on feeding forays (up to 50 km). Fruits and flowering plants of a wide variety of species are the main food source.

The species roosts in large 'camps' of up to 200,000 individuals. Camps are usually formed within 20 km of a regular food source and are generally close to water and along gullies. However, the species has been known to form camps in urban areas. Key threats to the species are loss of roosting and foraging sites, electrocution on powerlines, entanglement in netting and on barbed-wire, heat stress, and conflict with humans (OEH 2019). The nearest known camp is located approximately 7 km south-west in Ropes Creek. The population of the camp is estimated at 2,500 – 10,000 individuals (DotEE 2019).

There are 406 records for this species within a 10 km radius of the subject site (OEH 2019). There is potential that the subject site is used occasionally by this species, although it is unlikely that individuals of this species are dependent upon resources in the study area.

a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Grey-headed Flying-fox is one large interbreeding population. Impacts likely to have an adverse effect on the life cycle of Grey-Headed Flying-Fox would include impacts which resulted in the loss of significant areas of foraging habitat, increases in the mortality rate, and increases in conflicts with humans.

The proposal would remove of 0.24 ha of native vegetation and considered foraging habitat for the Grey-headed Flying-fox. No known camps would be affected. The impact is expected to be minimal given the retention of 15,700 ha of potential foraging habitat available in the local occurrence (10km radius around the Study area). The removal of 0.24 ha of potential foraging habitat constitutes 0.0015 % of the habitat present in the local occurrence. This is considered a minor impact given the species wide foraging range.

The potential habitat present within the local occurrence is likely to be of similar or better condition that the habitat to be removed. This patch would likely be utilised by this species. The nearest camp is 5 km north of the subject site in Bomaderry Creek (DotE 2019). Some disturbance (noise and dust) is expected to occur during the construction phase, however the works are unlikely to reach the camp. Any noise and dust impacts would be low-level, temporary and occurring during daytime hours. Therefore, these impacts would be unlikely to indirectly impact the camp or degrade adjacent habitat affecting species' habitat.

It is unlikely that the proposal would result in increases in mortality rates through heat stress or electrocution, given the small portion of potential habitat to be removed and no expected impacts to any camps. It is unlikely that the proposal would increase conflicts with humans as it is unlikely the proposal would contribute to Grey-Headed Flying-Fox establishing a camp in the locality.

Therefore, removal of potential foraging habitat is unlikely to have a significant impact on life cycle of this species such that a viable local population of the species would be placed at risk of extinction.

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

i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable – not an threatened ecological community population.

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

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

The proposal would remove of 0.24 ha of native vegetation and considered foraging habitat for the Grey-headed Flying-fox. This forms 0.0015 % of the potential foraging habitat within the local area, with 15,700 ha present. No known camps would be affected.

II. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The proposal would not result in the fragmentation or isolation of any areas of foraging habitat for this species. The areas of potential foraging habitat to be affected exist as small, isolated pockets and do not form part of a larger patch. The areas to be affected would not act as a foraging link between two areas of foraging habitat. The Grey-headed Flying-fox is also highly mobile and forages up to 50 km in a feeding foray. The removal of 0.24 ha of potential foraging habitat would not prevent this species from utilising other resources within the locality.

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 0.24 ha of potential foraging habitat to be removed is not considered important to the long-term survival of the species. The areas to be affected would not act as a foraging link between two areas of foraging habitat. The Grey-headed Flying-fox is also highly mobile and forages up to 50 km in a feeding foray. The removal of 0.24 ha of potential foraging habitat would not prevent this species from utilising other resources within the locality.

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

There are no areas of outstanding biodiversity value in the Subject Site.

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

There is one key threatening process associated with the proposal; clearing of native vegetation. The proposal would involve the clearing of 0.24 ha of native vegetation which forms potential foraging habitat for the Grey-headed Flying-fox. This species is highly mobile and is known to

rely on a range of foraging resources within the local occurrence. Therefore, the proposal is unlikely to exacerbate the impacts of this key threatening process.

Conclusion

The proposal is unlikely to constitute a significant impact on the Grey-headed Flying-fox given the following:

- the proposal would remove 0.24 ha of potential foraging habitat
- the Grey-headed Flying-fox is highly mobile, would not rely on the resources to be removed and would utilise a range of foraging habitat within the locality
- the habitat to be removed would not isolate or fragment other foraging resources within the local occurrence
- about 15,700 ha of potential foraging habitat would be retained within the local occurrence
- no known camps would be affected.

A Species Impact Statement or BDAR is not recommended with respect to the potentially affected species.

Threatened microchiropteran bats

The following six microchiropteran bat species have been grouped together as they are considered to have similar foraging and nesting habitat requirements. Where substantial differences exist, the species have been discussed separately.

There are records for the below listed species within a 10 km radius of the Study Area (DPIE 2019). There is potential for the subject site to be used occasionally by these species for foraging and nesting, although it is unlikely that individuals rely upon resources in the subject site.

- Large-eared Pied Bat (*Chalinolobus dwyeri*) - Vulnerable (BC Act) - Vulnerable (BC Act)

This species roosts on sandstone cliffs and fertile woodland valley habitat. Records from south-east Queensland suggest that rainforest and moist eucalypt forest habitats on other geological substrates (rhyolite, trachyte and basalt) at high elevation are of similar importance to the species.

The proposed minor vegetation clearance will require a maximum clearance of 0.24 ha of vegetation considered potential foraging and nesting habitat (2 HBTs present).

- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) - Vulnerable (BC Act)

The Eastern False Pipistrelle prefers moist habitats, with trees taller than 20 m.

They generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.

- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) - Vulnerable (BC Act)

Caves are the primary roosting habitat of this species, but they also use derelict mines, storm-water tunnels, buildings and other man-made structures. Breeding or roosting colonies can number from 100 to 150,000 individuals. They form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.

- Eastern Freetail-bat (*Mormopterus norfolkensis*) – Vulnerable (BC Act)

The species is found along the east coast from south Queensland to southern NSW in dry eucalypt forests, woodlands, swamp forests and mangrove forests where they forage for insects among canopy gaps and on edges of vegetation and mainly roost in hollow-bearing trees. This species will utilise paddock trees and remnant vegetation in farmland where these are in proximity to larger forest remnants. This species usually forages within a few kilometres of its roost. Eastern Freetail Bat is threatened by a number of processes including loss of trees for foraging and hollow-bearing trees for roosting, and application of pesticides in or adjacent to foraging areas (DPIE 2018b).

- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) – Vulnerable (BC Act)

The species forages in most habitats across a very wide range, with and without trees and appears to defend an aerial territory. Yellow-bellied Sheathtail-bats roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.

- Greater Broad-nosed Bat (*Scoteanax rueppellii*) – Vulnerable (BC Act)

This species 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. It is generally associated with gullies and river systems. The species primarily roosts in tree hollows.

a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Impacts from the proposed action which may have an adverse effect on the life cycles of the species include the loss of potential foraging habitat in the form of 0.24 ha of eucalypt woodland and nesting habitat including 2 HBTs.

The vegetation to be removed is considered less favourable compared to the surrounding woodland with all layers of vegetation present and located further from disturbance (i.e. the adjacent residential dwellings and roads). The areas of potential habitat represent a very small amount of some 15,700 ha of more consolidated woodland which exists within a 10 km radius of the site (Google Earth 2019). The species are highly mobile and would rely on the resources within the site occasionally at most.

The relative impact is expected to be very small given the remaining 15,700 ha of woodland considered potential foraging and roosting habitat within 10 kms. The removal of 0.24 ha of habitat is unlikely to impact these species' life cycle such that they are placed at risk of extinction. The maximum impact from the site would therefore occur to 0.0015% of the potential habitat within a 10 km radius. The development is not likely to have an adverse effect on the life cycle of the species such that a viable population of the species is likely to be placed at risk of extinction.

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

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 – not an threatened ecological community.

c. 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

The development would result in the removal of 0.24 ha of potential foraging habitat. This impact represents 0.0015% of the existing vegetation within the surrounding 10 km.

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

The impact from the development would not fragment or isolate any potential habitat from other areas of habitat.

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

The 0.24 ha of potential habitat for removal is not considered important to the long-term survival of the species. It is considered to represent poor quality habitat within the study area, and only 0.0015% of the remaining extent of available potential habitat.

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

There are no areas of outstanding biodiversity value in the Subject Site.

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

There is one key threatening process, as listed in Schedule 4 of the BC Act, of relevance to the proposed vegetation clearance:

- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee to list the key threatening process)

The removal of 0.24 ha of native vegetation is considered a small disturbance, particularly in relation to the surrounding habitat and mobility of these species, and ability to utilise a range of habitat attributes. Therefore, it is considered unlikely that the proposed vegetation removal would exacerbate any key threatening processes to such an extent that they would place any local populations of the species at risk of extinction.

Conclusion

The proposal will directly affect a maximum area of 0.24 ha of vegetation including 2 HBTs to be cleared. The vegetation exists within a disturbed area. Even if the species did use the trees for intermittent use or roosting, the localised nature of the vegetation removal and the presence of abundant suitable foraging and sheltering resources in the surrounding area, indicate that the

proposed action is *unlikely* to have a significant impact on the micro-bat species such that it would put a local population of any of the species at risk of extinction or substantially isolate any areas of potential habitat.

In summary:

- proposed habitat clearance is very small (0.24 ha)
- the habitat to be removed would not provide a habitat link between other foraging resources within the local occurrence
- these species are highly mobile
- Mitigation measures are required and will be conducted at a 2:1 ratio
- no confirmed nests are proposed to be impacted, with any removed hollows to be replaced by suitable nest boxes
- potential foraging and roosting habitat for these species will remain throughout the locality
- tree clearance measures will be in place, including felling supervision

A Species Impact Statement or BDAR is not recommended with respect to the potentially affected species.

Appendix E: Significant Impact Criteria

Grey-headed Flying-fox (*Pteropus poliocephalus*)

Grey-headed Flying-fox (*Pteropus poliocephalus*) is listed as a vulnerable threatened species under the EPBC Act.

The Grey-headed Flying-fox is one large interbreeding population. Impacts likely to have an adverse effect on the life cycle of Grey-Headed Flying-Fox would include impacts which resulted in the loss of significant areas of foraging habitat, increases in the mortality rate, and increases in conflicts with humans.

The proposal would remove of 0.24 ha of native vegetation and considered foraging habitat for the Grey-headed Flying-fox. No known camps would be affected. The impact is expected to be minimal given the retention of 15,700 ha of potential foraging habitat available in the local occurrence (10km radius around the Study area). The removal of 0.24 ha of potential foraging habitat constitutes 0.0015 % of the habitat present in the local occurrence. This is considered a minor impact given the species wide foraging range.

The potential habitat present within the local occurrence is likely to be of similar or better condition that the habitat to be removed. This patch would likely be utilised by this species. The nearest camp is 5 km north of the subject site in Bomaderry Creek (DotE 2019). Some disturbance (noise and dust) is expected to occur during the construction phase, however the works are unlikely to reach the camp. Any noise and dust impacts would be low-level, temporary and occurring during daytime hours. Therefore, these impacts would be unlikely to indirectly impact the camp or degrade adjacent habitat affecting species' habitat.

It is unlikely that the proposal would result in increases in mortality rates through heat stress or electrocution, given the small portion of potential habitat to be removed and no expected impacts to any camps. It is unlikely that the proposal would increase conflicts with humans as it is unlikely the proposal would contribute to Grey-Headed Flying-Fox establishing a camp in the locality.

Therefore, removal of potential foraging habitat is unlikely to have a significant impact on life cycle of this species such that a viable local population of the species would be placed at risk of extinction.

Criterion a: lead to a long-term decrease in the size of an important population of a species

No important populations have been recorded within the study area. The site does not support key source populations for breeding or dispersal, populations necessary for maintaining genetic diversity, or populations near the limit of the species range.

Criterion b: reduce the area of occupancy of an important population

This is not an important population.

Criterion c: fragment an existing important population into two or more populations

This is not an important population. The vegetation to be impacted by the proposal is currently isolated from other nearby stands of vegetation by cleared areas, exotic pasture, residential development and roadways. This species is also known to exist within urbanised environments and will likely continue to exist in the locality following the proposed development.

Criterion d: adversely affect habitat critical to the survival of a species

Although 0.24ha of potential habitat for this species will be removed for the proposal, the surrounding 15,700 ha of intact bushland provides a more contiguous suitable habitat for the species.

Criterion e: disrupt the breeding cycle of an important population

No important Grey-headed Flying-fox populations have been identified in the study area and the study area is not known to support 'camps' of flying foxes previously.

Criterion f: Adversely affect habitat critical to the survival of a species; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;

Although 0.24 ha of potential habitat for this species will be removed for the proposal, the surrounding 15,700 ha of intact bushland provides a more contiguous suitable habitat for the species. Given the small amount of habitat to be removed, the quality of potential foraging habitat outside of the study area and the high mobility of the species, it is unlikely that the habitat to be removed would be considered important to the long-term survival of the species in the locality.

Given the highly mobile nature of the species and the fact that the vegetation on site does not represent primary roosting or foraging habitat the potential for fragmentation or isolation is minimal.

Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;

The project will not result in the establishment of an invasive species that is harmful to the Grey-headed Flying-fox.

Criterion h: Introduce disease that may cause the species to decline;

The project will not result in the introduction of a disease that is harmful to the Grey-headed Flying-fox.

Criterion i: Interfere substantially with the recovery of the species;

Considering the above factors, the project will not interfere substantially with the recovery of the species.

The action is not likely to have a significant impact on the Grey-headed Flying-fox.