Flora and Fauna Assessment – Regulus Street, Erskine Park

Penrith City Council

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Project Manager	Karen Spicer
Prepared by	Griffin Taylor-Dalton
Reviewed by	**Karen Spicer**
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Abbreviations

Abbreviation	Description
BC Act	*Biodiversity Conservation Act 2016*
BC Reg	*Biodiversity Conservation Regulation 2017*
BOS	Biodiversity Offset Scheme
BV Map	Biodiversity Values Map
CAA	Controlled Activity Approval
CPW	Cumberland Plain Woodland
DA	Development Application
DAWE	Department of Agriculture, Water and the Environment
DCP	Development Control Plan
DPIE	Department of Planning, Industry and the Environment
ELA	Eco Logical Australia Pty Ltd
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FFA	Flora and Fauna Assessment
FM Act	*Fisheries Management Act 1994*
GHFF	Grey-headed Flying-fox
KFH	Key Fish Habitat
LEP	Local Environment Plan
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NRAR	Natural Resources Access Regulator
NSW	New South Wales
PCC	Penrith City Council
PCT	Plant Community Type
PMST	Protected Matters Search Tool
SIC	Significant impact criteria
SEPP	State Environmental Planning Policy
TEC	Threatened ecological community
ToS	Test of Significance

Executive Summary

Eco Logical Australia Pty Ltd was engaged by was engaged by Penrith City Council to prepare a Flora and Fauna (FFA) assessment for a proposed development at the corner of Swallow Drive and Regulus Street, Erskine Park, NSW (Lot 3280 DP786811). The proposed development will result in the subdivision of the Lot 3280 into five lots and residential development within each new lot. This will result in the removal of all vegetation within the subject site.

In total, the proposed development will impact an area of approximately 0.43 ha. Of this 0.10 ha was validated as poor condition PCT 849: *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion*. This PCT is consistent with the threatened ecological community *Cumberland Plain Woodland in the Sydney Basin Bioregion*. This community is listed as critically endangered under the NSW *Biodiversity Conservation Act 2016* (BC Act).

PCT 849 may also form part the threatened ecological community *Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest*. This community is listed as critically endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), however the vegetation within the subject site did not meet the minimum condition threshold to be recognised under the Act.

The subject site could also provide marginal habitat for the following threatened species that are listed under the BC Act:

- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- Hollow-dependant microbat species:
  - *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
  - *Miniopterus australis* (Little Bentwing-bat)
  - *Myotis macropus* (Southern Myotis)
  - *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
  - *Scoteanax rueppellii* (Greater Broad-nosed Bat)

Through application of the tests of significance (Section 7.3 BC Act), it was determined that the proposed development is unlikely to result in a significant impact to these species/communities. As such, the NSW Biodiversity Offset Scheme is not triggered.

Pteropus poliocephalus (Grey Headed Flying Fox) is also listed as a vulnerable species under the EBPC Act. The significant impact criteria were applied to determine whether the proposed development will result in a significant impact to this species and concluded that a significant impact will not result. As such, a referral to the Commonwealth under the EPBC Act is not required

To minimise impacts, ELA recommends the following mitigation and compensatory measures:

- A pre-clearing survey should be undertaken prior to any hollow-bearing trees being removed
- Clearing supervision should be undertaken during vegetation removal across the subject site
- Clearing of vegetation should occur during Autumn (March – May), which is outside of avian and microbat breeding seasons

- Nest boxes should be installed within the surrounding parklands to compensate for loss of habitat through the removal of hollows. Nest boxes should reflect the size classes of the hollows to be removed (i.e., if a small hollow is removed a small parrot/mammal or microbat nest box should be installed)
    - Nest boxes should be installed by a qualified and experienced climbing arborist under the supervision of an ecologist
    - Nest boxes should be monitored for use for a minimum of three years

1. Introduction

1.1. Background

Eco Logical Australia Pty Ltd (ELA) was engaged by Penrith City Council to prepare a Flora and Fauna (FFA) assessment for the proposed development at the corner of Swallow Drive and Regulus Street, Erskine Park, NSW (Lot 3280 DP786811) (the subject site) (Figure 1). The proposed development will result in the subdivision of the subject site into five lots. The subject site is zoned as R2 Low Density Residential under the Penrith City Council Local Environmental Plan (LEP) (PCC 2010) (Figure 2). The subject site currently operates as vacant land though was previously public parkland.

1.2. Purpose

The aim of this assessment is to outline the biodiversity values of the subject site and assess the impact of the proposed development on these values. This assessment includes information relating to relevant environmental planning instruments, threatened species and ecological communities, entry requirements into the Biodiversity Offset Scheme (BOS) and implications this scheme could have on future development. The following impact assessment has been assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.3. Definitions

For the purposes of this assessment, the following terms have been defined:

- **Subject site** – the area being directly impacted by the proposed subdivision and development (Lot 3280 DP7868110)
- **Study area** – the area surrounding the subject site, including adjacent properties and patches of connecting vegetation

Figure 1: Location of the subject site

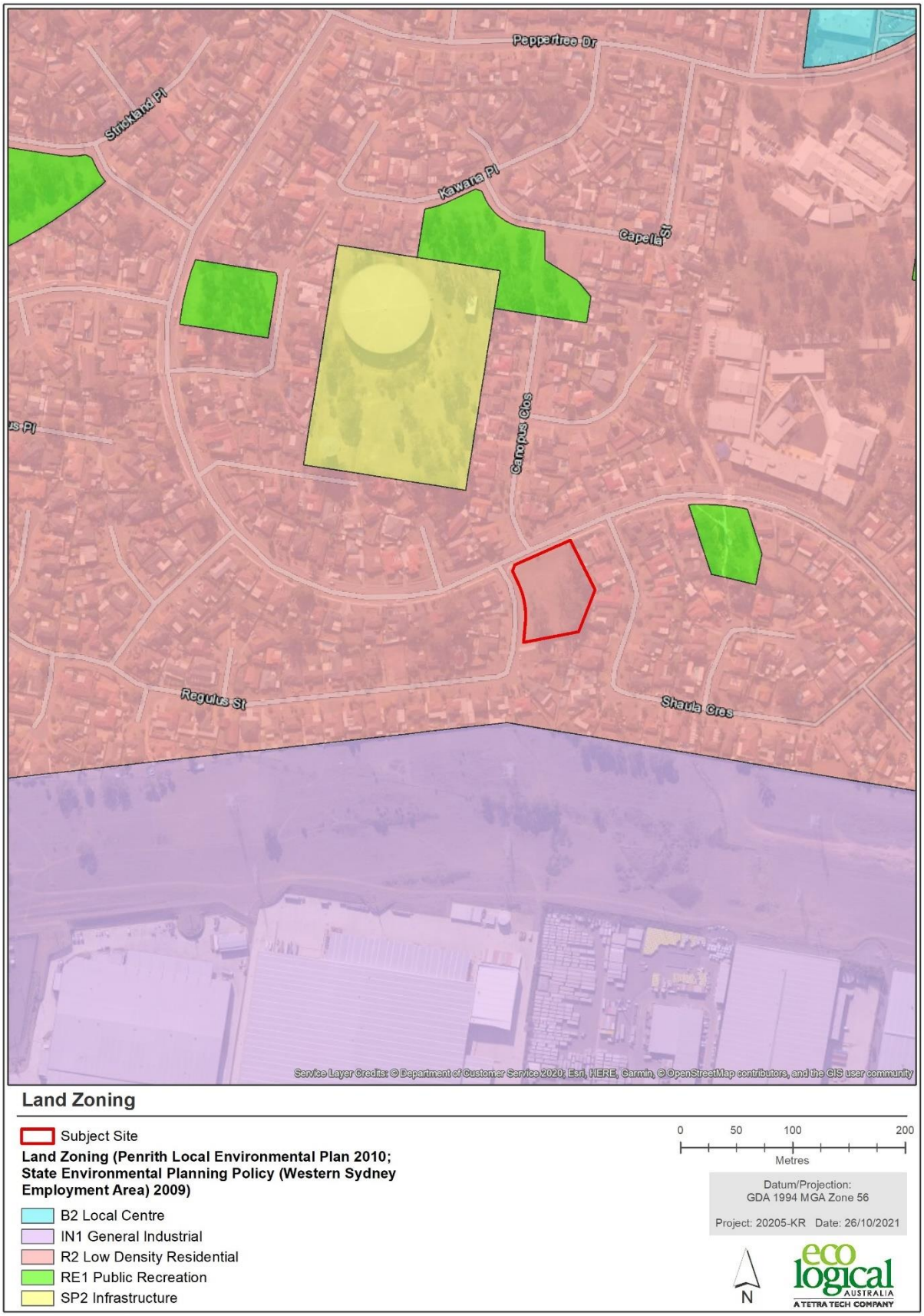

Figure 2: Land zoning of the subject site

2. Methodology

2.1. Literature review and desktop assessment

A desktop review was undertaken on the 1 October 2021. The following resources were consulted to inform this assessment:

- Commonwealth online Protected Matters Search Tool (PMST) (DAWE 2021a)
- BioNet Atlas of NSW Wildlife database (BioNet 2021)
- Biodiversity Values Map (DPIE 2021)
- Remnant Vegetation of the western Cumberland subregion 2013 (OEH 2013)
- ePlanning Spatial Viewer (NSW Government 2021)
- Penrith Local Environmental Plan 2010 (PCC 2010)
- Penrith Development Control Plan 2014 (PCC 2014)
- Cumberland Plain Conservation Plan Exhibition Viewer (DPIE 2021)

2.2. Field survey

ELA ecologists Griffin Taylor-Dalton and Karen Spicer undertook a field survey on the 5 October 2021. The field survey last approximately 4 person hours. Conditions during the field survey were clear and mild, with a maximum temperature of 22.5^{o}C.

Vegetation within the subject site was field validated and assigned a best-fit Plant Community Type (PCT) where applicable. Rapid point assessments were undertaken across the subject site to develop a flora species list (Appendix A). Validated vegetation was marked on a digital map using the Arc Collector App on a smartphone. Any important habitat features were marked spatially using Arc Collector. Habitat features include hollow-bearing trees, birds nests, decorticating bark and culverts. The number and size of any hollows was recorded.

In addition to the vegetation validation, targeted surveys for *Meridolum corneovirens* (Cumberland Plain Land Snail) were undertaken across the subject site. Where habitat was suitable, leaf litter at the base of any large tree was searched for either shells or live specimens of *M. corneovirens* (Cumberland Plain Land Snail). Habitat features were assessed for scratches and scats to indicate potential fauna usage. Any opportunistic sightings of threatened flora and fauna were also recorded.

3. Results

3.1. Legislative context

Table 1 summarises legislation relevant to the proposed development.

Table 1: Legislation relevant to the subject site

Name	Relevance to the project
	Commonwealth
Environment Protection and Biodiversity Conservation Act 1999	The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) aims to protect Matters of National Environmental Significance (MNES), including vegetation communities and species listed under the EPBC Act. If a development is likely to have a significant impact on MNES, it is likely to be considered a 'Controlled Action' by the Commonwealth and requires assessment and approval by the Commonwealth to proceed. The MNES that have been considered during this assessment are: • Listed threatened species and communities • Listed migratory species MNES that may require assessment at the DA stage include: • Impacts to *Pteropus poliocephalus* — Grey-headed Flying-fox
	State
Environmental Planning and Assessment Act 1979	The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. This Act provides for the creation of State Environmental Planning Policies (SEPPs), Local Environmental Plans (LEPs) and Development Control Plans (DCPs). The proposed works will be assessed under Part 4 of the EP&A Act. Part 4 assessments must determine whether the development will trigger the Biodiversity Offset Scheme (BOS). This is discussed further below.
Biodiversity Conservation Act 2016 and BC Regulation 2017	Developments assessed under Part 4 of the EP&A Act must assess impacts to threatened species, ecological communities, or their habitat via Section 7.3 of the *Biodiversity Conservation Act 2016* (BC Act) and whether the Biodiversity Offset Scheme (BOS) will be triggered. The BOS is triggered by any one of the following: • Clearing above the area threshold established under section 7.2 of the *Biodiversity Conservation Regulation 2017* (BC Reg). This is based on the minimum lot size allowable under the LEP • Impacting land that is a listed as an Area of Outstanding Biodiversity Value • Impacting land mapped on the Biodiversity Values (BV) map • If the development is likely to result in a significant impact to a threated species or ecological community. This is determined using a Test of Significance (ToS) as per Section 7.3 of the BC Act In relation to the subject site: • The subject site has a minimum lot size of 550m^2 therefore the minimum lot size clearing threshold for the subject site is 0.25 ha of native vegetation. The proposed development will remove 0.17 ha of native vegetation • The subject site does not occur within a listed Area of Outstanding Biodiversity Value • There is no BV mapped vegetation within the subject site (Figure 3)

Name	Relevance to the project
	• The proposed works are unlikely to result in a significant impact to any threatened species or vegetation communities Given the above information. The BOS will not be triggered by the proposed development.
Fisheries Management Act 1994 **(FM Act)**	The *Fisheries Management Act 1994* (FM Act) governs the management of fish and their habitat in NSW. The schedules of the Act list key threatening processes and threatened species which must be addressed at the DA stage. The FM Act regulates the provision of permits required in relation to harm of protected marine vegetation (seagrass, macroalgae, mangroves and saltmarsh), dredging, reclamation or obstruction of fish passage on or adjacent to Key Fish Habitat (KFH). This includes direct and indirect impacts, whether temporary or permanent. There are no waterways within the subject site.
Water Management Act 2000 **(WM Act)**	The WM Act aims to provide for the sustainable and integrated management of water resources for NSW. The Act requires developments on waterfront land to be ecologically sustainable and recognises the benefits of aquatic ecosystems to agriculture, fisheries, and recreation. The WM Act is administered by the Natural Resources Access Regulator (NRAR) and establishes an approval regime for activities within waterfront land, defined as the land 40 m from the highest bank of a river, lake or estuary. If works are proposed to take place on waterfront land, a Controlled Activity Approval (CAA) is required. There are no waterways within the subject site.
Planning Instruments	
State Environmental Planning Policy (Koala Habitat Protection) 2021	The Penrith City Council LGA is not a listed LGA to which the State Environmental Planning Policy (Koala Habitat Protection) 2021 applies.
State Environmental Planning Policy (Coastal Management) 2018	The subject site is not located within land that applies to this SEPP.
DRAFT Cumberland Plain Conservation Plan	The NSW Department of Planning, Industry and the Environment (DPIE) are in the process of preparing the Cumberland Plain Conservation Plan. This strategic assessment was on public exhibition in 2020 but is still in draft form. Once finalised and gazetted, this plan will be the first strategic biodiversity certification under the NSW BC Act. In relation to this plan, the subject site is on land that has been excluded from this plan.
Local	
Penrith Local Environment Plan 2010	The subject site is zoned as R2 Low Density Residential (Figure 2). No vegetation within the subject site is mapped under the Natural Resources sensitivity land Layer of the Penrith LEP 2010.
Penrith Development Control Plan 2014	Within the Penrith DCP 2014, Part C2: Vegetation management, outlines objectives and controls for the preservation and removal of native vegetation within the Penrith LGA. Section 2.1 of the DCP outlines that any vegetation removal must not occur until development consent has been issued. Section 2.2 of the plan relates exclusively to land that is mapped under the Natural Resources sensitivity land Layer of the Penrith LEP 2010 and thus is not relevant to the proposed development.

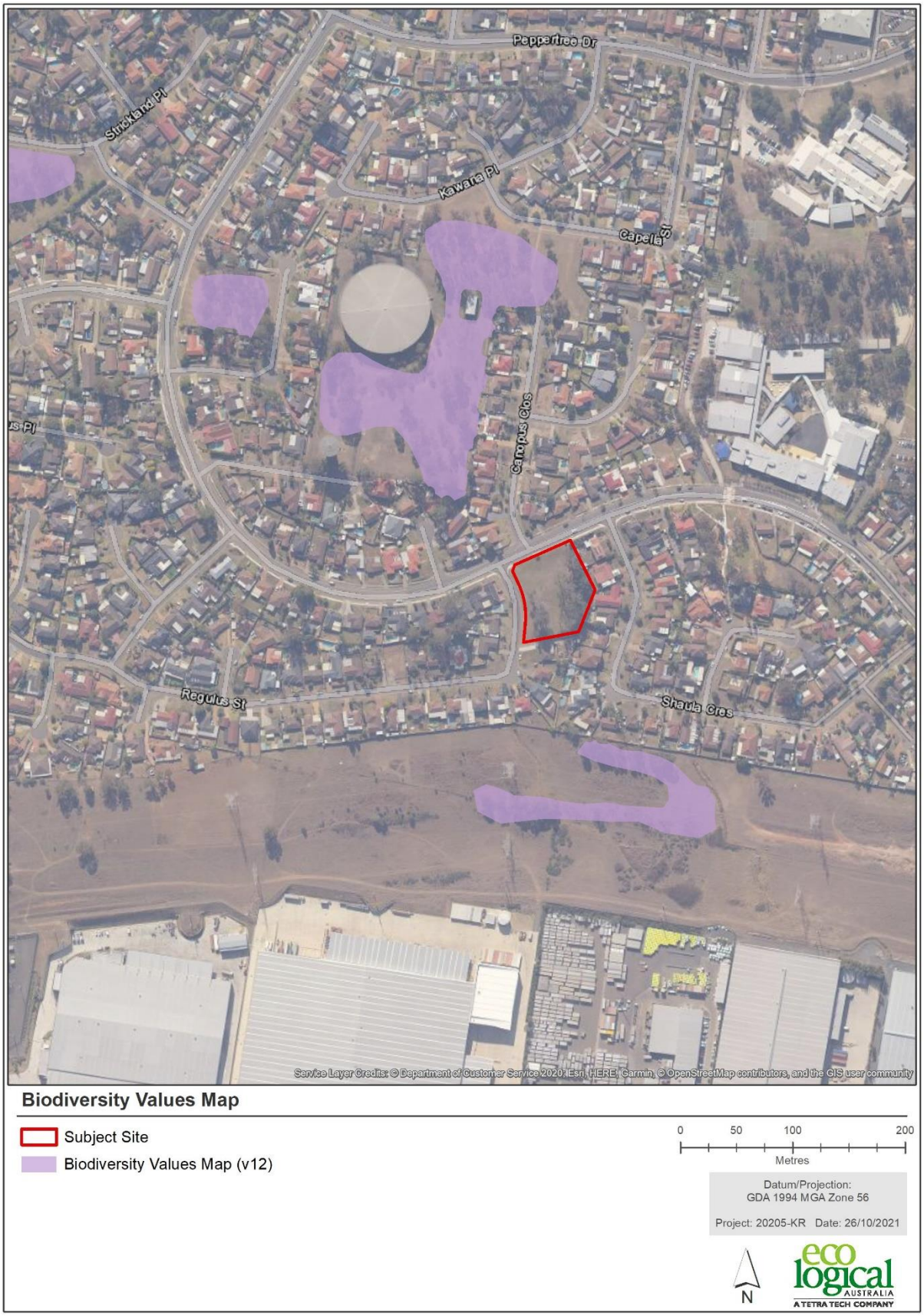

Figure 3: Biodiversity Values mapping within the study area

3.2. Literature review and desktop assessment

3.2.1. Vegetation communities

No PCTs have been previously mapped within the subject site (OEH 2013) (Figure 4). Within the wider study area, patches of PCT 849: *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion* have been mapped to the north and south of the subject site.

3.2.2. Threatened flora and fauna

Upon analysing the BioNet and PMST data, a total of five threatened ecological communities (TECs), 49 threatened fauna species and 25 threatened flora species were recorded within or having the potential to occur within a 5 km radius of the subject site. Using this data, a Likelihood of Occurrence table (see Appendix A) was prepared. This table was used to inform the likelihood each species or community has of occurring within the subject site. Figure 5 and Figure 6 display the BioNet results for threatened fauna and flora species.

Figure 4: Previous vegetation mapping within the subject site

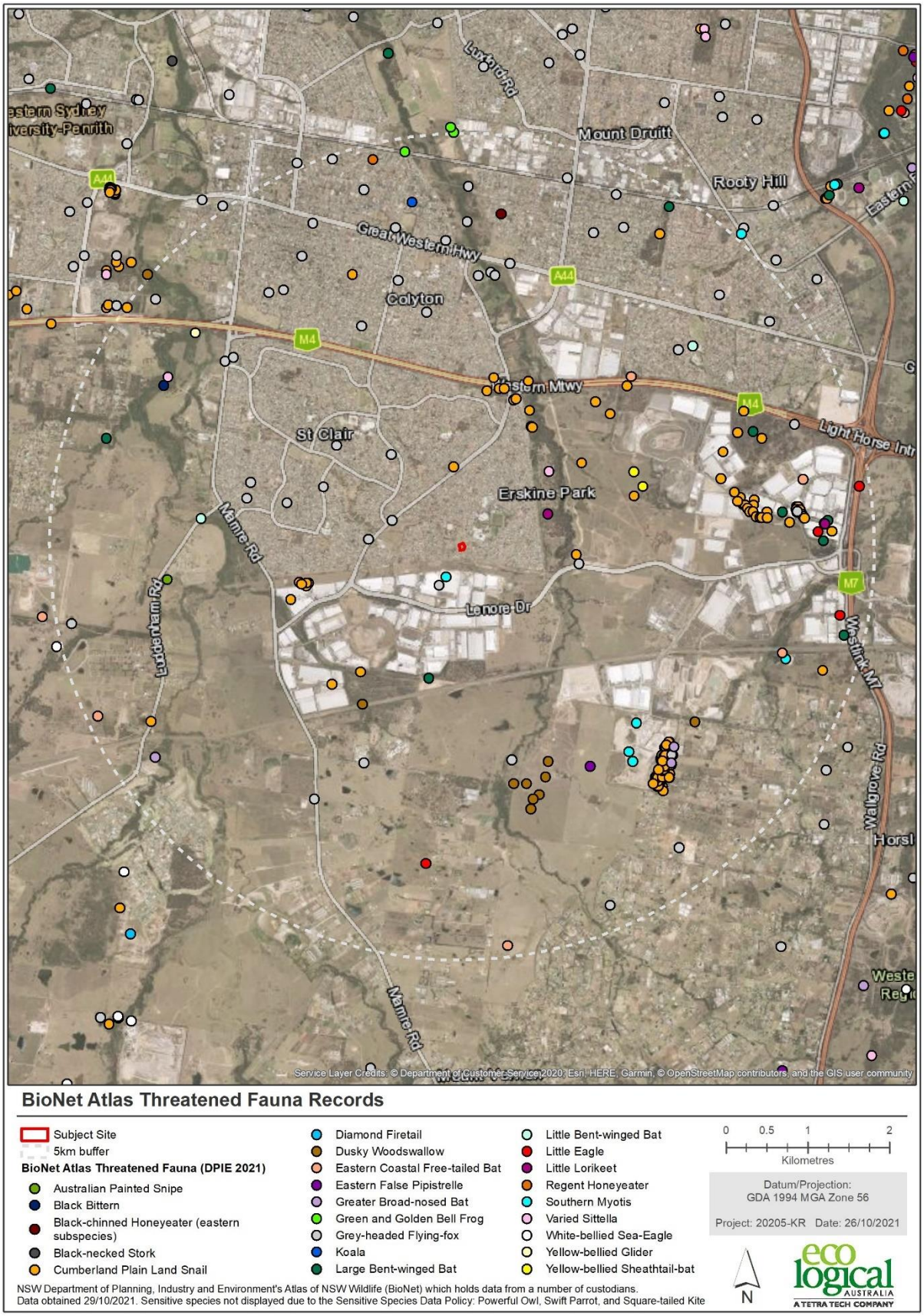

Figure 5: BioNet fauna records within the study area

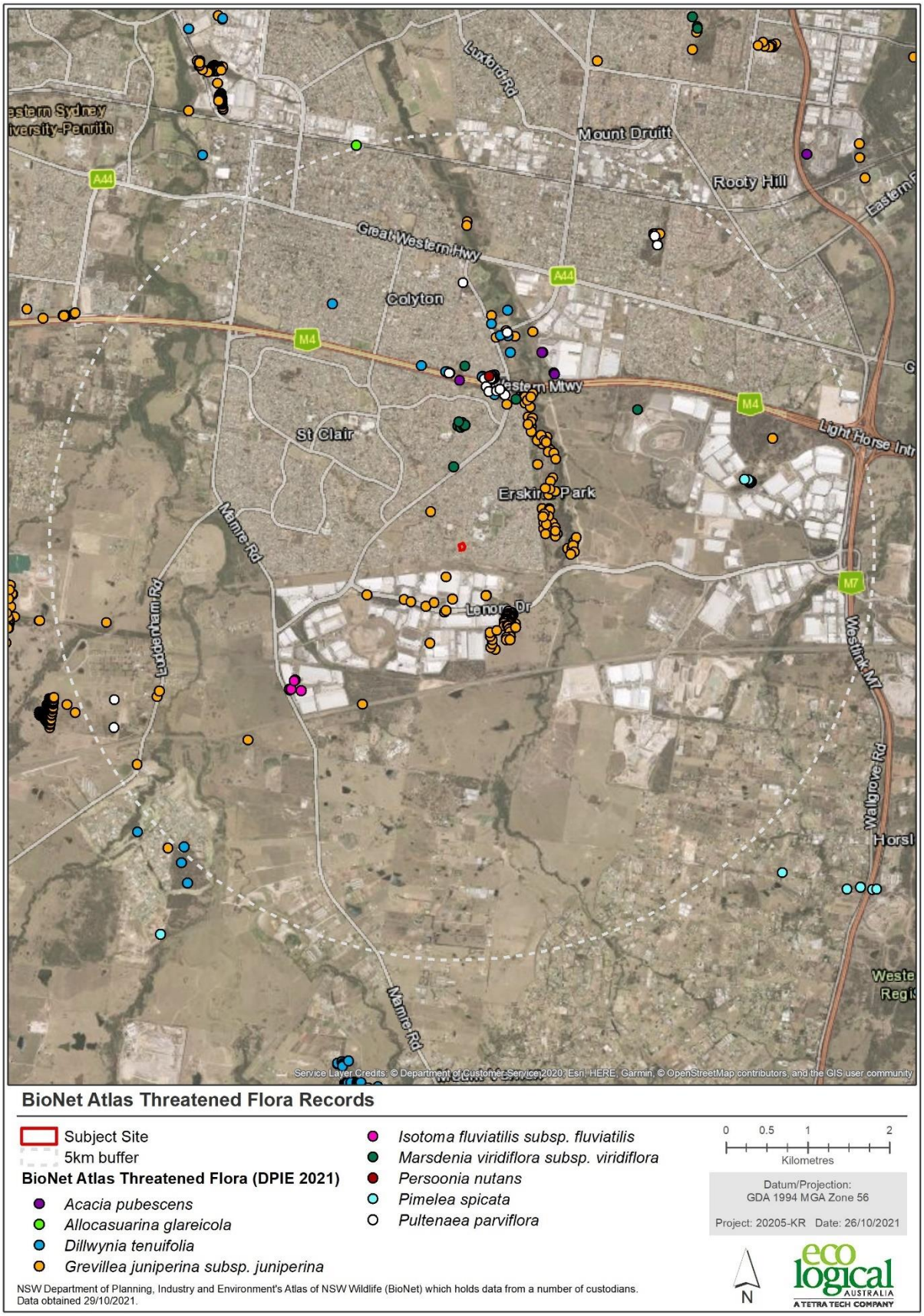

Figure 6: BioNet flora records within the study area

3.3. Field survey

3.3.1. Vegetation

The field survey validated the presence of three vegetation zones within the subject site, one of which conformed to a PCT (Table 2) (Figure 7). These vegetation zones were identified as follows:

- PCT 849: *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion* (poor)
- Planted native
- Cleared/exotic

PCT 849 forms part of the BC Act listed community *Cumberland Plain Woodland in the Sydney Basin Bioregion*. This community is listed as critically endangered under the BC Act. PCT 849 also forms part of the EPBC Act listed community *Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest*. This community is listed as critically endangered under the EPBC Act. However, the condition of the woodland within the study area does not meet the thresholds for listing under the EPBC Act.

Table 2: ELA validated vegetation summary statistics

PCT number	PCT name	Threatened ecological community	Area (ha) within the subject site	BC Act Listing
849	*Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (poor)*	**BC Act** - *Cumberland Plain Woodland in the Sydney Basin Bioregion*	0.10	Critically endangered
n/a	Planted native	n/a	0.07	n/a
n/a	Exotic vegetation	n/a	0.02	n/a
n/a	Cleared/exotic	n/a	0.24	n/a

Below is a description of each vegetation zone.

3.3.1.1. PCT 849: Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (poor)

This PCT was located in several patches across the subject site. This vegetation zone was characterised by a canopy consisting solely of *Eucalyptus moluccana* (Grey Box) (Figure 8). No species were present in the mid-storey stratum. Ground covers were predominately exotic with minor occurrences of native species including *Brunoniella australis* (Blue Trumpet), *Einadia hastata* (Berry Saltbush), *E. trigonos* (Fishweed) and *Dichondra repens* (Kidney Weed). Common exotic species identified within this vegetation zone include *Plantago lanceolata* (Lamb's Tongue), *Eragrostis curvula* (African Lovegrass), *Modiola caroliniana* (Red-flowered Mallow), *Cenchrus clandestinus* (Kikuyu), *Bromus catharticus* (Prairie Grass) and *Ehrharta erecta* (Panic Veldtgrass).

3.3.1.2. Planted native

Planted natives were common throughout the subject site, often planted in distinct patches. Canopy species observed within this vegetation include *Corymbia citriodora* (Lemon-scented Gum), *Grevillea*

robusta (Silky Oak), *Casuarina glauca* (Swamp Oak) and a single *E. tereticornis* (Forest Red Gum) (Figure 9). Mid-storey species consisted only of *Callistemon salignus* (Willow Bottlebrush). Similar to the PCT 849 vegetation, groundcovers were predominantly exotic with minor occurrences of native species. Native species identified in this stratum included *E. hastata* (Berry Saltbush) and *Cynodon dactylon* (Couch). Common exotic species occurring within this stratum include *E. erecta* (Panic Veldtgrass), *Sida rhombifolia* (Paddy's Lucerne), *Bidens pilosa* (Cobblers Pegs) and *Stellaria media* (Chickweed).

3.3.1.3. Exotic vegetation

This vegetation zone consisted only of *Photinia serratifolia* (Chinese Photinia) planted in hedge rows around the perimeter of the subject site (Figure 10).

3.3.1.4. Cleared/exotic

This vegetation zone occupied the majority of the subject site. There were no canopy or mid-storey species within this vegetation zone (Figure 11). Ground covers were predominantly exotic with native species, including as *E. hastata* (Berry Saltbush), *B. australis* (Blue Trumpet), *E. trigonos* (Fishweed) and *D. repens* (Kidney Weed), being uncommon. Frequently observed exotic species included *E. curvula* (African Lovegrass), *C. clandestina* (Kikuyu), *B. catharticus* (Prairie Grass) and *E. erecta* (Panic Veldtgrass).

3.3.2. EPBC Act listing status

In order to be recognised under the EPBC Act, the vegetation in question must meet the condition thresholds outlined in the approved conservation advice (DEWHA 2010). In the case of *Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest*, the minimum factors required to be recognised under the act include :

- Having a minimum project foliage of 10% among canopy species, and
- Having a patch size greater than 0.5 ha

The vegetation within the subject site did have a foliage cover of greater than 10%, but the patch size was 0.10 ha in size. As such, the PCT 849 vegetation within the study area will not be recognised under the EPBC Act. Polygons have been drawn on Figure 12 to indicate the selection criteria pathway that the vegetation within the subject site falls into.

Figure 7: ELA validated vegetation within the subject site

Figure 8: PCT 849 vegetation within the subject site

Figure 9: Planted native vegetation within the subject site

Figure 10: Exotic vegetation within the subject site

Figure 11: Cleared/exotic vegetation within the subject site

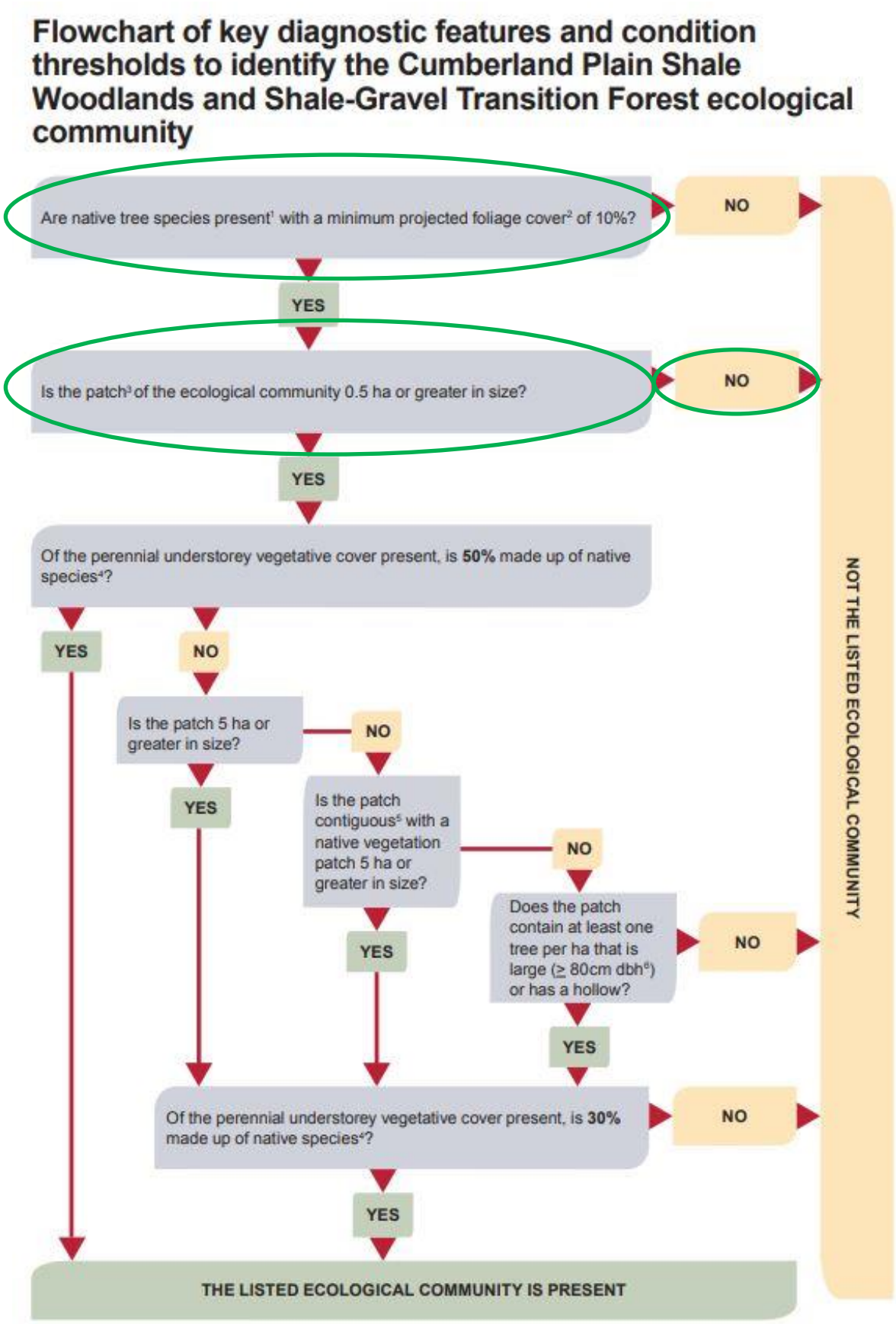

Figure 12: EPBC listing criteria for Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest (DEWHA 2010)

3.3.3. Threatened species and their habitat

The overall habitat values of the subject site is low. The groundcover consists of regularly mown exotic grass. No threatened flora species were observed during the field survey and none are likely to occur due to the highly disturbed nature of the site.

Several hollow-bearing trees were observed during the field survey (Table 3). Most appeared to show no evidence of use (i.e. scratching, scats and feathers at the entrance or base of the tree) however one tree did appear to have an active *Trichoglossus moluccanus* (Rainbow Lorikeet) nest. Despite the remaining hollow-bearing trees appearing unused, they could act as marginal breeding habitat for small hollow-dependant microbats. Most hollows appeared to have resulted from the lopping of the various limbs of the trees. As a result, most hollows formed spouts (a hollow that opens directly toward the sky). Spout hollows are unlikely to be preferred by microbat species due to the reduced thermoregulatory properties of the hollow as a result of its orientation to the sky, and the reduced protection from rain. However, if habitat availability is limited within the region, microbat species may utilise these habitat features. The hollows identified are likely to be too small for any owl or medium to large bird/mammal species.

The small patches of PCT 849 vegetation could act as marginal foraging habitat for *Pteropus poliocephalus* (Grey-headed Flying-fox) (GHFF). No GHFF camps are located within the subject site, however the Ropes Creek GHFF camp is located 3.5 km north of the subject site, along Ropes Creek (DAWE 2021b). Given the proximity of the camp to the subject site, it is possible that this species could utlise the vegetation on site as foraging habitat.

M. corneovirens (Cumberland Plain Land Snail) occurs within PCT 849 however during the field survey no specimens or shells were identified, despite searches being undertaken in leaf litter around the base of trees.

Table 3: Hollow-bearing trees within the subject site

Species	Easting	Northing	Size Class (diameter)		
			<100 mm	100-200 mm	>200 mm
Eucalyptus moluccana	296459	6256895	1		
Eucalyptus moluccana	296449	6256878	2		
Eucalyptus tereticornis	296452	6256870	3		
Eucalyptus moluccana	296431	6256858	1		
Stag (dead tree)	296422	6256865	1		

4. Impact Assessment

4.1. Summary of impacts

4.1.1. Direct impacts

Table 4 summarises the total impacts for the subject site.

Table 4: Impacts associated with the proposed development

PCT number	PCT name	Threatened ecological community	Area (ha) to be impacted	BC Act Listing
849	*Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (poor)*	**BC Act** - *Cumberland Plain Woodland in the Sydney Basin Bioregion*	0.10	Critically endangered
n/a	Planted native	n/a	0.07	n/a
n/a	Exotic vegetation	n/a	0.02	
n/a	Cleared/exotic	n/a	0.24	n/a
Total			**0.43**	

As a part of the proposed development, all vegetation within the subject site will be removed. This will result in a total impact area of 0.43 ha, including cleared land. Of the 0.43 ha of impact, 0.10 ha of PCT 849 will be removed (Figure 13).

4.1.2. Indirect impacts

Indirect impacts are those that do not directly affect the habitat or species within the subject site but have the potential to affect through indirect actions. Indirect impacts that is may be associated with the proposed development include:

- an increase in erosion of soils and sediment movement and due to earthworks
- introduction of exotic flora species

4.1.3. Key Threatening process

The following key threatening process is associated with the proposed development:

- Clearing of native vegetation

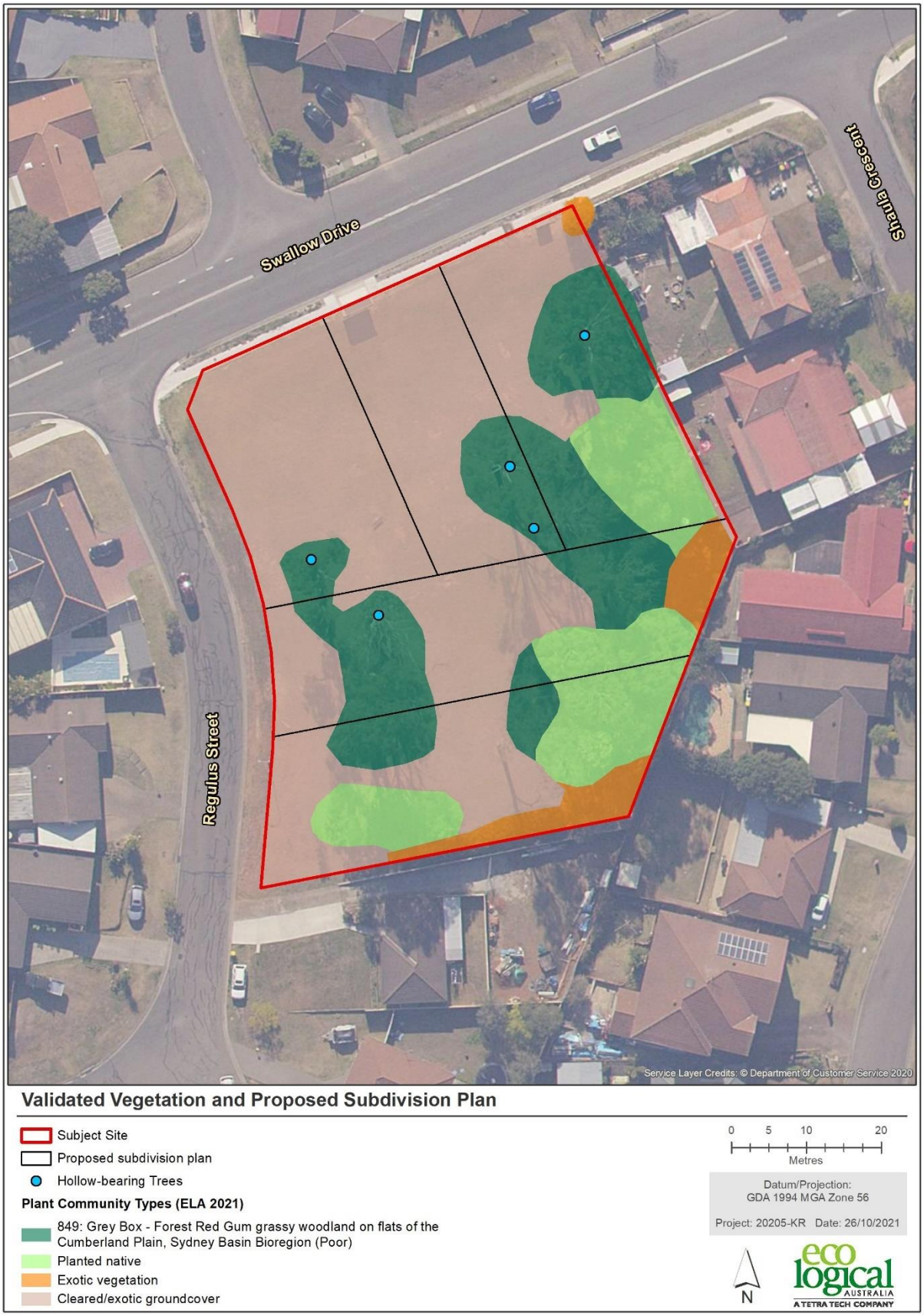

Figure 13: ELA validated vegetation and proposed lot layout

4.2. Biodiversity Conservation Act 2016

As mentioned previously, PCT 849 forms part of the TEC *Cumberland Plain Woodland in the Sydney Basin Bioregion* (CPW). This TEC is listed as critically endangered under the BC Act. As impacts to this community will result as a part of the proposed development, a test of significance (ToS) was undertaken to assess impacts to this community (Appendix C).

Through the application of a ToS, it was determined that the proposed development is unlikely to result in a significant impact to CPW. The proposed development will remove 0.10 ha of poor condition CPW. Although this will increase the distance between patches, it is unlikely to result in the extinction of the local occurrence (defined as patches within 100 m of one another. The vegetation within the subject site was not representative of a good quality patch of CPW as it lacked native species diversity and structure.

ToS were also undertaken for several fauna species that could utilise the subject site as marginal habitat. These species include:

- *Pteropus poliocephalus* (Grey Headed Flying Fox)
- Hollow-dependant microbat species:
  - *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
  - *Miniopterus australis* (Little Bentwing-bat)
  - *Myotis macropus* (Southern Myotis)
  - *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
  - *Scoteanax rueppellii* (Greater Broad-nosed Bat)

Through the application of ToS's, it was determined that the proposed development is unlikely to have a significant impact on the above species. The removal of foraging habitat for these species is unlikely to result in a significant impact, as all the above species are highly mobile and able to forage within the study area. For microbats, the potential breeding habitat that is present within the subject site is marginal and unlikely to be ideal given the orientation of most hollow. No evidence of microbat use was noted during the field survey.

4.3. Environment Protection and Biodiversity Conservation Act 1999

As mentioned, the PCT 849 vegetation did not meet the minimum condition thresholds to be recognised under the EPBC Act. As such, applying the significant impact criteria (SIC) (Commonwealth of Australia. 2013) is not required for this vegetation community.

Pteropus poliocephalus (Grey-headed Flying-fox) is listed as vulnerable under the EPBC Act and thus requires application of the SIC. By applying this assessment, it was determined that the proposed development is unlikely to result in a significant impact to this species. As mentioned above, the removal of 0.10 ha of marginal foraging habitat is unlikely to significantly impact a highly mobile species. Foraging habitat of similar or greater quality will continue to exist within the study area. No camps will be impacted by the proposed development.

4.4. Priority Weeds and Weeds of National Significance

The *Biosecurity Act 2015* and regulations provide specific legal requirements for State level priority weeds. Under the Act, all exotic plants are regulated with a general biosecurity duty to prevent,

eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Specific legal requirements apply to State determined priorities under the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 (updated 2019) (LLS 2019). Weeds listed as 'state priority weeds', 'regional priority weeds' or 'other weeds of regional concern' under the plan warrants resources for local control or management programs and are a priority to keep out of the region.

Inclusion in this list may assist Local Control Authorities and/or land managers to prioritise action in certain circumstances where it can be demonstrated the weed poses a threat to the environment, human health, or agriculture. See Table 5 for a breakdown of the species identified during the field survey and what classification they have been given under the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 (updated 2019) (LLS 2019).

Table 5: Weed species recorded within the study area and their status (LLS 2019)

Scientific name	Common name	Listing status	Weed of national significance (WoNS)
Senecio madagascariensis	Fireweed	State priority weed	Yes
Cenchrus clandestina	Kikuyu	Other weed of regional concern	No
Eragrostis curvula	African Lovegrass	Other weed of regional concern	No

5. Conclusion and recommendations

ELA was engaged by Penrith City Council to prepare an FFA for the proposed development at the corner of Swallow Drive and Regulus Street, Erskine Park, NSW (Lot 3280 DP786811). The proposed development will impact an area of 0.43 ha. This will result in the removal of 0.10 ha of native vegetation, specifically PCT 849: *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion* (poor).

PCT 849 forms part of the TEC *Cumberland Plain Woodland in the Sydney Basin Bioregion*. This TEC is listed as critically endangered under the BC Act. PCT 849 also forms a part of the TEC *Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest* which is listed as critically endangered under the EPBC Act, however the vegetation within the subject site failed to meet the condition threshold requirements needed to be recognised under the EPBC Act.

The subject site provides marginal foraging habitat for *P. poliocephalus* (Grey Headed Flying Fox) and the several threatened microbat species. The several hollow-bearing trees identified within the subject site also provide marginal breeding habitat for the listed microbat species. No evidence of microbat usage was noted during the field survey, however one hollow did contain an active *T. moluccanus* (Rainbow Lorikeet) nest.

To assess the likely impact of the proposed development on the above threatened entities, a test of significance (BC Act) and application of the significant impact criteria (EPBC Act) were undertaken. Through the application of these assessments, it was determined that the proposed development is unlikely to result in a significant impact to any of the above species/communities.

As such, the NSW Biodiversity Offset Scheme is not triggered and a referral to the Commonwealth under the EPBC Act is not required for the proposed development.

To minimise impacts, ELA recommends the following mitigation and compensatory measures:

- A pre-clearing survey should be undertaken prior to any hollow-bearing trees being removed
- Clearing supervision should be provides during vegetation removal across the subject site
- Clearing of vegetation should occur outside of avian and microbat breeding seasons. Ideally this should occur during Autumn (March – May)
- Nest boxes should be installed within the surrounding parklands to compensate for loss of habitat through the removal of hollows. Nest boxes should reflect the size classes of the hollows to be removed (i.e., if a small hollow is removed a small parrot/mammal or microbat nest box should be installed)
    - Nest boxes should be installed by a qualified and experienced climbing arborist under the supervision of an ecologist
    - Nest boxes should be monitored for use for a minimum of three years

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Appendix A – Flora list

Table 6: Flora species list

Family	Scientific name	Common Name	Exotic
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	Yes
Asteraceae	*Conyza* spp.	Fleabane	Yes
Asteraceae	*Gamochaeta* spp.		Yes
Asteraceae	*Hypochaeris radicata*	Catsear	Yes
Asteraceae	*Senecio madagascariensis*	Fireweed	Yes
Asteraceae	*Soliva sessilis*	Bindyi	Yes
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	Yes
Asteraceae	*Taraxacum officinale*	Dandelion	Yes
Caryophyllaceae	*Cerastium glomeratum*	Mouse-ear Chickweed	Yes
Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow	Yes
Caryophyllaceae	*Petrorhagia dubia*		Yes
Caryophyllaceae	*Stellaria media*	Common Chickweed	Yes
Chenopodiaceae	*Einadia trigonos* subsp. *trigonos*		No
Convolvulaceae	*Dichondra repens*	Kidney Weed	No
Fabaceae (Faboideae)	*Glycine tabacina*	Variable Glycine	No
Fabaceae (Faboideae)	*Medicago sativa*	Lucerne	Yes
Fabaceae (Faboideae)	*Pultenaea microphylla*	A Bush Pea	
Malaceae	*Photinia serratifolia*		Yes
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	Yes
Moraceae	*Ficus* spp.		No
Myrtaceae	*Corymbia maculata*	Spotted Gum	No
Myrtaceae	*Eucalyptus eugenioides*	Thin-leaved Stringybark	No
Myrtaceae	*Eucalyptus fibrosa*	Red Ironbark	No
Myrtaceae	*Eucalyptus moluccana*	Grey Box	No
Myrtaceae	*Eucalyptus* spp.		No
Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum	No
Myrtaceae	*Melaleuca decora*		No
Oxalidaceae	*Oxalis perennans*		No
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	Yes
Plantaginaceae	*Plantago myosuros* subsp. *myosuros*		Yes
Poaceae	*Briza subaristata*		Yes

Family	Scientific name	Common Name	Exotic
Poaceae	*Bromus catharticus*	Praire Grass	Yes
Poaceae	*Chloris truncata*	Windmill Grass	No
Poaceae	*Ehrharta erecta*	Panic Veldtgrass	Yes
Poaceae	*Eragrostis curvula*	African Lovegrass	Yes
Poaceae	*Eragrostis tenuifolia*	Elastic Grass	No
Poaceae	*Microlaena stipoides* var. *stipoides*	Weeping Grass	No
Poaceae	*Paspalum dilatatum*	Paspalum	No
Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass	No
Rubiaceae	*Richardia stellaris*		Yes

Appendix B – Likelihood of occurrence table

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the site inspection and professional judgement. Some Migratory or Marine species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- 'known' = the species was or has been observed on the site
- 'likely' = a medium to high probability that a species uses the site
- 'potential' = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- 'unlikely' = a very low to low probability that a species uses the site
- 'no' = habitat within the subject site and in the vicinity is unsuitable for the species

Information provided in the habitat associations' column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database and the NSW Threatened Species Profiles.

Table 7: Likelihood of occurrence – threatened ecological communities

Scientific Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
ECOLOGICAL COMMUNITIES				
Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion	V		Dominated by *Eucalyptus parramattensis subsp. parramattensis*, *Angophora bakeri* and *E. sclerophylla*. A small tree stratum of *Melaleuca decora* is sometimes present, generally in areas with poorer drainage. It has a well-developed shrub stratum consisting of sclerophyllous species such as Banksia spinulosa var. spinulosa, *Melaleuca nodosa*, *Hakea sericea* and *H.* dactyloides (multi-stemmed form). The ground stratum consists of a diverse range of forbs including *Themeda australis*, Entolasia stricta, *Cyathochaeta diandra*, *Dianella revoluta subsp. revoluta*, *Stylidium graminifolium*, *Platysace ericoides*, *Laxmannia gracilis* and *Aristida warburgii*. Occurs within the local government areas of Bankstown, Blacktown, Campbelltown, Hawkesbury, Liverpool and Penrith. Mainly found in the Castlereagh area of the Cumberland Plain, with small patches occurring at Kemps Creek and Longneck Lagoon; also present around Holsworthy.	No – this community was not identified within the subject site.
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community		E	The ecological community occurs in sub-tropical, sub-humid and temperate climatic zones from Curtis Island, north of Gladstone, in Queensland to Bermagui in southern New South Wales. The ecological community is found within the South Eastern Queensland (SEQ), NSW North Coast (NNC), Sydney Basin (SYB) and South East Corner (SEC) IBRA7 Bioregions. Coastal Swamp Oak Forest is often found in association with other vegetation types such as coastal saltmarsh, mangroves, freshwater wetlands, littoral rainforests or swamp sclerophyll forests in a 'mosaic' of coastal floodplain communities.	No – this community was not identified within the subject site.
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	E	CE	Ranges from open forest to low woodland, with a canopy dominated by *Eucalyptus fibrosa* (Broad-leaved Ironbark) and *Melaleuca decora* (Paperbark). The canopy may also include other eucalypts such as *E. longifolia* (Woolybutt). The dense shrubby understorey consists of *Melaleuca nodosa* (Prickly-leaved Paperbark) and *Lissanthe strigosa* (Peach Heath), with a range of 'pea' flower shrubs, such as *Dillwynia tenuifolia*, *Pultenaea villosa* (Hairy Bush-pea) and *Daviesia ulicifolia* (Gorse Bitter Pea). The sparse ground layer contains a range of grasses and herbs. Occurs in western Sydney, with the most extensive stands occurring in the Castlereagh and Holsworthy areas. Smaller remnants occur in the Kemps Creek area and in the eastern section of the Cumberland Plain.	No – this community was not identified within the subject site.

Scientific Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Cumberland Plain Woodland in the Sydney Basin Bioregion	**CE**	**CE**	**The dominant canopy trees are Eucalyptus moluccana (Grey Box) and *E. tereticornis* (Forest Red Gum), with *E. crebra* (Narrow-leaved Ironbark), *Corymbia maculata* (Spotted Gum) and *E. eugenioides* (Thin-leaved Stringybark) occurring less frequently. The shrub layer is dominated by *Bursaria spinosa* (Blackthorn), and it is common to find abundant grasses such as *Themeda australis* (Kangaroo Grass) and *Microlaena stipoides var. stipoides* (Weeping Meadow Grass). Remnants scattered widely across the Cumberland Plain in western Sydney.**	**Present - this community was identified during the field survey**
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	CE	The structure of the community may vary from tall open forests (>40m) to woodlands. 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 azadarach* (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. Found on the river flats of the coastal floodplains. Known from parts of the Local Government Areas of Port Stephens, Maitland, Singleton, Cessnock, Lake Macquarie, Wyong, Gosford, Hawkesbury, Baulkham Hills, Blacktown, Parramatta, Penrith, Blue Mountains, Fairfield, Holroyd, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Sutherland, Wollongong, Shellharbour, Kiama, Shoalhaven, Palerang, Eurobodalla and Bega Valley.	No – this community was not identified within the subject site.

Table 8: Likelihood of occurrence – threatened fauna and flora

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
FAUNA					
Actitis hypoleucos	Common Sandpiper		M	Summer migrant. In NSW, widespread along coastline and also occurs in many areas inland. Coastal wetlands and some inland wetlands, especially muddy margins or rocky shores. Also estuaries and deltas, lakes, pools, billabongs, reservoirs, dams and claypans, mangroves.	No – no habitat within the subject site.
Anthochaera phrygia	Regent Honeyeater	CE	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of Casuarina cunninghamiana (River Oak).	Unlikely – lack of suitable habitat present within the subject site.
Apus pacificus	Fork-tailed Swift		M	Recorded in all regions of NSW. Riparian woodland., swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes.	Unlikely – lack of suitable habitat present within the subject site.
Ardea ibis	Cattle Egret		M	Widespread and common across NSW. Grasslands, wooded lands and terrestrial wetlands.	Unlikely – lack of suitable habitat present within the subject site.
Botaurus poiciloptilus	Australasian Bittern	E	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly Typha spp. (bullrushes) and Eleocharis spp. (spikerushes).	No – no suitable habitat within the subject site.
Calidris acuminata	Sharp-tailed Sandpiper		M	Summer migrant. Widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions. Shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	No – no suitable habitat within the subject site.
Calidris ferruginea	Curlew Sandpiper	E	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland	No – no suitable habitat within the subject site.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Calidris melanotos	Pectoral Sandpiper		M	Summer migrant to Australia. Widespread but scattered in NSW. East of the Great Divide, recorded from Casino and Ballina, south to Ulladulla. West of the Great Divide, widespread in the Riverina and Lower Western regions. Shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	No – no suitable habitat within the subject site.
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	Unlikely – lack of breeding habitat within the subject site. Degraded foraging habitat unlikely to support this species.
Daphoenositta chrysoptera	Varied Sittella	V		Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, mallee and Acacia woodland.	Unlikely – lack of suitable habitat present within the subject site.
Dasyurus maculatus maculatus (SE mainland population)	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Unlikely – lack of suitable habitat present within the subject site.
Falco hypoleucos	Grey Falcon	E		Arid and semi-arid zones. In NSW, found chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Shrubland, grassland and wooded watercourses, occasionally in open woodlands near the coast, and near wetlands.	No – outside of natural range, lack of suitable habitat present within the subject site.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		South-east coast and ranges of Australia, from southern Qld to Victoria and Tasmania. In NSW, records extend to the western slopes of the Great Dividing Range. Tall (greater than 20m) moist habitats.	Unlikely – lack of suitable habitat present within the subject site.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Gallinago hardwickii	Latham's Snipe		M	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	Unlikely – lack of suitable habitat present within the subject site.
Glossopsitta pusilla	Little Lorikeet	V		In NSW, found from the coast westward as far as Dubbo and Albury. Dry, open eucalypt forests and woodlands, including remnant woodland patches and roadside vegetation.	Unlikely – lack of suitable habitat present within the subject site.
Grantiella picta	Painted Honeyeater	V	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	No – lack of suitable habitat present within the subject site.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V		Distributed along the coastline of mainland Australia and Tasmania, extending inland along some of the larger waterways, especially in eastern Australia. Freshwater swamps, rivers, lakes, reservoirs, billabongs, saltmarsh and sewage ponds and coastal waters. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest and urban areas.	Unlikely – lack of suitable habitat present within the subject site.
Heleioporus australiacus	Giant Burrowing Frog	V	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	No – lack of suitable habitat present within the subject site.
Hieraaetus morphnoides	Little Eagle	V		Throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment. Open eucalypt forest, woodland or open woodland, including sheoak or Acacia woodlands and riparian woodlands of interior NSW.	Unlikely – lack of suitable habitat present within the subject site.
Hirundapus caudacutus	White-throated Needletail		M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Unlikely – lack of suitable habitat present within the subject site.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Hoplocephalus bungaroides	Broad-headed Snake	E	V	Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney. Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands.	No – lack of suitable habitat present within the subject site.
Ixobrychus flavicollis	Black Bittern	V		In NSW, records are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland. Terrestrial and estuarine wetlands. Also flooded grassland, forest, woodland, rainforest and mangroves where permanent water is present.	No – lack of suitable habitat within the subject site.
Lathamus discolor	Swift Parrot	E	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.	No – lack of suitable habitat present within the subject site.
Litoria aurea	Green and Golden Bell Frog	E	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region. Marshes, dams and stream-sides, particularly those containing Typha spp. (bullrushes) or Eleocharis spp. (spikerushes). Some populations occur in highly disturbed areas.	Unlikely – lack of suitable habitat present within the subject site.
Lophoictinia isura	Square-tailed Kite	V		In NSW, it is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast. Timbered habitats including dry woodlands and open forests, particularly timbered watercourses.	Unlikely – lack of suitable habitat present within the subject site.
Macquaria australasica	Macquarie Perch	E	E	Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. River and lake habitats, especially the upper reaches of rivers and their tributaries.	No – outside natural range and lack of suitable habitat present within the subject site.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V		Widespread in NSW from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Also Richmond and Clarence River areas and a few scattered sites in the Hunter, Central Coast and Illawarra regions.	Unlikely – habitat within the subject site is degraded.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
				Open forests or woodlands dominated by box and ironbark eucalypts, or by smooth-barked gums, stringybarks, river sheoaks and tea-trees.	
Meridolum corneovirens	Cumberland Plain Land Snail	E		Areas of the Cumberland Plain west of Sydney, from Richmond and Windsor south to Picton and from Liverpool, west to the Hawkesbury and Nepean Rivers at the base of the Blue Mountains. Primarily inhabits Cumberland Plain Woodland. Also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest.	Unlikely – habitat quality on site is marginal. Targeted surveys did not find any specimens within the subject site.
Merops ornatus	Rainbow Bee-eater			Distributed across much of mainland Australia, including NSW. Open forests and woodlands, shrublands, farmland, areas of human habitation, inland and coastal sand dune systems, heathland, sedgeland, vine forest and vine thicket.	Unlikely – lack of suitable habitat present within the subject site.
Micronomus norfolkensis	**Eastern Coastal Free-tailed Bat**	**V**		**The Eastern Freetail-bat has dark brown to reddish brown fur on the back and is slightly paler below. Like other freetail-bats it has a long (3 - 4 cm) bare tail protruding from the tail membrane. Freetail-bats are also known as mastiff-bats, having hairless faces with wrinkled lips and triangular ears. They weigh up to 10 grams.**	**Potential – marginal breeding and foraging habitat within the subject site.**
Miniopterus australis	**Little Bentwing-bat**	**V**		**East coast and ranges south to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub.**	**Potential – marginal breeding and foraging habitat within the subject site.**
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		Large Bent-winged bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	Unlikely – no breeding habitat within the subject site. Foraging habitat is marginal and degraded.
Monarcha melanopsis	Black-faced Monarch		M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park and Wombeyan	Unlikely – lack of suitable habitat

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
				Caves. It is rarely recorded farther inland. Rainforest, open eucalypt forests, dry sclerophyll forests and woodlands, gullies in mountain areas or coastal foothills, Brigalow scrub, coastal scrub, mangroves, parks and gardens.	present within the subject site.
Motacilla flava	Yellow Wagtail		M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA. Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	Unlikely – lack of suitable habitat present within the subject site.
Myiagra cyanoleuca	Satin Flycatcher		M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies.	Unlikely – lack of suitable habitat present within the subject site.
Myotis macropus	**Southern Myotis**	**V**		**In NSW, found in the coastal band. It is rarely found more than 100 km inland, except along major rivers. Foraging habitat is waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetation up to 20m.**	**Potential – marginal breeding habitat within the subject site.**
Ninox strenua	Powerful Owl	V		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. Woodland, open sclerophyll forest, tall open wet forest and rainforest.	Unlikely – lack of suitable habitat present within the subject site.
Numenius madagascariensis	Eastern Curlew		CE, M	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records. Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	No – lack of suitable habitat present within the subject site.
Petaurus australis	Yellow-bellied Glider population on the Bago Plateau	E		The endangered population of the Yellow-bellied Glider occurs on the Bago Plateau; a westward extension of the Kosciuszko highlands in southern NSW. The habitat on the Bago Plateau consists of tall wet sclerophyll forest dominated by *Eucalyptus delegatensis* (Alpine Ash), *E. dalrympleana* (Mountain Gum), *E. radiata* (Narrow-leaved Peppermint), and *E. rubida* (Candlebark).	No – the subject site is too far from the known distribution of this species.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Petaurus australis	Yellow-bellied Glider	V		Along the eastern coast to the western slopes of the Great Dividing Range, from southern Qld to Victoria. Tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	Unlikely – lack of suitable habitat within the subject site.
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	No – lack of suitable habitat present within the subject site.
Phascolarctos cinereus	Koala, Hawks Nest and Tea Gardens population	E,V	V	Known from, and in the immediate vicinity of, the towns of Hawks Nest and Tea Gardens in the Great Lakes Local Government Area. Eucalypt forest and woodland communities, including coastal forests, rainforest, riparian areas, swamp sclerophyll forests, heathland and shrubland.	No – outside of natural range and lack of suitable habitat present within the subject site.
Phascolarctos cinereus	Koala in the Pittwater Local Government Area	E, V	V	The endangered population occurs within the Pittwater Local Government Area, with most recent records occurring on the Barrenjoey Peninsula. Eucalypt forests and woodlands. Key likely habitats within Pittwater Council are: Swamp Mahogany Forest, ecotone between Spotted Gum Forest & Hawkesbury Sandstone Open-Forest, Northern form of Coastal Sandstone Woodland at Whale Beach, Red Bloodwood - Scribbly Gum Woodland, Bilgola Plateau Forest and the Grey Ironbark - Grey Gum form of the Newport Bangalay Woodland.	No – outside of natural range and lack of suitable habitat present within the subject site.
Phascolarctos cinereus	Koala	V	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. Eucalypt woodlands and forests.	Unlikely – no individuals were observed during the site visit and there is a lack of suitable habitat present within the subject site. Lack of connectivity to

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
					known habitat of this species.
Prototroctes maraena	Australian Grayling		V	Streams and rivers on the eastern and southern flanks of the Great Dividing Range; in NSW, it occurs south from the Shoalhaven River. Coastal rivers and streams, fresh and brackish coastal lagoons.	No – lack of suitable habitat present within the subject site.
Pseudomys novaehollandiae	New Holland Mouse		V	Fragmented distribution across eastern NSW. Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	No – lack of suitable habitat present within the subject site.
Pteropus poliocephalus	**Grey-headed Flying-fox**	**V**	**V**	**Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.**	**Potential – marginal foraging habitat within the subject site.**
Rhipidura rufifrons	Rufous Fantail		M	Coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW. Wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands.	Unlikely – lack of suitable habitat present within the subject site.
Rostratula australis	Australian Painted Snipe	E	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas.	Unlikely – lack of suitable habitat present within the subject site.
Saccolaimus flaviventris	**Yellow-bellied Sheathtail-bat**	**V**		**There are scattered records of this species across the New England Tablelands and North West Slopes. Rare visitor in late summer and autumn to south-western NSW. Almost all habitats, including wet and dry sclerophyll forest, open woodland, open country, mallee, rainforests, heathland and waterbodies.**	**Potential – marginal breeding and foraging habitat within the subject site.**
Scoteanax rueppellii	**Greater Broad-nosed Bat**	**V**		**Both sides of the great divide, from the Atherton Tableland in Qld to north-eastern Victoria, mainly along river systems and gullies. In NSW it is widespread on the New England Tablelands. Woodland, moist and dry eucalypt forest and rainforest.**	**Potential – marginal breeding and foraging habitat**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
					within the subject site.
Tringa nebularia	Common Greenshank		M	Summer migrant to Australia. Recorded in most coastal regions of NSW; also widespread west of the Great Dividing Range, especially between the Lachlan and Murray Rivers and the Darling River drainage basin, including the Macquarie Marshes, and north-west regions. Terrestrial wetlands (swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans, saltflats, sewage farms and saltworks dams, inundated rice crops and bores) and sheltered coastal habitats (mudflats, saltmarsh, mangroves, embayments, harbours, river estuaries, deltas, lagoons, tidal pools, rock-flats and rock platforms).	No – lack of suitable habitat present within the subject site.
FLORA					
Acacia bynoeana	Bynoe's Wattle	E	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.
Allocasuarina glareicola		E	E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Castlereagh woodland on lateritic soil. Found in open woodland with Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla and Melaleuca decora.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.
Cynanchum elegans	White-flowered Wax Plant	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.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Dillwynia tenuifolia	Dillwynia tenuifolia, Kemps Creek	E,V		Occurs in the area bounded by Western Road, Elizabeth Drive, Devonshire Road and Cross Street, Kemps Creek in the Liverpool Local Government Area. Transition from Castlereagh Ironbark Forest to Castlereagh Scribbly Gum Woodland.	No – subject site is too far from the known distribution of this population.
Dillwynia tenuifolia	Dillwynia tenuifolia Sieber ex D.C. in the Baulkham Hills local government area	E,V		Near the junction of Wisemans Ferry and Sackville Roads within the Baulkham Hills local government area. Vegetation similar to Cumberland Plain Woodland, on Wianamatta Shale soils.	No – subject site is too far from the known distribution of this population.
Dillwynia tenuifolia		V		Mainly on the Cumberland Plain, but also Bulga Mountains at Yengo in the north, and Kurrajong Heights and Woodford in the Lower Blue Mountains. Scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest, transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland, and disturbed escarpment woodland on Narrabeen sandstone.	Unlikely – habitat within the subject site is degraded. This species was not identified during the field survey.
Genoplesium baueri	Bauer's Midge Orchid	E	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Dry sclerophyll forest and moss gardens over sandstone.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.
Grevillea juniperina subsp. *juniperina*	Juniper-leaved Grevillea	V		Endemic to Western Sydney, centred on an area bounded by Blacktown, Erskine Park, Londonderry and Windsor with outlier populations at Kemps Creek and Pitt Town. Cumberland Plain Woodland, Castlereagh Ironbark Woodland, Castlereagh Scribbly Gum Woodland and Shale/Gravel Transition Forest, on reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium.	Unlikely – this species was not identified during the field survey.
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	V	V	Sporadically distributed throughout the Sydney Basin and in the Hunter in the Cessnock - Kurri Kurri area. Also known from Putty to Wyong and Lake Macquarie on	Unlikely – lack of suitable habitat present within the

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
				the Central Coast. Heath and shrubby woodland to open forest on sandy or light clay soils usually over thin shales.	subject site. Not identified during the field survey.
Haloragis exalata subsp. *exalata*	Square Raspwort	V	V	Disjunct distribution in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Protected and shaded damp situations in riparian habitats.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.
Isotoma fluviatilis subsp. *fluviatilis*		E	X	Currently known from only one property at Erskine Park in the Penrith LGA. Previously sighted at Homebush and at Agnes Banks. Damp places on the Cumberland Plain, including freshwater wetland, grassland/alluvial woodland, and alluvial woodland/shale plains woodland.	Unlikely – lack of suitable habitat within the subject site.
Marsdenia viridiflora subsp. *viridiflora*	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	E		Razorback Range, also recorded at Prospect, Bankstown, Smithfield, Cabramatta Creek and St Marys. Vine thickets and open shale woodland.	Unlikely – lack of suitable habitat present within the subject site. Not identified during the field survey.
Melaleuca deanei	Deane's Paperbark	V	V	Ku-ring-gai/Berowra area, Holsworthy/Wedderburn area, Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Heath on sandstone.	Unlikely – lack of suitable habitat present within the subject site. Not

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
					identified during the field survey.
Persicaria elatior	Tall Knotweed	V	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). Beside streams and lakes, swamp forest or disturbed areas.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.
Persoonia hirsuta	Hairy Geebung	E	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.
Persoonia nutans	Nodding Geebung	E	E	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. Northern populations: sclerophyll forest and woodland (Agnes Banks Woodland, Castlereagh Scribbly Gum Woodland and Cooks River / Castlereagh Ironbark Forest) on aeolian and alluvial sediments. Southern populations: tertiary alluvium, shale sandstone transition communities and Cooks River / Castlereagh Ironbark Forest.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.
Pimelea curviflora var. curviflora		V	V	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south. Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	Unlikely – lack of suitable habitat present within the subject site. Not identified during the field survey.
Pimelea spicata	Spiked Rice-flower	E	E	Two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama). Well-structured clay soils. Eucalyptus moluccana (Grey Box) communities and in areas of ironbark on the Cumberland Plain. Coast Banksia open woodland or coastal grassland in the Illawarra.	Unlikely – lack of suitable habitat present within the subject site. Not

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
					identified during the field survey.
Pomaderris brunnea	Brown Pomaderris	E	V	In NSW, found around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands. Moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	Unlikely – lack of suitable habitat present within the subject site. Not identified during the field survey.
Pterostylis gibbosa	Illawarra Greenhood	E	E	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra). Open forest or woodland, on flat or gently sloping land with poor drainage.	Unlikely – the subject site is not within the known distribution of this species. The habitat on site is degraded. This species was no identified during the field survey.
Pterostylis saxicola	Sydney Plains Greenhood	E	E	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. Small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines, adjacent to sclerophyll forest or woodland on shale/sandstone transition soils or shale soils.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.
Pultenaea parviflora		E	V	Endemic to the Cumberland Plain. Mainly from Windsor to Penrith and east to Dean Park, with outlier populations at Kemps Creek and Wilberforce. Dry sclerophyll forest, especially Castlereagh Ironbark Forest, Shale Gravel Transition Forest and transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.	Unlikely – lack of suitable habitat present within the subject site. Not identified during the field survey.
Rhizanthella slateri	Rhizanthella slateri (Rupp)	E,V	E	The population occurs near Bulahdelah (within the Great Lakes LGA). Sclerophyll forest in shallow to deep loams.	No – outside of natural range and

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
	M.A. Clem. & Cribb in the Great Lakes local government area				lack of suitable habitat present within the subject site.
Rhizanthella slateri	Eastern Australian Underground Orchid	V	E	In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Sclerophyll forest in shallow to deep loams.	Unlikely – lack of suitable habitat present within the subject site. Not identified during the field survey.
Rhodamnia rubescens	Scrub Turpentine	CE		Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of R. rubescens typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	No – lack of suitable habitat present within the subject site. Not identified during the field survey.
Syzygium paniculatum	Magenta Lilly Pilly	E	V	Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Subtropical and littoral rainforest on gravels, sands, silts and clays.	Unlikely – lack of suitable habitat present within the subject site. Not identified during the field survey.
Thesium australe	Austral Toadflax	V	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. Grassland on coastal headlands or grassland and grassy woodland away from the coast.	Unlikely – lack of suitable habitat present within the subject site. Not identified during the field survey.

Appendix C – Tests of Significance

The 'Test of significance' (5-part test) is applied to species, populations and ecological communities listed on Schedules 1 and 2 of the BC Act and Schedules 4, 4A and 5 of the FM Act. The assessment sets out five factors, which when considered, allow proponents to undertake a qualitative analysis of the likely impacts of an action and to determine whether a significant impact is likely. All factors must be considered, and an overall conclusion made based on all factors in combination.

Tests of Significance have been undertaken for the following threatened entities:

- *Cumberland Plain Woodland in the Sydney Basin Bioregion*
- *Pteropus poliocephalus* (Grey Headed Flying Fox)
- Hollow-dependant microbat species:
  - *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
  - *Miniopterus australis* (Little Bentwing-bat)
  - *Myotis macropus* (Southern Myotis)
  - *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
  - *Scoteanax rueppellii* (Greater Broad-nosed Bat)

For the purposes of this assessment, the following terms have been defined:

- **Subject site** – the area being directly impacted by the proposed subdivision and development (Lot 3280 DP7868110)
- **Study area** – the area surrounding the subject site, including adjacent properties and patches of connecting vegetation

See Table 9 to Table 11 for the results.

CPW is listed as critically endangered under the BC Act. This TEC occupies an area of 0.10 ha within the subject site. All of this vegetation will be removed as a part of the proposed development. Table 9 outlines the results of the ToS. For this assessment, the local occurrence has been defined as any contiguous patches that are within 100 m of one another (Figure 14).

Table 9: Test of Significance - *Cumberland Plain Woodland in the Sydney Basin Bioregion*

BC Act	Question	Response
7.3.1 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	N/A.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	The proposed development is likely to impact 0.10 ha of CPW. There is a total of 3.25 ha of CPW within the local occurrence. The impacts associated with the proposed development will result in a loss of 3.07% of the local occurrence. The patches located south and north of the subject site will continue to exist and thus the local occurrence will persist despite the proposed development.
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity 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 CPW within the subject site was identified as being in a poor condition, with a high abundance of exotic species. This patch of vegetation lacked the structural integrity that a higher quality condition patch would exhibit. This includes features such as a ground and mid-storey stratum with a diverse group of native species. As such. the proposed impact of 0.10 ha is unlikely to substantially and adversely modify the composition of the TEC to the point where the local occurrence will be placed at risk of extinction.
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	All the CPW vegetation within the subject site will be removed as a part of the proposed development.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: 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	The patch in question is already fragmented from other patches within the study area. The proposed development will increase the proximity other patches have from one another within the subject site.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The CPW patch to be impacted lacks structural integrity and species diversity that a higher quality patch would be expected to have. Currently, the patch exists as several canopy trees. Given this, the importance of this patch is low.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared	The proposed development will not be occurring on any declared area of outstanding biodiversity value.

BC Act	Question	Response
	area of outstanding biodiversity value (either directly or indirectly).	
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The proposed development will contribute to the following key threatening process: • Clearing of native vegetation
Conclusion	Is there likely to be a significant impact?	Unlikely. Although all the vegetation within the subject site will be removed, the patch to be removed is of a poor condition, lacks structural integrity and consists only of several canopy species. The proposed development is unlikely to result in the local occurrence becoming extinct.

Figure 14: Local occurrence of CPW vegetation

The following ToS encompasses all hollow-dependant microbat species that have the potential to utilise the subject site. These species have been grouped together as most share similar breeding habitat requirements and would likely be affected equally. Foraging habitat is considered to be marginal however this has been taken into consideration of the ToS. These species include:

- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
- *Miniopterus australis* (Little Bentwing-bat)
- *Myotis macropus* (Southern Myotis)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)

All of these species are listed as vulnerable under the BC Act. Table 10 outlines the results of the ToS.

Table 10: Test of Significance – Hollow-dwelling microbat species

BC Act	Question	Response
7.3.1 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 proposed development will impact 0.10 ha of potential habitat for these species. There is no evidence that the trees to be removed are being used by these species nor are any populations known to occur within the subject site. It is likely that breeding habitat exists within the study area, in particular to the east along Ropes Creek. Potential foraging habitat within the subject site will be removed however the quality of this habitat is marginal at most. Potential foraging habitat exists within proximity to the subject site. For highly mobile species, such as microbats, these impacts are unlikely to have an adverse effect on the life cycle of the species. It is likely that these species will continue to forage and breed within the study area, and broader region, particularly in higher quality habitat.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	N/A
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity 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.	N/A
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community:	All habitat within the study area will be removed. Patches of equal, or higher quality vegetation will

BC Act	Question	Response
	The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	however remain within the study area as small isolated patches throughout the suburb of Erskine Park.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: 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	Habitat for these species exists within 100 m of the subject site. The removal of the habitat within the subject site will further isolate surrounding patches from one another however this is unlikely to impact highly mobile species, such as microbats.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The subject site could act as marginal breeding and foraging habitat however the vegetation within the subject site was identified in a poor condition. Larger patches, such as those located along Rope Creek, are likely to provide higher quality foraging and breeding habitat. As such, the vegetation within the subject site is unlikely to be important for the survival of the above species.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No. The proposed development is not situated in an area of declared area of outstanding biodiversity value.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The proposed development will contribute to the following key threatening process: • Clearing of native vegetation
Conclusion	**Is there likely to be a significant impact?**	No. It is unlikely that the proposed development will result in a significant impact to any of the listed microbat species. Given the above information: • The proposed development is unlikely to significantly impact the life cycle of the listed microbat species • Habitat will continue to exist within close proximity to the subject site. Highly mobile species will be able to utilise these patches The proposed development is unlikely to result in a significant impact to any of the listed microbat species.

Table 11 outlines the results of the Test of Significance for *Pteropus poliocephalus* (Grey-headed Flying-fox). The subject site does not contain any known flying fox camps (DAWE, 2021b), nor were any seen during the field survey. The subject site could provide foraging habitat for this species.

Table 11: Test of Significance – *P. poliocephalus* (Grey-headed Flying-fox)

BC Act	Question	Response
7.3.1 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	There are no known flying fox camps within the subject site (DAWE 2021b). The site could act as foraging habitat. Given the high mobility of this species, the impact of 0.10 ha of potential foraging habitat is unlikely to impact the life cycle of this species. This species is likely to continue to forage in the remaining unimpacted vegetation within the study area as well as any foraging habitat within the wider locality.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	N/A
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity 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.	N/A
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	0.10 ha of potential foraging habitat will be impacted as a part of the proposed development. For a highly mobile species, this impact is considered to be minor. This species will be able to continue to utilise the unimpacted vegetation within the study area as foraging habitat. As such, the extent to which the potential foraging habitat will be removed is unlikely to impact upon this species.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: 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	All the vegetation within subject site will be removed. Given the vegetation is of a low quality, and habitat will continue to exist within the study area, a highly mobile species such as *P. poliocephalus* (Grey-headed Flying-fox) is unlikely to be impacted by the proposed development.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The quality of vegetation within the subject site is of a poor condition. Several similar patches occur within the study area. The removal of 0.10 ha of poor-quality vegetation is unlikely to be important for the survival of this species.

BC Act	Question	Response
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No. The proposed development is not situated in an area of declared area of outstanding biodiversity value.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The proposed development will contribute to the following key threatening process: • Clearing of native vegetation
Conclusion	**Is there likely to be a significant impact?**	No. The proposed development in unlikely to result in a significant impact to *P. poliocephalus* (Grey-headed Flying-fox). Given the above information: • The proposed development is unlikely to significantly impact the life cycle of *P. poliocephalus* (Grey-headed Flying-fox) • The habitat to be impacted is unlikely to be important for the long term survival of the species due to the degraded nature of the patch • As a highly mobile species, *P. poliocephalus* (Grey-headed Flying-fox) is likely able to venture to other patches to forage. As a result, the proposed development is unlikely to result in a significant impact to *P. poliocephalus* (Grey-headed Flying-fox).

Appendix D – Assessment of Significance (EPBC Act)

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where Matters of National Environmental Significance may be affected. Under the Act, any action which 'has, will have, or is likely to have a significant impact on a matter of MNES' is defined as a controlled action, and requires approval from the Commonwealth Department of Agriculture Water and Environment (DAWE), which is responsible for administering the EPBC Act.

The process includes applying the significant impact criteria (SIC) to listed threatened species and ecological communities that represent a matter of MNES that will be affected by a proposed action (Commonwealth of Australia 2013). Significant impact guidelines outline a number of criteria, to provide assistance in applying the SIC to decide whether or not a referral to the Commonwealth is required.

One MNES has been assessed as a part of this assessment. This species is *P. poliocephalus* (Grey-headed Flying-fox).

The Grey-headed Flying-fox is listed as vulnerable under the EPBC Act. Impacts associated with the proposed development include the removal of 0.10 ha of potential foraging habitat from within the subject site. No known camps occur within the study area. The closest camp to the study area is located approximately 3.5 km north at the Ropes Creek Camp. The most recent population estimates suggest there are approximately 500 - 2500 individuals utilising this camp (DAWE 2021b). Table 12 outlines the results of the SIC

Table 12: Significant impact criteria – *Pteropus poliocephalus* (Grey-headed Flying-fox)

Criterion	Question	Response
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1)	lead to a long-term decrease in the size of an important population of a species	The Matters of National Environmental Significance Impact Guidelines 1.1 (Commonwealth of Australia, 2013) defines an important population as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species range. The study area does not contain a breeding camp however it could provide marginal foraging habitat for travelling Flying-foxes. Considering the small size of the impact and the amount of foraging habitat in the locality, it is considered unlikely that action will result on a long-term decrease in the size of an important population.
2)	reduce the area of occupancy of an important population	Considering the small size of the impact and the number of suitable areas of occupancy in the locality, it is considered unlikely that the proposed development will result in a long-term reduction of an area of occupancy of an important population.
3)	fragment an existing important population into two or more populations	The Grey-headed Flying-fox is a highly mobile species and forms one large intermixing population along the east Australian coast. The proposed work is unlikely to result in the fragmentation or isolation of areas of potential habitat as patches of vegetation within the study area will continue to exist. This is unlikely to inhibit the movement of highly mobile species. Therefore, the proposed action will not fragment an existing important population into two or more populations.
4)	adversely affect habitat critical to the survival of a species	The national recovery plan for the Grey-headed Flying-fox (DAWE 2021c) identifies habitat that is critical to the survival of GHFF as follows: • Important winter and spring flowering vegetation communities that contain the following species *E. tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E.*

Criterion	Question	Response
		seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia or *Syncarpia glomulifera.* Habitat critical to the survival of the Grey-headed Flying-fox may also be vegetation communities not containing the above tree species but which: • contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May) • contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or • contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp as identified on the Department's interactive flying-fox web viewer. A single *E. tereticornis* (Forest Red Gum) was identified during the field survey. Most canopy species were identified as *E. moluccana* (Grey Box). The subject site is also located within 20 kms of a nationally important flying fox camp (the Parramatta Park Camp). Given the above points, the vegetation within the subject site would be considered habitat critical for the survival of this species. However, given the small patch size and poor condition of the subject site, it is unlikely that the removal of this vegetation will result negatively impact this species. Habitat of equal or greater quality will continue to exist within the study area.
5)	disrupt the breeding cycle of an important population	No Grey-headed Flying-fox camps would be removed or disturbed. The proposed development will not disrupt the breeding cycle of the Grey-headed Flying-fox. Additionally, foraging habitat will remain in the study area and within the broader locality.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No Grey-headed Flying-fox camps would be removed, or disturbed, and extensive foraging habitat exists in the region within large conservation areas and in urban areas. The proposed works would be unlikely to modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Additionally, foraging habitat will remain in the study area.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	It is unlikely that this will result in the introduction of an invasive species that could impact this species.

Criterion	Question	Response
8)	introduce disease that may cause the species to decline, or	Grey-headed Flying-foxes are reservoirs for the Australian bat lyssavirus (ABL) and hendra virus. These diseases can cause mortality in GHFF (DAWE 2021c). The proposed development is unlikely to introduce significant ecological stress on known individuals or camps utilising the study area and therefore unlikely to affect this species. The proposed work would be unlikely to introduce a disease that may cause this species to decline.
9)	interfere substantially with the recovery of the species.	The proposed development is unlikely to substantially impact the recovery of this species. A small amount of potential foraging habitat will be removed as a part of the proposed development.
Conclusion	**Is there likely to be a significant impact?**	No. The proposed development will remove 0.10 ha of marginal foraging habitat for this species. No camps currently occupy the subject site and therefore breeding habitat is unlikely to be impacted. The removal of this patch of vegetation is unlikely to place significant stress on the species as they are highly mobile and will be able to continue to forage in the surrounding habitat that is of equal or greater quality then what was identified in the subject site.

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