Precinct 3 Edmondson Park - Flora and Fauna Assessment

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Template 2.8.1

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Abbreviations

Abbreviation	Description
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
CEMP	Construction Environmental Management Plan
DCP	Development Control Plan
DPE	Department of Planning and 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*
FM Act	*Fisheries Management Act 1994*
KFH	Key Fish Habitat
LEP	Local Environmental Plan
MNES	Matters of National Environmental Significance
PCT	Plant Community Type
PW	Priority Weed
SAII	Serious and Irreversible Impacts
SEPP	State Environmental Planning Policy
TEC	Threatened ecological community
Western City Parkland SEPP	*State Environmental Planning Policy (Precincts – Western Parkland City)* 2021
WM Act	*Water Management Act 2000*
WoNS	Weeds of National Significance

Executive Summary

Eco Logical Australia Pty Ltd (ELA) was engaged by Landcom to prepare a Flora and Fauna Assessment (FFA) for the estate works associated to the subdivision of Precinct 3 Edmondson Park. The proposed works are located within Lot 3 and Lot 5, DP 1272931. ELA understands that this FFA report will accompany a development application (DA) to be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) with Liverpool City Council as the determining authority. This FFA documents the ecological values within the study area and considers the current environmental planning legislation.

This report describes impacts on native vegetation, threatened species, populations and communities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and associated habitat features because of the proposed works.

This assessment is solely focused on the construction of the bioretention basin within non-biodiversity certified land contained within Lot 3 DP 1272931. The 'study area' refers to the portion of Lot 3 that will include the area subject to the proposed works, which is within the land parcel Lot 3 DP 1272931. Within this report 'impact area' refers to the proposed area of works.

Field survey validated vegetation within the study area, which was split between 0.56 ha of cleared/exotic vegetation and 0.51 ha of Plant Community Type (PCT) 3320: *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion.* PCT 3320 was found in good and low condition with impacts of the proposal are confined to 0.01 ha of low condition PCT 3320 and 0.1 ha of cleared/exotic vegetation.

PCT 3320 corresponds to the BC Act listed *Cumberland Plain Woodland in the Sydney Basin Bioregion* and aligns to the EPBC Act critically endangered ecological community *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.* The listings between State and Commonwealth legislation differ based on condition criteria. The low condition PCT 3320 met the condition requirements of the BC Act listing but did not meeting the EPBC Act listing criteria.

No threatened flora our fauna species were identified during the field survey. However, the study area was considered to potentially contain habitat for the following threatened flora and fauna species:

- *Pimelea spicata* (Spiked Rice Flower)
- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Circus assimilis* (Spotted Harrier)
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Falco subniger* (Black Falcon)
- *Glossopsitta pusilla* (Little Lorikeet)
- Hieraaetus morphnoides (Little Eagle)
- Lathamus discolor (Swift Parrot)
- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
- *Miniopterus australis* (Little Bentwing-bat)

- Miniopterus orianae oceanensis (Large Bent-winged Bat)
- *Myotis Macropus* (Southern Myotis)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

Impacts of the proposal are confined to 0.01 ha of low condition PCT 3320 and 0.1 ha of cleared/exotic vegetation. Tests of Significance consistent with section 7.3 of the BC Act were undertaken for each of the above threatened species and the threatened ecological community *Cumberland Plain Woodland in the Sydney Basin Bioregion.* It was concluded that the proposed works are unlikely to result in a significant impact to any threatened entities or communities.

Impact assessments consistent with the EPBC Act guidelines were undertaken for *Pimelea spicata* (Spiked Rice Flower) and *Pteropus poliocephalus* (Grey-headed Flying-fox). The assessment determined that the proposed works are unlikely to significantly affect these species.

Mitigation measures are provided to minimise and manage impacts to threated ecological communities and species prior to, during and post construction.

1. Introduction

1.1. Purpose of the Report

Eco Logical Australia Pty Ltd (ELA) was engaged by Landcom to prepare a Flora and Fauna Assessment (FFA) for the subdivision of Precinct 3 Edmondson Park. The proposed works are located within Lot 3 and Lot 5, DP 1272931. ELA understands that this FFA report will accompany a development application (DA) to be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) with Liverpool City Council as the determining authority.

This report describes impacts on native vegetation, threatened species, populations and communities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and associated habitat features because of the proposed works. The impact assessments in this report are based on information gathered from database searches and field investigations. The report sets out the legislative context, methods used, likely impacts to the environment and recommendations to manage these impacts.

1.2. Study Area

Precinct 3 is a precinct of the Edmondson Park Precinct within the Southwest Growth Centre (Figure 1). The DA is for a subdivision of Part Lot 3 and part Lot 5 DP 1272931 into 250 residential Torrens titled residential lots and residual open space lots with associated roads, servicing, and landscaping. The majority of the proposed works are located within biodiversity certified land under Part 8 of the *Biodiversity Conservation Act 2016* (BC Act). Section 8.4(2) of the BC Act describes the effect of biodiversity certification in relation to development under Part 4 of the EP&A Act: '*an assessment of the likely impact on biodiversity of development on biodiversity certified land is not required for the purposes of Part 4 of the EP&A Act 1979'.*

Therefore, the 'study area' refers to an area north of the site that is located on land that is not biodiversity certified, contained within part of Lot 3 and Lot 5 DP 1272931 (Figure 2). This area is a broader area situated around the 'Impact Area', which refers to the area required to construction a bioretention basin. This assessment is solely focused on the assessment of impacts to non-biodiversity certified land and is not considering the rest of the works proposed under the DA on certified land.

1.3. Proposed Works

The DA is seeking to subdivide of part Lot 3 and Part Lot 5 DP 1272931 into 250 residential lots and residual open space lots with associated roads, servicing, and landscaping. As discussed above this assessment is solely focused on the construction of the bioretention basin within noncertified land contained within Lot 3 DP 1272931 (Figure 2). The proposed scope of works assessed in this report includes the following:

- Clearing of groundcover vegetation and shrubs
- Earthworks to construct basin
- Construction of basin, connections to stormwater network and planting of native vegetation

Ongoing maintenance of stormwater infrastructure. This would include ongoing access for maintenance. This is to be located through the current development footprint being assessed in this report.

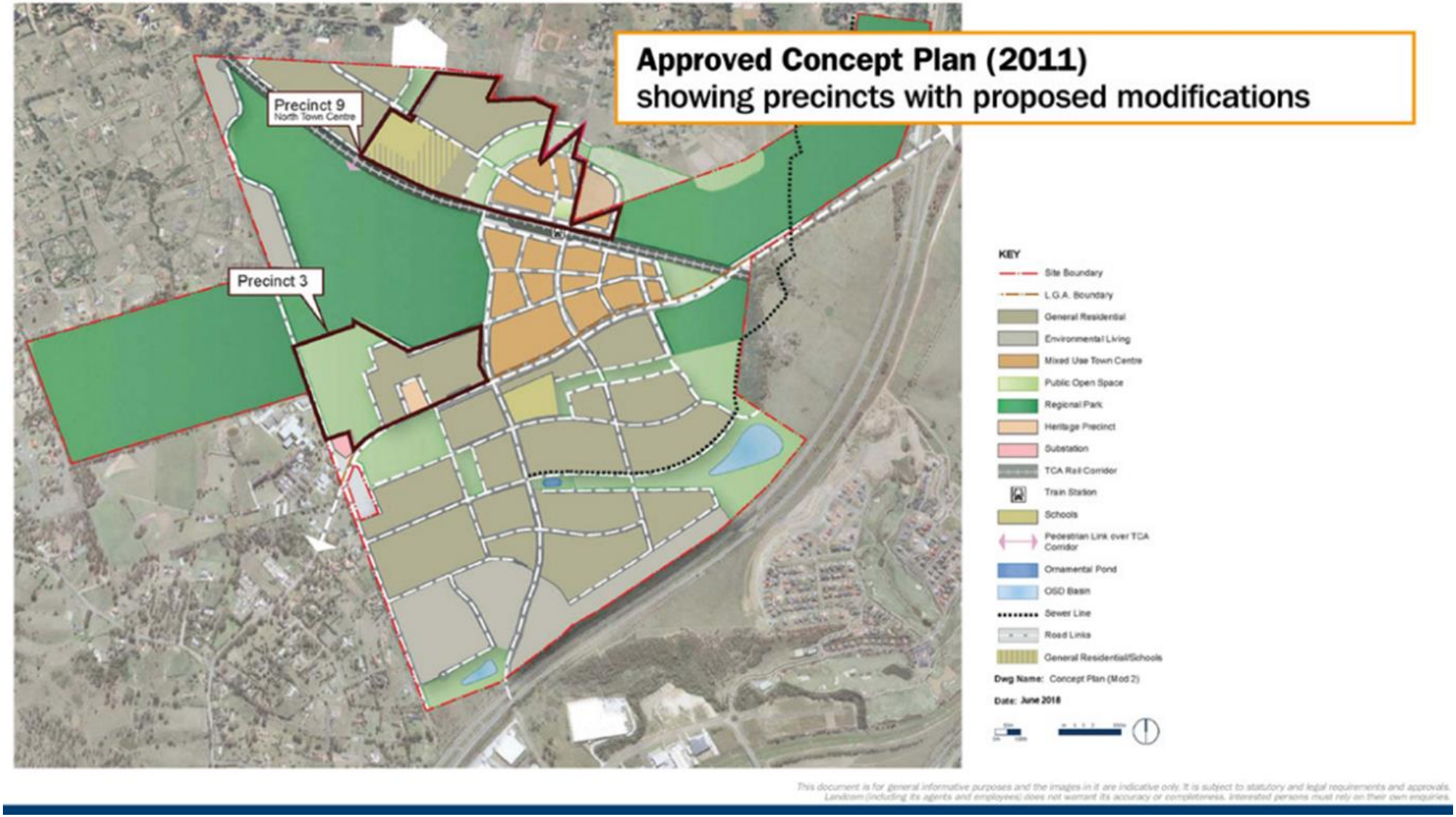

Figure 1 Indicative Layout Plan (ILP) highlighting the location of Precinct 3

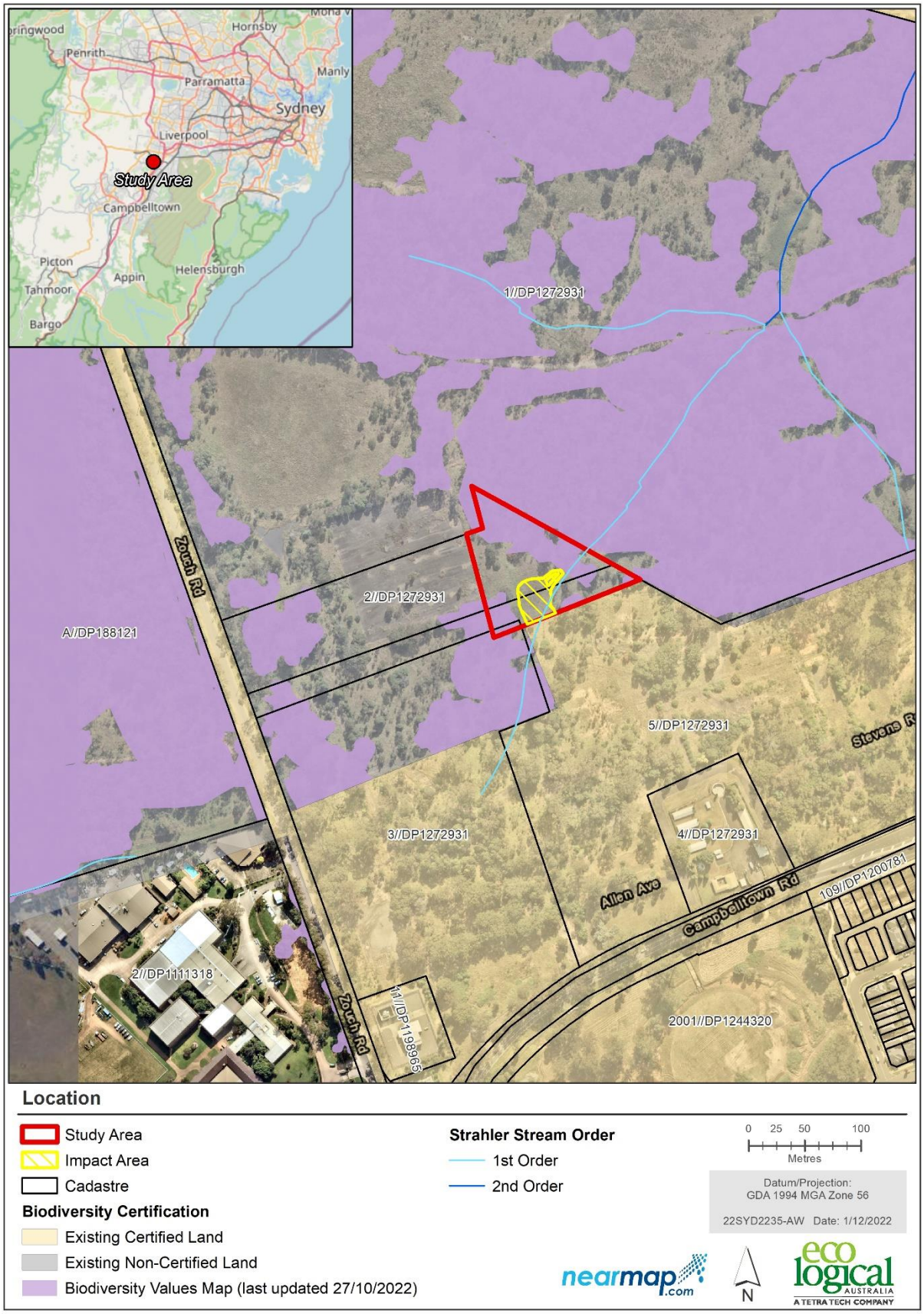

Figure 2: Location of study area and proposed works

2. Legislative Context

Table 1: Legislative context

Name	Relevance to the project
	Commonwealth
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Matters of National Environmental Significance (MNES) have been identified on or near the study area. Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest, a MNES, was identified within the study area but is not going to be affected by the proposed works. *Pimelea spicata* (Spiked Rice Flower) and P*teropus poliocephalus* (Grey-headed Flying-fox) have been identified as potentially using the study area as foraging habitat. Significance Assessments have been undertaken for these two species and are provided in Appendix D. The assessments concluded that proposed works are not likely to have a significant impact on MNES.
	State
Environmental Planning and Assessment Act 1979 (EP&A Act)	The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of proposals. The EP&A Act places a duty on the determining authority to adequately address a range of environmental matters including maintenance of biodiversity and the likely impact to threatened species, populations, or ecological communities. The proposed works are to be assessed as 'development permissible with consent' under Part 4 of the EP&A Act, with Liverpool Council as the determining authority.
Biodiversity Conservation Act 2016 (BC Act)	The BC Act outlines the assessment requirements to determine whether a proposed development (under Part 4 of the EP&A Act) is likely to significantly affect threatened species or ecological communities, or their habitats under section 7.3 of the Act, and whether the Biodiversity Offsets Scheme (BOS) will be triggered. If thresholds for the BOS and application of the Biodiversity Assessment Method (BAM) are triggered, a Biodiversity Development Assessment Report (BDAR) would be required. Triggers for the BOS and BAM are as follows: • Exceeding a native vegetation area clearance threshold relative to minimum lot size; or • Clearing of native vegetation identified on the NSW Government Biodiversity Values Map (BV Map); or • A significant impact on a threatened species or ecological community (as assessed in accordance with section 7.3 of the BC Act by a qualified ecologist). As shown in Figure 3, the proposed works are not within an area mapped on the Biodiversity Values Map and the works will not exceed the area clearing threshold of 0.25 ha. To determine if a significant impact is likely Tests of Significance under the BC Act were undertaken for the following threatened community and species and their habitats: • Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest • *Pimelea spicata* (Spiked Rice Flower) • Artamus cyanopterus cyanopterus (Dusky Woodswallow) • *Circus assimilis* (Spotted Harrier) • Daphoenositta chrysoptera (Varied Sittella) • *Falco subniger* (Black Falcon) • Glossopsitta pusilla (Little Lorikeet) • Hieraaetus morphnoides (Little Eagle) • Lathamus discolor (Swift Parrot) • *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat) • *Miniopterus australis* (Little Bentwing-bat) • Miniopterus orianae oceanensis (Large Bent-winged Bat) • *Myotis macropus* (Southern Myotis)

Name	Relevance to the project
	• *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat) • *Scoteanax rueppellii* (Greater Broad-nosed Bat) • *Pteropus poliocephalus* (Grey-headed Flying-fox) It was determined that a significant impact is unlikely to result from the proposed works meaning the BOS is not triggered and the preparation of a BDAR is not required.
Biosecurity Act 2015 (BS Act)	Under the BS Act, priority weeds have been identified for local government areas and assigned strategies to contain, remove or manage. Occupiers of land (this includes owners of land) have responsibility for taking appropriate action for priority weeds on the land they occupy. The field survey identified 4 weeds listed as priority weeds in the Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022 which was developed under this Act.
Fisheries Management Act 1994 (FM Act)	The objectives of the FM Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. The FM Act provides protection and approval processes for activities which may impact on threatened species, protected marine vegetation, or involve dredging, reclamation, or obstruction of fish passage. The proposed works do not involve impacts to Key Fish Habitat, harm to marine vegetation, dredging, reclamation, or obstruction of fish passage. A permit or consultation under Part 7 of the FM Act is not required.
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. A Controlled Activity Approval (CAA) is typically required for work within waterfront land. Section 91E of the Act creates an offence for carrying out a controlled activity within waterfront land without approval. The project is located within waterfront associated to a validated firstorder watercourse as such the proponent will need to obtain a CAA from the NRAR as part of these works in accordance with the WM Act. The location of the validated water course is shown in Figure 8.
	Environmental Planning Instruments
State Environmental Planning Policy (Western Parkland City) 2021 (Western Parkland City SEPP)	The study area is zoned RE 1 - Public Recreation, under Appendix 1 Western Parkland City SEPP, Edmondson Park South site precinct plan.
State Environmental Planning Policy (Biodiversity Conservation) 2021 (BC SEPP)	In 2021 The Biodiversity Conservation SEPP repealed numerous SEPP relating to biodiversity and conservation. **Koala Habitat Protection** Chapter 4 of the SEPP contains controls for koala habitat protection. The plan does not apply to the proposal as the area subject to this assessment is less than 1 hectare, Control 4.9 states: *(1) This section applies to land to which this Chapter applies if the land—* *(a) has an area of at least 1 hectare (including adjoining land within the same ownership),* Furthermore, a likelihood of occurrence assessment in Appendix A determined that koalas are unlikely to occur in this location as the area is fragmented and isolated from koala populations. Koalas use tree species in accordance with Schedule 3 of the SEPP are within the study area but are not going to be affected by the proposed works.

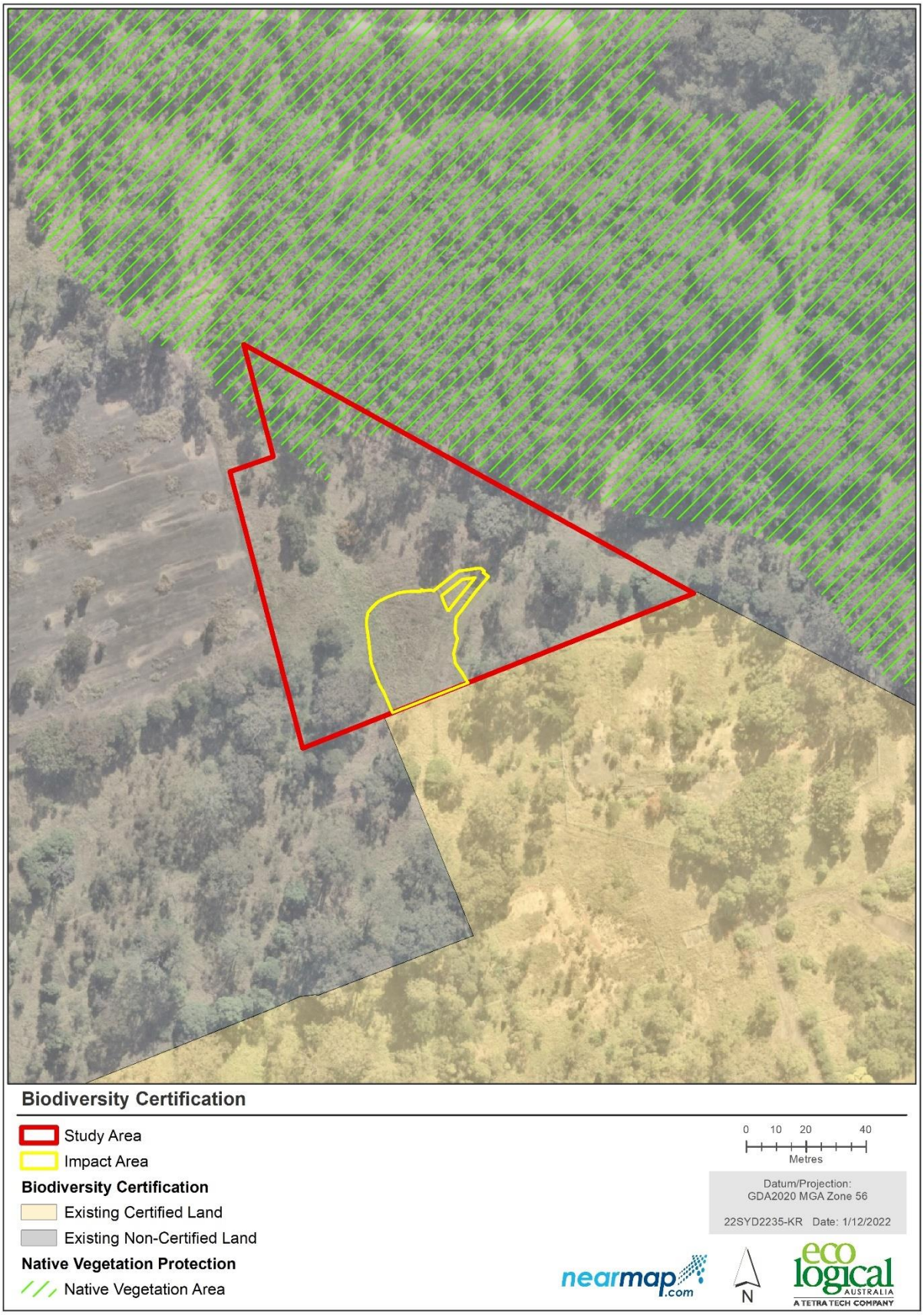

Figure 3: Areas of biodiversity certified lands, non-certified lands, and Native Vegetation Areas in relation to the study area

3. Methods

3.1. Literature and Data Review

Database records and relevant literature pertaining to the ecology of the study area and locality (5km of the study area) were reviewed. This included:

- NSW State Vegetation Type Map (DPE 2022)
- EPBC Act Protected Matters Search Tool (5 km)
- NSW BioNet / Atlas of NSW Wildlife database search (5 km) (DPE 2022)
- NSW Threatened Species Profiles (DPIE 2021b)/

Aerial photography of the study area and surrounds were also used to investigate the extent of vegetation cover and landscape features. In addition, relevant Geographic Information Systems (GIS) datasets (soil, geology, drainage) were reviewed to guide the field survey.

A 5 km radial search of the BioNet Atlas and Protected Matters Search Tool was undertaken on 11 November 2022. The results of these searches were combined to produce a list of threatened species, populations and ecological communities that may occur within the study area (Appendix A). Likelihood of occurrences for threatened species, endangered populations and threatened ecological communities in the study area were then made based on location of database records, the likely presence or absence of suitable habitat within the study area, and knowledge of the species' ecology. A list of potentially affected species was then identified, based on those species defined as 'yes', 'likely' or having 'potential' to occur within the study area. The terms for the likelihood of occurrence are listed in Appendix A.

Note that assessments for the likelihood of occurrence were made both prior to field survey and following field survey. The pre-survey assessments were performed to determine which species were 'affected species', and hence determine which sorts of habitat to search for during field survey. The post-survey assessments to determine final affected species were made after observing the available habitat in the study area.

3.2. Field survey

ELA ecologist Michael Gregor conducted a site inspection throughout the entire study area on 10 October 2022. The field survey utilised the random meander technique of Cropper (1993) and focused on the following:

- Validation of existing vegetation mapping, determining type, condition, and extent
- Threatened flora and fauna habitat assessment, including spatially recording hollow bearing trees
- Opportunistic fauna sightings.

3.2.1. Threatened Flora and Fauna Habitat Assessment

The presence of threatened flora and fauna species identified as having potential to occur in the study area was determined through a habitat assessment. Where important habitat features, such as hollow bearing trees, rocky outcrops, deep leaf litter and logs, wetlands and waterways or abandoned buildings were observed, their location was noted.

3.2.2. Survey Limitations

This assessment was not intended to provide an inventory of all species present across the study area but instead an overall assessment of the ecological values of the study area. The survey was conducted with an emphasis on threatened species, threatened ecological communities and key fauna habitat features. It is important to note that some species may not have been detected within the study area during the inspection as they may be cryptic or seasonal and only detectable during flowering or during breeding. No targeted surveys were conducted. In this case the likelihood of their occurrence has been assessed based on the presence of potential habitat. The field survey was undertaken using hand-held GPS units. It should be noted that these units can have errors in accuracy of up to 20 m (subject to availability of satellites on the day).

4. Results

4.1. Literature and Data Review

4.1.1. Vegetation mapping

One (1) plant community type (PCT) was previously mapped within the study area (DPE 2022):

- PCT 3320: *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion*

There were also areas within the study area that contained vegetation, however, were not captured in the DPE dataset.

4.1.2. Threatened Flora and Fauna

The BioNet and Protected Matters Search tools returned 10 threatened ecological communities (TECs), 27 threatened flora species and 48 threatened fauna species (including migratory species) either known or considered likely to occur within a 5 km radius of the study area.

An assessment of the likelihood of occurrence of threatened species within the study area is in Appendix A and was used to guide the site inspection methodology. Note, the likelihood of occurrence provided in Appendix A represents the assessment following the site inspection results. The Bionet Atlas database records of flora and fauna site are shown in Figure 5 and Figure 6.

The closest Nationally Important Flying-fox camp is approximately 3.5 km to the southeast of the study area in Macquarie Fields and had an individual count of 10,000-15,999 in February 2020 (Department of Agriculture, Water, and the Environment (DAWE) 2021). It is assumed there is no study undertaken later than this.

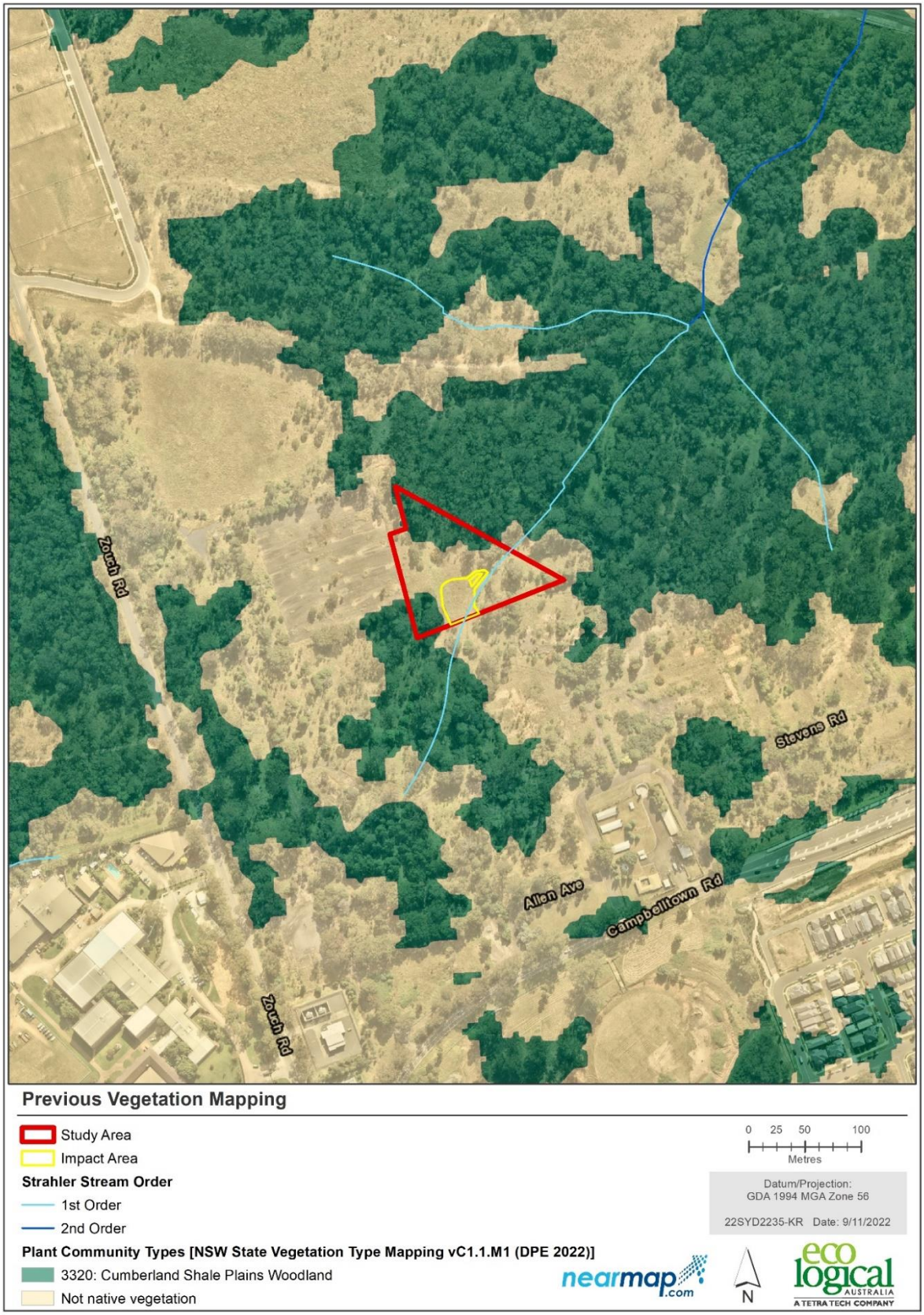

Figure 4: Previously mapped vegetation communities (DPE, 2022)

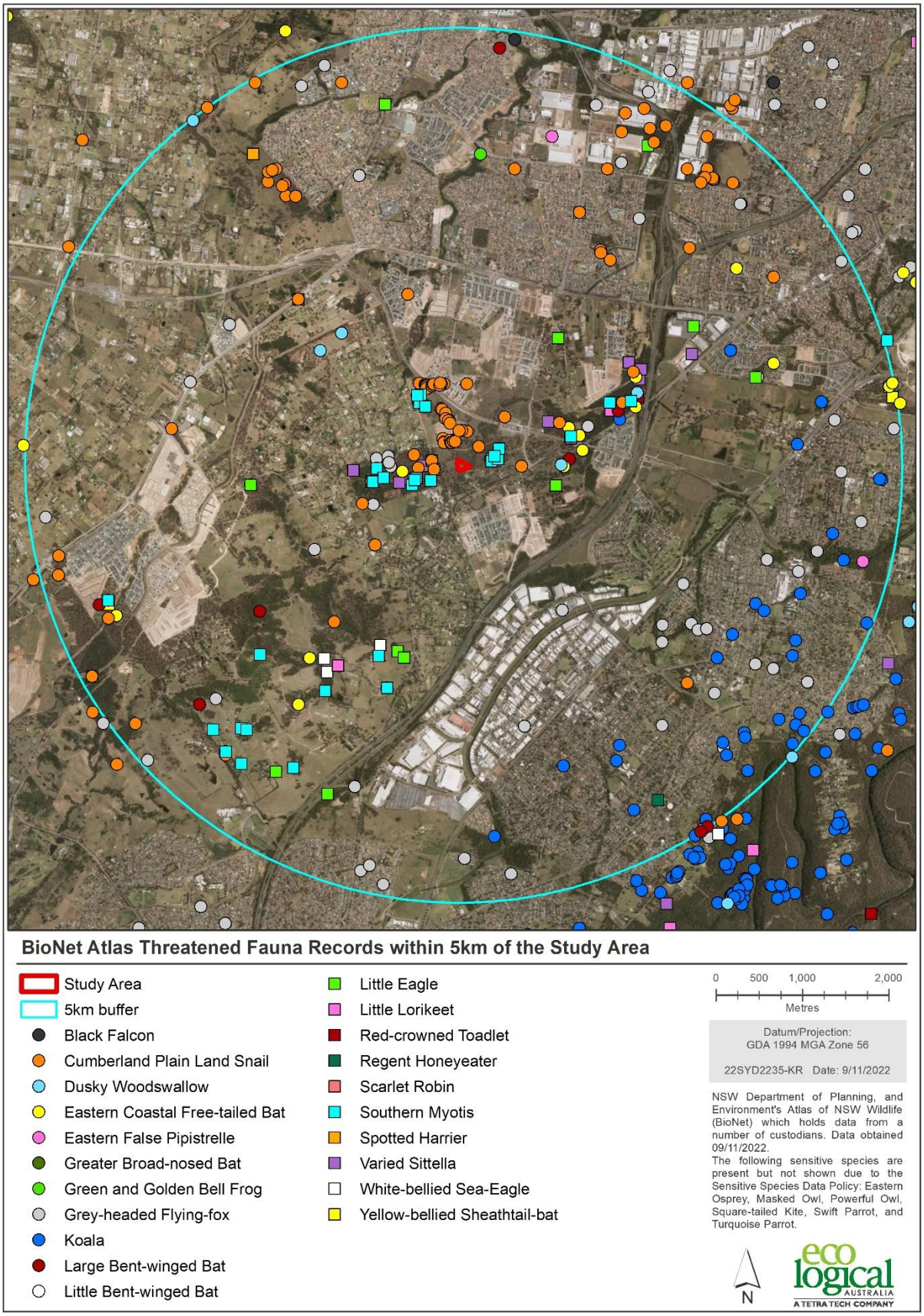

Figure 5: Threatened fauna species within a 5km radius of the study area

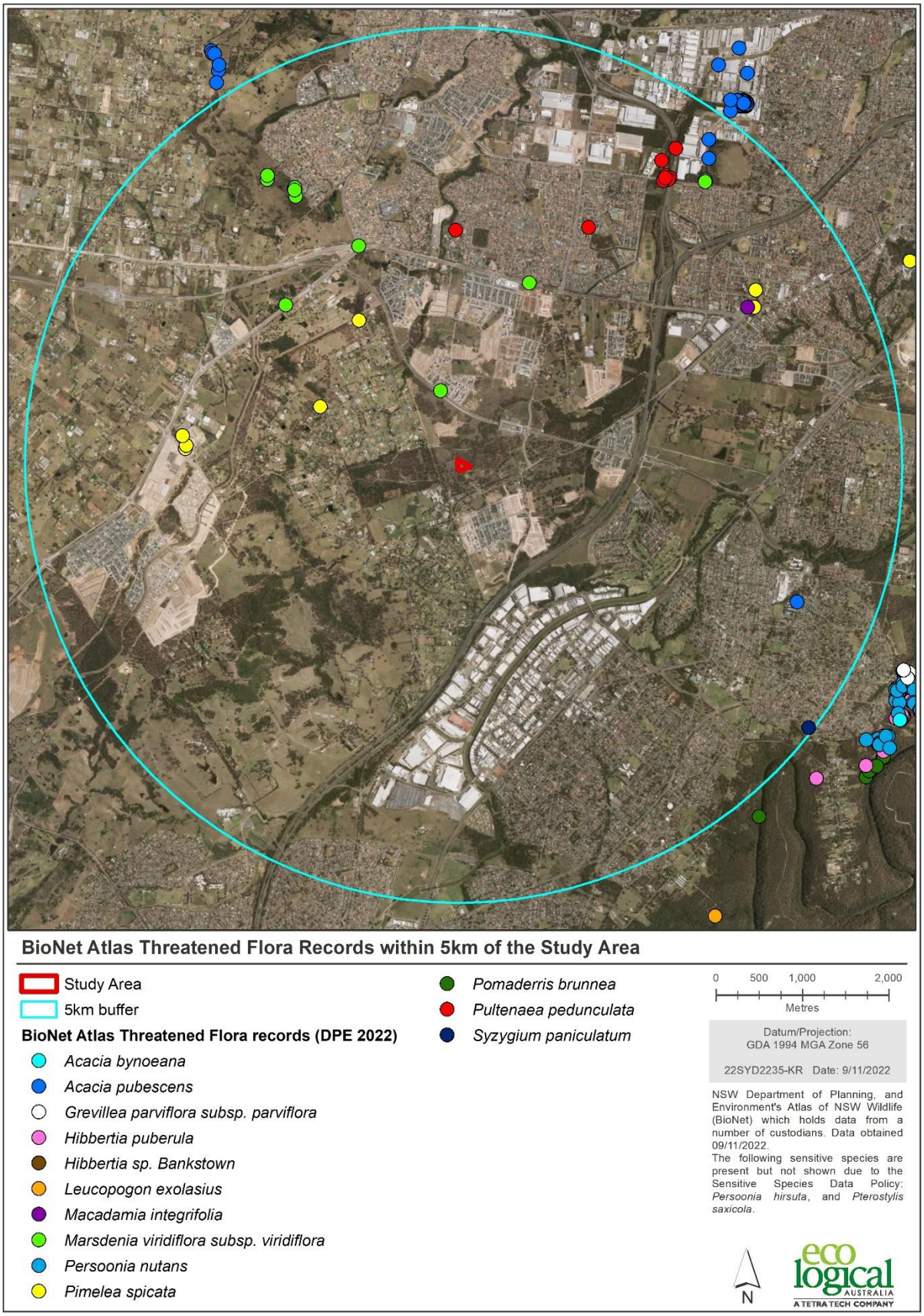

Figure 6: Threatened Flora species within a 5 km radius of the Study Area

4.2. Field Survey

4.2.1. Vegetation Validation

Previous vegetation mapping (DPE, 2022) indicated that the non-biodiversity certified lands (Study Area) contained one (1) associated PCT with the rest of the vegetation mapped as non-native vegetation. This was confirmed during the field survey (Figure 7):

- PCT 3320: *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion.*

PCT 3320 was found to be in two distinct conditions within the study area, good and low, this is discussed in further detail below and presented in Table 2 and Table 3. Other areas not previously mapped as native vegetation were confirmed as comprising exotic vegetation.

4.2.2. Threatened Ecological Communities

PCT 3320 corresponds to state and federally listed TECs. PCT 3320 corresponds to the BC Act listed *Cumberland Plain Woodland in the Sydney Basin Bioregion.* PCT 3320 also aligns to the EPBC Act critically endangered ecological community *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.* The TEC was found within the study area in good and low condition. The low condition patch of this vegetation did not the EPBC listing criteria as the groundcover does not meet the 30% native species cover requirement. The location of the TECs is presented in Figure 7 with descriptions provided in Table 2 and Table 3.

Table 2: PCT 3320 Cumberland Shale Plains Woodland Description (Good)

PCT 3320 *Cumberland Shale Plains Woodland* (good)	
Associated TEC	Cumberland Plain Woodland in the Sydney Basin Bioregion
BC Act Conservation Status	**Critically Endangered** The patch meets the definition under the BC listing due to its size, location (Cumberland Plain) and diversity.
EPBC Act Conservation Status	**Critically Endangered** This patch of vegetation within the study area meets the definition of Cumberland Plain Woodland in relation to its listing under the Commonwealth EPBC Act as the patch is over 0.5 ha and the groundcover contains over 30% cover of native species.
Vegetation Description	The vegetation within the study area contains all structural layers and native species in each stratum. The canopy consisted of native species including *Eucalyptus tereticornis* (Forest Red Gum) *Eucalyptus moluccana* (Grey Box) and *Eucalyptus amplifolia* (Cabbage Gum). The mid-storey was sparse, consisting of *Bursaria spinosa* (Blackthorn), *Acacia decurrens* (Black Wattle) and *Dillwynia sieberi* (Sieber's Parrot-pea). The groundcover had a high diversity of native grasses, forbs and sedges including *Microlaena stipodies var. stipodies* (Weeping Grass), *Themeda triandra* (Kangaroo Grass), *Glycine clandestina, Entolasia marginata* (Bordered Panic), *Dichondra repens* (Kidney Weed), *Dianella caerulea* (Blue Flax-lily), *Cheilanthes sieberi* (Mulga Fern), *Brunoniella pumilio* (Blue Trumpet), *Lomandra multiflora subsp. multiflora* (Many-flowered Mat-rush), *Schoenus apogon* (Common Bog-rush), *Leucopgon juniperinus* (Prickly Beard-health), *Veronica plebeia* (Trailing Speedwell), *Goodenia hederacea* (Forest Goodenia). Several exotic species and high threat weeds were also present, in low abundance, including *Olea europaea* subsp. *cuspidata* (African Olive), *Plantago lanceolata* (Plantain), *Hypochaeris radicata* (Flatweed), *Briza subaristata* (Quaking Grass), *Senecio madagascariensis* (Fireweed) and *Bidens Pilosa* (Cobbler's Peg).
Area within the study area (ha)	0.26 ha
Impact area (ha)	0.00 ha

Table 3: PCT 3320 Cumberland Shale Plain Woodland Description (Low)

PCT 3320 *Cumberland Shale Plains Woodland* (low)	
Associated TEC	Cumberland Plain Woodland in the Sydney Basin Bioregion
BC Act Conservation Status	**Critically Endangered** The patch meets the definition under the BC listing due to its size, location (Cumberland Plain) and diversity.
EPBC Act Conservation Status	**Critically Endangered** The low condition Cumberland Plain Woodland within the study area does not meet the definition for its listing under the Commonwealth EPBC Act as the groundcover does not meet the 30% native species cover requirement.
Vegetation Description	The low condition CPW vegetation within the study area contains all structural layers and native species in each stratum. The canopy consisted of native species including *Eucalyptus tereticornis* (Forest Red Gum*) Eucalyptus moluccana* (Grey Box) and *Eucalyptus amplifolia* (Cabbage Gum). The mid-storey was sparse, consisting of *Bursaria spinosa* (Blackthorn), *Acacia decurrens* (Black Wattle) and *Acacia falcata* (Hickory Wattle). The groundcover was exotic dominated with a low cover of native species including *Microlaena stipodies* var. *stipodies* (Weeping Grass), *Centella asiatica* (Asiatic Pennywort). Several exotic species and high threat weeds were also present in high cover and abundance, this included *Olea europaea* subsp. *cuspidata* (African Olive), *Plantago lanceolata* (Plantain), *Hypochaeris radicata* (Flatweed), *Briza subaristata* (Quaking Grass), *Senecio madagascariensis* (Fireweed) and *Bidens Pilosa* (Cobbler's Peg), *Chloris gayana* (Rhodes Grass), *Ligustrum lucidum* (Broad-leaved Privet), *Verbena bonariensis* (Purpletop), *Cirsium vulgare* (Spear Thistle).
Area within the study area (ha)	0.25 ha
Impact area (ha)	0.01 ha

Table 4: Cleared Exotic vegetation description

Cleared Exotic	
Associated TEC	N/A
BC Act Conservation Status	N/A
EPBC Act Conservation Status	N/A
Vegetation Description	These areas have previously been cleared and are now dominated by weeds with no native species present. The weeds present include *Rubus fruiticosus* (Blackberry), *Plantago lanceolata* (Plantain), *Hypochaeris radicata* (Flatweed), Briza subaristata (Quaking Grass), *Senecio madagascariensis* (Fireweed) and *Bidens Pilosa* (Cobbler's Peg), *Pinus elliotii* (), *Chloris gayana* (Rhodes Grass), *Cenchrus clandestinus* (Kikuyu), *Ligustrum sinense* (Small Leaved Privet).
Area within the study area (ha)	0.46 ha
Impact area (ha)	0.10 ha

Figure 7: Validated vegetation communities and habitat features within the study area

4.2.3. Threatened Flora and Fauna

A search for threatened species using the Protected Matters Search Tool and Atlas of NSW Wildlife (within a 5 km buffer around the study area) and the review of literature identified several threatened flora species, threatened fauna and migratory species.

No threatened flora species were identified during the site inspection. No threatened fauna species were identified during the site inspection. However, the study area is considered to provide potential habitat for several threatened species. The habitat on site for threatened flora and fauna is described in the Table 3 below.

Table 5: Potential threatened fauna habitat

Fauna	Threatened Fauna species	Habitat within study area
Aves	Potential foraging habitat for threatened forest birds was identified within the study area for the following threatened birds, in the form of flowering Eucalypt species: • *Artamus cyanopterus cyanopterus* (Dusky Woodswallow) • *Circus assimilis* (Spotted Harrier) • *Daphoenositta chrysoptera* (Varied Sittella) • *Falco subniger* (Black Falcon) • *Glossopsitta pusilla* (Little Lorikeet) • *Hieraaetus morphnoides* (Little Eagle) • *Lathamus discolor* (Swift Parrot) No Hollow Bearing Trees (HBTs) were identified during the field survey.	Potential foraging and nesting habitat, consisting of 0.51 ha of PCT 3320; 0.26 ha in good condition and 0.25 ha of low condition.
Microchiroptera Bats	However, the following bats have been previously recorded within a 5 km radius of the study area include: • *Chalinolobus dwyeri* (Large-eared Pie Bat) • *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) • *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat) • *Miniopterus australis* (Little Bent-winged bat) • *Miniopterus orianae oceanensis* (Large Bent-winged Bat) • *Myotis macropus* (Southern Myotis) • *Scoteanax rueppellii* (Greater Broad-nosed Bat) • *Saccolaimus flaviventris* (Yellow-bellied Sheath-tailed Bat) Several threatened microbat species are known to roost in stags and tree hollows. Other species are non to roost in caves and manmade structures that resemble a cave. Non stags or HBTs were identified during the field survey.	Potential foraging habitat consisting of 0.51 ha of PCT 3320; 0.26 ha in good condition and 0.25 ha of low condition.
Megabat	Flowering Eucalypts provide foraging habitat for *Pteropus poliocephalus* (Grey-headed flying fox). The nearest camp is approximately 3.5km to the south east within Macquarie Fields (Camp ID 482). It is considered likely that individuals from this camp would utilise the study area for foraging.	Potential foraging habitat consisting of 0.51 ha of PCT 3320; 0.26 ha in good condition and 0.25 ha of low condition.
Gastropods	The bases of larger remnant trees in the Study Area contained some leaf litter which may provide suitable habitat for threatened gastropod species *Meridolum corneovirens* (Cumberland Plain Land Snail). Some loose rocks may also provide habitat for this species. Target surveys were not undertaken for this species.	Remnant trees are located in relation to goof condition PCT 3320.

4.2.4. Validated Water Course

There is one (1) mapped 1st order watercourse (in accordance with the Strahler system) within the study area, see Figure 8. ELA undertook field validation of the watercourse and found that the mapped water course, within lot 3 DP 1272931, was an overland flow path and only met the definition of a 'river', under the WM Act approximately 230 m downstream of the start of the mapped 1st order watercourse (ELA, 2022). This is presented in Figure 8.

A Controlled Activity Approval (CAA) is typically required for as the proposed works are within waterfront land. Waterfront land is defined as land 40 m from the highest bank of a river, lake, or estuary. This is presented in Figure 8.

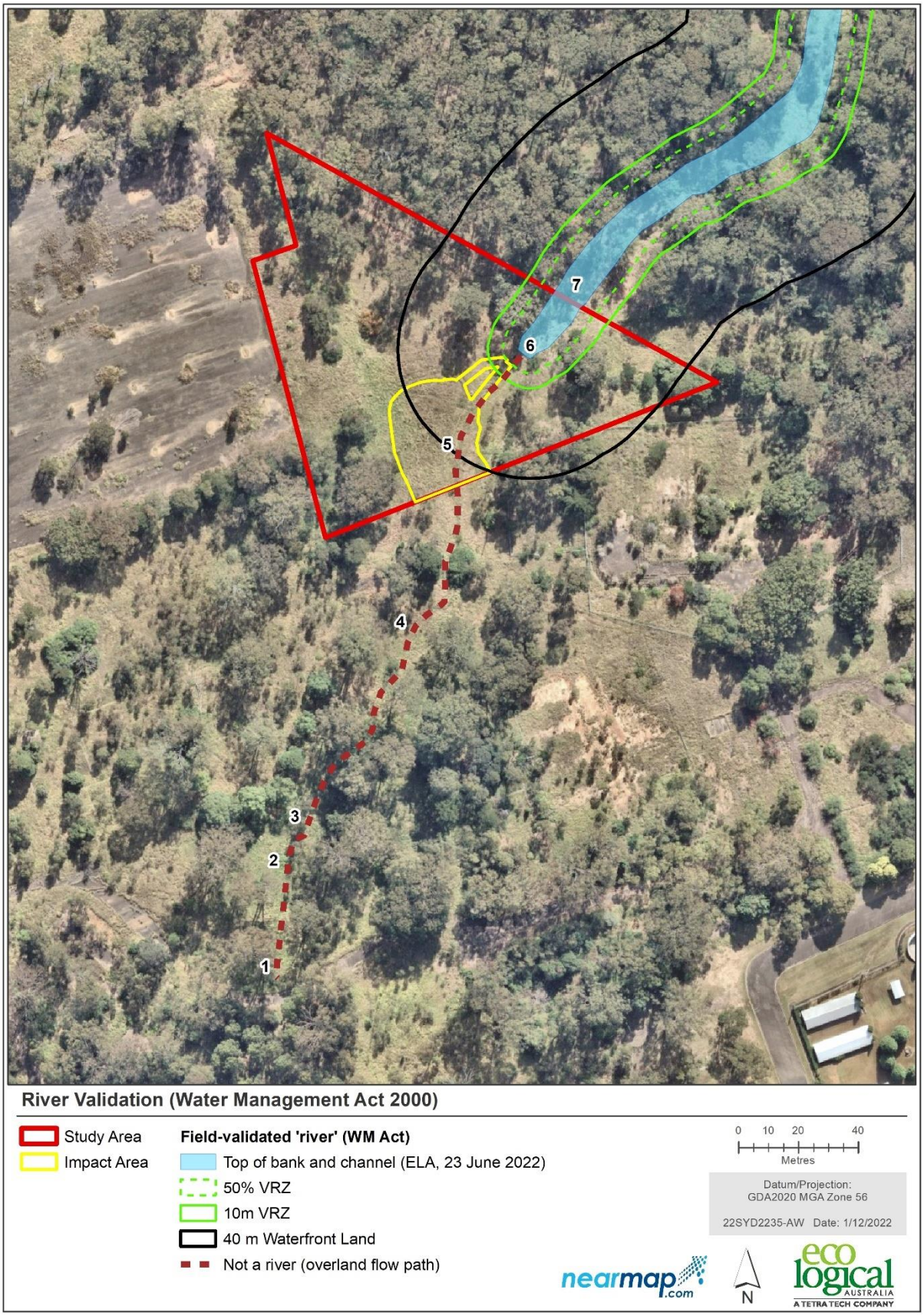

Figure 8 Validated Water Course and Waterfront Land

5. Impact Assessment

5.1. Direct Impacts

The proposed works would result in the direct removal of 0.11 ha of vegetation, of which 0.01 ha corresponds to a PCT. A breakdown of the direct impacts is outlined in Table 6 below. It is noted that the proposed impacts on biodiversity non-certified land would only impact on exotic vegetation and poor quality PCT 3320.

Table 6: Direct impacts to PCTs and other vegetation

PCT	Direct Impacts (ha)
PCT 3320: ***Cumberland Plain Woodland in the Sydney Basin Bioregion*** (Low) (BC Act)	0.01
Cleared/exotic	0.10
TOTAL	**0.11**

PCT 3320 low is consistent with the critically endangered ecological community of *Cumberland Plain Woodland in the Sydney Basin Bioregion* listed under the State BC Act. A Test of Significance was therefore undertaken (Appendix C) and concluded that a significant impact is unlikely.

This community is also listed under the Commonwealth EPBC Act as *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.* However, the patch within the impact area does not meet the listing criteria as the groundcover does not meet the 30% native species cover requirement.

5.1.1. Threatened Flora

No threatened flora were identified within the study area or subject site. As shown in Figure 6, no threatened flora were recorded in proximity to the study area. However, the study area is considered to provide potential habitat for *Pimelea spicata* as the species was previously recorded within 5 km of the study area. *Pimelea spicata* is a threatened species listed under the BC Act and the EPBC Act. A Test of Significance under Section 7.3 of the BC Act and Significance Assessment in accordance with the EPBC Act have been completed. These are provided in Appendix C and Appendix D and both found that the proposed work is unlikely to have a significant impact on *Pimelea spicata.*

5.1.2. Threatened Fauna

No threatened fauna was identified during the field survey. No hollow bearing trees were found within the subject site, so breeding habitat for woodland birds, microbats or owl species would be affected. However, the impact area was considered to potentially contain 0.01 ha of foraging habitat for the following threatened species:

- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Circus assimilis* (Spotted Harrier)
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Falco subniger* (Black Falcon)
- *Glossopsitta pusilla* (Little Lorikeet)
- *Hieraaetus morphnoides* (Little Eagle)
- *Lathamus discolor* (Swift Parrot)

- *Meridolum corneovirens* (Cumberland Plain Land Snail)
- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
- *Miniopterus australis* (Little Bentwing-bat)
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
- *Myotis macropus* (Southern Myotis)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

Tests of Significance in accordance with Section 7.3 of the BC Act were undertaken for each of the above threatened species, and it was concluded that the proposed works are unlikely to result in a significant impact (Appendix C).

An Assessment of Significance in accordance with the EPBC Act was undertaken for *Pteropus poliocephalus* (Grey-headed Flying-fox). The assessment determined that the proposed works are unlikely to significantly impact the species.

5.2. Indirect Impacts

Indirect impacts are those impacts that do not directly affect habitat and individuals but that have the potential to interfere through indirect action. Indirect impacts considered for this assessment include site impacts such as noise, light and weed invasion or spread; and downstream or downwind impacts such as edge effects, sedimentation, dust, accidental spills, and leaks resulting in soil or water pollution.

During the construction, noise, dust and to a small degree vibration will be emitted which could have an indirect impact on local fauna. These impacts result from the operation of heavy machinery to clear vegetation and construct the infrastructure. These impacts are short term only and therefore are unlikely to significantly impact fauna.

Also, during the construction period there is a risk that spills, or sediment runoff may impact adjacent native vegetation and nearby drainage lines / creeks if appropriate sediment and erosion measures are not in place. This impact will be managed via an appropriate erosion and sediment control plan. The overall impact is likely to be minor.

Management measures to further mitigate potential impacts of the proposal on threatened ecological community have been included in Section 6.

6. Mitigation Measures

The measures in Table 7 are recommended to lessen the impacts of the proposed works on surrounding biodiversity values.

Table 7: Mitigation measures

Environmental Aspect	Mitigation Measures
Removal of Native Vegetation	• An ecologist is to undertake a pre-clearance survey across the whole impact area and undertake necessary measure to ensure no fauna are harmed in the clearing of vegetation
Accidental damage / clearing	• Contractors are to undertake a pre-works briefing advising of sensitive areas and relevant safeguards for these areas • Stop works if any previously undiscovered threatened species are discovered during works. An assessment of the impact and any required approvals must be obtained. Works must not recommence until Council has provided written approval to do so. • Ensure the site-specific Construction Environmental Management Plan (CEMP) includes instructions for dealing with orphaned or injured native animals and ensure the CEMP includes the contact details for the NSW Wildlife Information, Rescue and Education Service Inc (WIRES). • Install temporary barrier fencing to prevent entry into adjacent vegetation and appropriate 'no-go zone' signage. • Install tree protection measures around trees to be retained in the study area, if required. Structures should be adequate to prevent machinery from entering within the drip zone. • Maintain temporary fencing to prevent access into the native vegetation.
Spread and control of priority weeds	• Wash down equipment and vehicles prior to and after use, to manage the introduction and spread of weed propagules. • Thoroughly clean all equipment of soil and weed propagules prior to entry into the subject site. • Remove Priority weeds using best management practices (including appropriate controls to prevent impacts to threatened species) prior to removal of native vegetation. Remove weed propagules offsite. • Bag and remove all weed propagules offsite, preferably the same day and dispose of at designated green waste facility. • Consider the implementation of a Weed Management Plan.
Introduction/ spread of pathogens	• Adhere to the Saving our Species Hygiene guidelines Protocols to protect priority biodiversity areas in NSW from *Phytophthora cinnamomi*, myrtle rust, amphibian chytrid fungus and invasive plants (DPE, 2020) (https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Wildlife-management/saving-our-species-hygiene-guidelines-200164.pdf). The following should be included in the CEMP: o Wash down equipment and vehicles prior to entering the site, to manage the introduction and spread of pathogens. Pay particular attention to cleaning mud flaps and tyres. o Thoroughly clean all equipment of soil and vegetation debris prior to entry into the study area. o Use a solution of 70% ethanol or methylated spirits in 30% water for wash down and equipment cleaning to effectively disinfect areas. o Wash down on a hard, well-drained surface, for example a road, and on ramps if possible. o Machinery and equipment must also be cleaned when leaving site.

7. Conclusion

This report describes impacts on native vegetation, threatened species, populations and communities listed under the NSW BC Act and Commonwealth EPBC Act and associated habitat features as a result of the proposed works.

Field survey validated vegetation within the study area, which comprised 0.56 ha of cleared/exotic vegetation and 0.51 ha of PCT 3320: *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion.* PCT 3320 was found in good and low condition.

PCT 3320 corresponds to the BC Act listed *Cumberland Plain Woodland in the Sydney Basin Bioregion* and aligns to the EPBC Act critically endangered ecological community *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.* The low condition PCT 3320 meet the condition requirements of the BC Act listing but did not meeting the EPBC Act listing criteria.

No threatened flora our fauna species were identified during the field survey, However, the study area was considered to potentially contain habitat for the following threatened flora and fauna species:

- *Pimelea spicata* (Spiked Rice Flower)
- Artamus cyanopterus cyanopterus (Dusky Woodswallow)
- *Circus assimilis* (Spotted Harrier)
- Daphoenositta chrysoptera (Varied Sittella)
- *Falco subniger* (Black Falcon)
- Glossopsitta pusilla (Little Lorikeet)
- Hieraaetus morphnoides (Little Eagle)
- Lathamus discolor (Swift Parrot)
- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
- *Miniopterus australis* (Little Bentwing-bat)
- Miniopterus orianae oceanensis (Large Bent-winged Bat)
- *Myotis Macropus* (Southern Myotis)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)

Impacts of the proposal are confined to 0.01 ha of low condition PCT 3320 and 0.1 ha of cleared/exotic vegetation. Tests of Significance consistent with Section 7.3 of the BC Act were undertaken for each of the above threatened species and *Cumberland Plain Woodland in the Sydney Basin Bioregion.* It was concluded that the proposed works are unlikely to result in a significant impact.

Assessments of Significance in accordance with the EPBC Act was undertaken for *Pimelea spicata* (Spiked Rice Flower) and *Pteropus poliocephalus* (Grey-headed Flying-fox). The assessment determined that the proposed works are unlikely to significantly impact these species.

The mitigation measures provided in this report would further ameliorate indirect impacts to biodiversity values prior to, during and post construction and ensure the proposal will not significantly impact biodiversity values.

8. References

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Appendix A 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 on site and in the vicinity is unsuitable for the species.

A test of significance was conducted for threatened species or ecological communities that were recorded within the study area or had a higher likelihood of occurring and were not recorded during the site visit. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the study area intermittently for foraging. For these fauna species, the habitat present and likely to be impacted is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, a test of significance in reference to State or Commonwealth legislation was not considered necessary.

The records column in the threatened species tables refers to the number of records occurring within 5 km of the study area, as provided by the Atlas of NSW Wildlife (BioNet) and Protected Matters Search Tool database search.

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 8: Likelihood of occurrence of threatened ecological communities

Name	BC Act Status	Habitat Associations	Likelihood of occurrence within the study area	Test of Significance Required (Y/N)
Castlereagh Scribbly Gum and Agnes Banks Woodland	V	Occurs almost exclusively on soils derived from Tertiary alluvium, or on sites located on adjoining shale or Holocene alluvium. Often adjacent to and on slightly higher ground than Castlereagh Ironbark Forest or Shale Gravel Transition Forest in the Sydney Basin Bioregion. Dominated by *Eucalyptus parramattensis* subsp. *parramattensis*, *Angophora bakeri* and *Eucalyptus 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 *Hakea 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*.	No – this ecological community was not identified within the study area.	No.
Coastal Upland Swamps in the Sydney Basin Bioregion	EEC	Endemic to NSW and confined to the Sydney Basin Bioregion. It occurs in the eastern Sydney Basin from the Somersby district in the north (Somersby-Hornsby plateaux) to the Robertson district in the south (n the Woronora plateau). Occurs primarily on impermeable sandstone plateaux with shallow groundwater aquifers in the headwaters and impeded drainage lines of streams, and on sandstone benches with abundant seepage moisture. Generally associated with acidic soils. May include tall open scrubs, tall, closed scrubs, closed heaths, open graminoid heaths, sedgelands and fernlands. Larger examples may include a complex of these structural forms.	No – this ecological community was not identified within the study area.	No.
Cooks River / Castlereagh Ironbark Forest	EEC	Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. 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), *Eucalyptus amplifolia* (Cabbage Gum), *Angophora floribunda* (Rough-barked Apple) and *Angophora subvelutina* (Broad-leaved Apple). *Eucalyptus baueriana* (Blue box), *Eucalyptus botryoides* (Bangalay) and *Eucalyptus elata* (River Peppermint) may be common south from Sydney. *Eucalyptus ovata* (Swamp Gum) occurs on the far south coast, *Eucalyptus saligna* (Sydney Blue Gum) and *Eucalyptus grandis* (Flooded Gum) may occur north of Sydney, while *Eucalyptus benthamii* is restricted to the Hawkesbury floodplain. A layer of small trees may be present, including Melaleuca decora, *M. styphelioides* (prickly-leaved teatree), *Backhousia*	No – this ecological community was not identified within the study area.	No.

Name	BC Act Status	Habitat Associations	Likelihood of occurrence within the study area	Test of Significance Required (Y/N)
		myrtifolia (grey myrtle), *Melia azadarach* (white cedar), *Casuarina cunninghamiana* (river oak) and *Casuarina 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.		
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest/ Cumberland Plain Woodland in the Sydney Basin Bioregion	**CEEC**	**Endemic to the shale hills and plains of the Sydney Basin Bioregion in NSW, occurring primarily in, but not limited to, the Cumberland Sub-region. Flat to undulating or hilly terrain, at elevations up to approximately 350 metres above sea level. Predominantly associated with clay soils, that are derived from Wianamatta Shale geology. Minor occurrences may be present on other soil groups, notably Holocene Alluvium and soils derived from the Mittagong Formation.**	**Yes – this ecological community was recorded within the study area.**	**Yes.**
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	EEC	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. Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains.	No – this ecological community was not identified within the study area.	No.
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	CEEC	Occurs at the edges of the Cumberland Plain in western Sydney, most now occurs in the Hawkesbury, Baulkham Hills, Liverpool, Parramatta, Penrith, Campbelltown and Wollondilly local government areas. The main tree species include *Eucalyptus tereticornis* (Forest Red Gum), *E. punctata* (Grey Gum), stringybarks (*E. globoidea, E. eugenioides*) and ironbarks (*E. fibrosa* and *E. crebra*). Areas of low sandstone influence (more clay-loam soil texture) have an understorey that is closer to Cumberland Plain Woodland.	No – this ecological community was not identified within the study area.	No.
Turpentine-Ironbark Forest of the Sydney Basin Bioregion	CEEC	Occurs close to the shale/sandstone boundary on the more fertile shale influenced soils, in higher rainfall areas on the higher altitude margins of the Cumberland Plain, and on the shale ridge caps of sandstone plateaus. Open forest, with dominant canopy trees including *Syncarpia glomulifera* (Turpentine), *Eucalyptus punctata* (Grey Gum), *E. paniculata* (Grey Ironbark) and *E. eugenioides* (Thin-leaved Stringybark). In areas of high rainfall (over 1050 mm per annum) *E. saligna* (Sydney Blue Gum) is more dominant. The shrub stratum is usually	No – this ecological community was not identified within the study area.	No.

Name	BC Act Status	Habitat Associations	Likelihood of occurrence within the study area	Test of Significance Required (Y/N)
		sparse and may contain mesic species such as *Pittosporum undulatum* (Sweet Pittosporum) and *Polyscias sambucifolia* (Elderberry Panax).		
Western Sydney Dry Rainforest and Moist Woodland on Shale	EEC	Occurs almost exclusively on soils derived from Tertiary alluvium, or on sites located on adjoining shale or Holocene alluvium. Often adjacent to and on slightly higher ground than Castlereagh Ironbark Forest or Shale Gravel Transition Forest in the Sydney Basin Bioregion. Dominated by *Eucalyptus parramattensis* subsp. *parramattensis*, *Angophora bakeri* and *Eucalyptus 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 *Hakea dactyloides* (multi-stemmed form). The ground stratum consists of a diverse range of grasses and forbs including *Themeda australis, Entolasia stricta, Cyathochaeta diandra, Dianella revoluta* subsp. *revoluta, Stylidium graminifolium, Platysace ericoides, Laxmannia gracilis* and *Aristida warburgii.*	No – this ecological community was not identified within the study area.	No.

V = vulnerable; EEC= endangered ecological community; CEEC = critically endangered ecological community

Table 9: Likelihood of occurrence of flora species recorded within a 5 km radius of the study area

Scientific Name	Common Name	BC Act Status	EPBC Act	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Acacia bynoeana	Bynoe's Wattle	E		*Acacia bynoeana* is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains and has recently been found in the Colymea and Parma Creek areas west of Nowra. It is found in heath and dry sclerophyll forest, typically on a sand or sandy clay substrate, often with ironstone gravels.	0	Unlikely – no known nearby populations.	No
Acacia pubescens	Downy Wattle	V		*Acacia pubescens* occurs on the NSW Central Coast in Western Sydney, mainly in the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. It is associated with Cumberland Plains Woodlands, Shale / Gravel Forest and Shale / Sandstone Transition Forest growing on clay soils, often with ironstone gravel.	4	Unlikely - suitable habitat recorded within the subject site and BioNet records within 5 km of the subject site, however species not observed during surveys, survey period year-round- and conspicuous species. Considered unlikely to occur within the subject site.	No
Allocasuarina glareicola	null	-	*E*	*Allocasuarina glareicola* is primarily restricted to the Richmond district on the north-west Cumberland Plain, with an outlier population found at Voyager Point. It grows in Castlereagh woodland on lateritic soil.	0	Unlikely – no known nearby populations. No records within 5km of subject site.	No

Scientific Name	Common Name	BC Act Status	EPBC Act	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Caladenia tessellata	Thick-lipped Spider-orchid, Daddy Long-legs			Currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast	0	Unlikely – no known nearby populations. No records within 5km of subject site.	No
Cryptostylis hunteriana	Leafless Tongue-orchid			In NSW, recorded mainly on coastal and near coastal ranges north from Victoria to near Forster, with two isolated occurrences inland north-west of Grafton.	0	Unlikely – no known nearby populations. No records within 5km of subject site.	No
Cynanchum elegans	White-flowered Wax Plant	E	*E*	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.	0	No - suitable habitat not recorded within the subject site, species not observed during surveys, no local records.	No
Genoplesium baueri	Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid	V	*E*	Known from coastal areas from northern Sydney south to the Nowra district. Previous records from the Hunter Valley and Nelson Bay are now thought to be erroneous. Grows in shrubby woodland in open forest on shallow sandy soils and flowers from December to March.	0	No - suitable habitat (dry sclerophyll forest over sandstone) not recorded within the subject site, no local records.	No
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	V		Heath and shrubby woodland to open forest on sandy or light clay soils usually over thin shales.	0	Unlikely – lack of preferred growth medium (tertiary sands and alluvium) within the subject site,	No

Scientific Name	Common Name	BC Act Status	EPBC Act	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Haloragis exalata subsp. Exalata	Wingless Raspwort, Square Raspwort	V	V	Protected and Shaded damp situations in riparian habitats	0	Unlikely – no known nearby populations. No records within 5km of subject site. No local records.	No
Macadamia integrifolia	Macadamia Nut	-	V	Not known to occur naturally in the wild in NSW; recorded from Camden Haven but it is not known if the tree was cultivated or growing naturally. Prefers drier subtropical rainforest.	1	No – limited records of species within 5 km, but unsuitable habitat (no rainforest).	No
Marsdenia viridiflora subsp. *viridiflora*	*Marsdenia viridiflora* R. Br. subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith LGAs	E2		Currently populations are found in disjunct areas in Prospect, Bankstown, Smithfield, Cabramatta Creek and St Marys. Was previously known from the Razorback Range.	13	Unlikely - BioNet records within 5 km of the subject site, however species not observed during surveys (grows in thick vine thickets) and not known from this particular location. Considered unlikely to occur within the subject site	No
Melaleuca deanei	Deane's Melaleuca	V	V	Heath on Sandstone with species exhibiting a limited capacity to regenerate. 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.	0	No - suitable habitat not recorded within the subject site, species not observed during surveys, no local records.	No

Scientific Name	Common Name	BC Act Status	EPBC Act	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Persicaria elatior	Knotweed, Tall Knotweed	-	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).	0	Unlikely – potential habitat within subject site was not in good condition, no local records.	No
Persoonia hirsuta	Hairy Geebung, Hairy Persoonia	E1	E	Sandy soils in dry sclerophyll open forest, woodland and health on sandstone	0	No - suitable habitat not recorded within the subject site (heath on sandstone/sandy soils)	No
Persoonia nutans	Nodding Geebung	E		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.	0	No – subject site not within known northern or southern populations for this species,	No
Pimelea curviflora var. curviflora	null	V	V	Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes	0	No - suitable habitat not recorded within the subject site (shale/sandstone transitional areas / ridgetops), species not observed during surveys, no local records	No

Scientific Name	Common Name	BC Act Status	EPBC Act	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Pimelea spicata	**Spiked Rice-flower**	**E**	**E**	**In western Sydney, *Pimelea spicata* occurs on an undulating topography of well-structured clay soils, derived from Wianamatta shale. It is associated with Cumberland Plains Woodland, in open woodland and grassland often in moist depressions or near creek lines. Has been located in disturbed areas that would have previously supported.**	**9**	**Potential – suitable habitat available and local records**	**Yes**
Pomaderris brunnea	Brown Pomaderris	E1		Moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	0	No - suitable habitat not recorded (moist woodland/forest) within the subject site	No
Pterostylis gibbosa	Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood	-	E	Known from a small number of populations in the upper Hunter Valley (Milbrodale), the Illawarra region (Albion Park and Yallah) and near Nowra (DECC 2007). Plants grow in a variety of woodland and open forest communities with shallow rocky soils.	0	Unlikely - suitable habitat not recorded (shallow rocky soils) within the subject site, subject site not within known populations for this species	No
Pterostylis saxicola	Sydney Plains Greenhood	E	E	Terrestrial orchid predominantly found in Hawkesbury Sandstone Gully Forest growing in small pockets of soil that have formed in depressions in sandstone rock shelves. Known from Georges River National Park, Ingleburn, Holsworthy, Peter Meadows Creek, St Marys Tower.	0	Unlikely - suitable habitat not recorded (sandstone rock shelves) within the subject site, subject site not within known populations for this species	No

Scientific Name	Common Name	BC Act Status	EPBC Act	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Pultenaea pedunculata	Matted Bush-pea	E		Matted Bush-pea is widespread in Victoria, Tasmania, and south-eastern South Australia. In NSW however, it is represented by just three disjunct populations, in the Cumberland Plains in Sydney, the coast between Tathra and Bermagui and the Windellama area south of Goulburn (where it is locally abundant). In the Cumberland Plain the species favours sites in clay or sandy-clay soils (Blacktown Soil Landscape) on Wianamatta Shale-derived soils, usually close to patches of Tertiary Alluvium (Liverpool area) or at or near the Shale-Sandstone interface (Appin). All sites have a lateritic influence with ironstone gravel (nodules) present.	9	Unlikely – suitable habitat recorded within the development area (PCT 3320). However, no BioNet records within the subject site and species not recorded during surveys. Considered unlikely to occur within the subject site	No
Rhizanthella slateri	Eastern Underground Orchid	B	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.	0	No - suitable habitat not recorded (not one of the listed TECs it is known to occur in) within the subject site, no local records.	No
Rhodamnia rubescens	Scrub Turpentine, Brown Malletwood	CE	E	Subtropical Rainforests, Warm Temperate Rainforests, Littoral Rainforests, and Wet Sclerophyll Forests. It may also occur as a pioneer in adjacent areas of dry sclerophyll and grassy woodland associations	0	No - suitable habitat not recorded (rainforest and wet sclerophyll forest) within the subject site, no local records.	No
Rhodomyrtus psidioides	Native Guava	CE	CE	Occurs from Broken Bay north of Sydney into QLD, with populations typically restricted to coastal and sub-coastal areas of low elevation. Pioneer species found in littoral, warm temperate and subtropical	0	No - suitable habitat not recorded (littoral, subtropical rainforest or wet schlerophyll	No

Scientific Name	Common Name	BC Act Status	EPBC Act	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
				rainforest and wet schlerophyll forest often near creeks and drainage lines and characterised by being extremely susceptible to myrtle rust.		forest) within the subject site, no local records.	
Syzygium paniculatum	Magenta Pilly	Lilly	V	This species occupies a narrow coastal area between Bulahdelah and Conjola State Forests in NSW. On the Central Coast, it occurs on Quaternary gravels, sands, silts and clays, in riparian gallery rainforests and remnant littoral rainforest communities. In the Ourimbah Creek valley, *S. paniculatum* occurs within gallery rainforest with *Alphitonia excelsa*, *Acmena smithii*, *Cryptocarya glaucescens*, *Syzygium oleosum* with emergent *Eucalyptus saligna*. At Wyrrabalong NP, *S. paniculatum* occurs in littoral rainforest as a co-dominant with *Ficus fraseri, Syzygium oleosum*, *Acmena smithii,* and *Endiandra sieberi.*	1	No - suitable habitat not recorded (riparian gallery rainforest and littoral rainforest) within the subject site	No
Thelymitra kangaloonica	Kangaloon Orchid	Sun		Only known to occur on the southern tablelands of NSW in the Moss Vale / Kangaloon / Fitzroy Falls area at 550-700 m above sea level. Swamps in sedgelands over grey silty grey loam soils	0	No - suitable habitat not recorded (swamp sedgelands over silty grey loams) within the subject site, no local records.	No

Scientific Name	Common Name	BC Act Status	EPBC Act	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Thesium australe	Austral Toadflax, Toadflax	V	V	Widespread throughout the eastern third of NSW but most common on the North Western Slopes, Northern Tablelands and North Coast. Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass (*Themeda australis*) (DECC 2007). The preferred soil type is a fertile loam derived from basalt although it occasionally occurs on metasediments and granite.	0	Unlikely – no known nearby populations. No records within 5km of subject site.	No

V= Vulnerable; E= Endangered; E2= Endangered population; E= Endangered, CE= Critically Endangered.

Table 10: Likelihood of occurrence of fauna species recorded within a 5 km radius of the study area

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
				AMPHIPIANS			
Heleioporus australiacus	Giant Burrowing Frog	V	V	Forages in woodlands, wet heath, dry and wet sclerophyll forest (Ehmann 1997). Associated with semi-permanent to ephemeral sand or rock-based streams, where the soil is soft and sandy so that burrows can be constructed.	0	No – suitable habitat not present within the study area, no local records	No
Litoria aurea	Green and Golden Bell Frog	E1	V	It can utilise a variety of natural and man-made waterbodies such as coastal swamps, marshes, lakes, other estuary wetlands, riverine floodplain wetlands, stormwater detention basins, farm dams, bunded areas, drains, ditches and other structures capable of storing water. Permanent swamps and ponds with established fringing vegetation (e.g. *Typha* sp. and spikerushes–*Eleocharis* sp.) adjacent to open grassland areas for foraging and free from predatory fish such as Mosquito Fish (*Gambusia holbrooki*) are also.	1	Unlikely – suitable habitat not present within the study area, considered unlikely to occur within the study area.	No
				AVES			
Anthochaera phrygia	Regent Honeyeater	E4A	CE	Associated with temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts, and riparian forests of River Oak (*C. cunninghamiana*). It primarily feeds on nectar from box and ironbark eucalypts and occasionally from Banksia's and mistletoes. It is reliant on locally abundant nectar sources with different flowering times to provide reliable supply of nectar. Suitable habitat likely to be present within the Precinct.	1	Unlikely – suitable habitat not present within the study area, considered unlikely to occur within the study area.	No
Artamus cyanopterus cyanopterus	**Dusky Woodswallow**	**V**		**The Dusky Woodswallow is found in open forests and woodlands and may be seen along roadsides and on golf courses. The Dusky Woodswallow nests colonially in 'neighbourhoods'. The nest is a loose bowl of twigs, grass and roots, lined with fine grass, and is placed in a tree fork, behind bark, in a stump hollow or in a fence post, about 1 m – 10 m above the ground.**	**5**	**Potential – marginal suitable foraging habitat available within subject site.**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Botaurus poiciloptilus	Australasian Bittern	E1	E	Occurs in terrestrial wetlands with tall dense vegetation, occasionally estuarine habitats, reedbeds, swamps, streams, and estuaries	0	Unlikely – suitable habitat not present within the study area, considered unlikely to occur within the study area.	No
Calidris ferruginea	Curlew Sandpiper	E1	CE	Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	0	No – suitable habitat not present within the study area, no local records.	No
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	Tall mountain forests and woodlands in summer; in winter, may occur at lower altitudes in open eucalypt forests and woodlands, and urban areas.	0	Unlikely – suitable habitat not present within the study area, considered unlikely to occur within the study area.	No
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	-	Open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur.	0	Unlikely – suitable habitat not present within the study area, considered unlikely to occur within the study area.	No
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	V	V	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks	0	No – suitable habitat not present within the study	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
						area, no local records.	
Circus assimilis	**Spotted Harrier**	**V**	**-**	**Grassy open woodland, inland riparian woodland, grassland, shrub steppe, agricultural land and edges of inland wetlands.**	**1**	**Potential – marginal suitable foraging habitat available within subject site.**	**Yes**
Daphoenositta chrysoptera	**Varied Sittella**	**E1**	**-**	**Distribution includes most of mainland Australia except deserts and open grasslands. Prefers eucalypt forests and woodlands with rough-barked species, or mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods from bark, dead branches, or small branches and twigs.**	**19**	**Potential – marginal suitable foraging habitat available within subject site.**	**Yes**
Dasyornis brachypterus	Eastern Bristlebird	E1	E	Habitat is characterised by dense, low vegetation and includes sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland, and rainforest, as well as open woodland with a heathy understorey. In northern NSW occurs in open forest with tussocky grass understorey.	0	No – suitable habitat not present within the study area, no local records.	No
Erythrotriorchis radiatus	Red Goshawk	E4	V	Distribution confined to the Northern Rivers region, with habitat including open woodland and forest, often along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, swamp forest and coastal riparian Eucalyptus Forest and are often associated with permanent wetlands. Feeds on medium to large birds, but is known to also take mammals, reptiles, and insects.	0	Unlikely – suitable habitat not present within the study area, considered unlikely to occur within the study area.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Falco hypoleucos	Grey Falcon	E1	-	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.	0	Unlikely – rarely occurs east of Great Dividing Range. No local records.	No
Falco subniger	**Black Falcon**	**V**	**-**	**Woodland, shrubland and grassland, especially riparian woodland and agricultural land. Often associated with streams or wetlands.**	**1**	**Potential – marginal suitable foraging habitat available within subject site.**	**Yes**
Grantiella picta	Painted Honeyeater	V	V	A nomadic species that typically inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests with abundant mistletoe (DECC 2007). It is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias, preferring Amyema sp. mistletoe (DECC 2007).	0	No – suitable habitat not present within the study area	No
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.**	**3**	**Potential – marginal suitable foraging habitat available within subject site.**	**Yes**
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	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.	3	No – suitable habitat not present within the study area	No
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 She oak or Acacia woodlands and riparian woodlands of interior NSW.**	**17**	**Potential – marginal suitable foraging habitat available within subject site.**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Hirundapus caudactus	White Throated Needletail	-	V	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occurs most often over open forest and rainforest, as well as heathland, and remnant vegetation farmland	0	No – suitable habitat not present within the study area, no local records.	No
Lathamus discolor	**Swift Parrot**	**E**	**CE**	**Breeds in Tasmania between September and January. Migrates to mainland in autumn, where it forages on profuse flowering Eucalypts. Hence, in this region, autumn and winter flowering eucalypts are important for this species. Favoured feed trees include winter flowering species such as Swamp Mahogany (Eucalyptus robusta), Spotted Gum (Corymbia maculata), Red Bloodwood (C. gummifera), Mugga Ironbark (E. sideroxylon), and White Box (E. albens).**	**16**	**Likely – suitable foraging habitat detected within the study area and study area within DPIE mapped important areas (accessed 15.11.2022).**	**Yes**
Lophoictinia isura	Square Tailed Kite	V	-	Timbered habitats including dry woodlands and open forests, particularly timbered watercourses.	1	Unlikely – marginal foraging habitat recorded within the study area.	No
Neophema puchella	Turquoise Parrot	V	-	Eucalypt and cypress pine open forests and woodlands, ecotones between woodland and grassland, or coastal forest and heath. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants or browsing on vegetable matter. Nests in tree hollows, logs or posts, from August to December.	1	Unlikely – marginal foraging habitat recorded within the study area.	No
Ninox strenua	Powerful Owl	V	-	Woodland, open sclerophyll forest, tall open wet forest and rainforest. It roosts by day in dense vegetation comprising species such as Syncarpia glomulifera (Turpentine), Allocasuarina littoralis (Black She-oak), Acacia melanoxylon (Blackwood), Angophora floribunda (Rough-barked Apple), Exocarpus cupressiformis (Cherry Ballart) and eucalypt species. The main prey items are medium-sized arboreal marsupials. Powerful Owls nest in large tree	2	Unlikely – suitable breeding habitat (i.e. large sized hollows) are not present within the subject site, habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
				hollows in large eucalypts that are at least 150 years old. Nesting occurs from late autumn to mid-winter.		considered too fragmented to provide suitable foraging habitat.	
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	-	CE	Primarily coastal in distribution, along estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats/sandflats, ocean beach, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms. Mainly forages on intertidal sandflats and mudflats and ocean beaches.	0	Unlikely, suitable habitat was not recorded.	No
Petauroides volans	Greater Glider	E2	V	Eucalypt forest and woodlands and feeds exclusively on eucalypt leaves, buds, flowers and mistletoe with the population on the south coast of NSW bounded by the Moruya River to the north, Coila Lake to the south and Princes Highway and cleared land exceeding 700 m in width to the west	0	Unlikely – no local records and area considered too fragmented.	No
Petaurus australis australis	Yellow-Bellied Glider	V	V	Occurs along the eastern coast to the western slopes of the Great Dividing Range, from QLD to VIC in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils	0	Unlikely, suitable habitat was not recorded.	No
Pycnoptilus floccosus	Pilotbird	-	V	Upland Pilotbirds occur above 600 m in the Brindabella Ranges in the ACT, and in the Snowy Mountains in NSW and north-east Victoria Lowland. Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne. Wet sclerophyll forests in temperate zones in moist gullies with dense undergrowth and dry sclerophyll forests and woodlands occupying dry slopes and ridges.	0	No – no local records and outside geographic range. No suitable habitat.	No
Rostratula australis	Australian Painted Snipe	E1	E	Primarily distributed along the Murray-Darling Basin, with recent records including wetlands on the Hawkesbury and Clarence Rivers, with habitats favouring swamps, dams and nearby marshy areas. A nocturnal forager on mud flats and in shallow water.	0	No – suitable habitat not present within the study area, no local records.	No
				GASTROPODs			

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Meridolum corneovirens	Cumberland Plain Land Snail	E1	-	Primarily inhabits Cumberland Plain Woodland, with a distribution in areas of the Cumberland Plain west of Sydney. Lives under litter of bark, leaves and logs or shelters in loose soil around grass clumps. They can dig several centimetres into soil to escape drought and is a fungus specialist, known to be active at night.	135	Unlikely – suitable habitat detected within the study area (Good Condition PCT 3320) however not within the impact area.	n
				FISH			
Macquaria australasica	Macquarie Perch	E	E	River and lake habitats, especially the upper reaches of rivers and their tributaries.	0	No – suitable habitat not present within the study area, no local records	No
Prototroctes maraena	Australian Grayling	-	V	Streams and rivers on the eastern and southern flanks of the Great Dividing Range, and in NSW occurring south from the Shoalhaven River in coastal rivers and streams with fresh and brackish coastal lagoons.	0	No – suitable habitat not present within the study area, no local records	No
				INSECTS			
Austrocordulia leonardi	Sydney Hawk Dragonfly	E1	-	Found in deep and shady riverine pools with cooler water in three locations around south Sydney from Audley to Picton. Larvae are found under rocks	0	No – suitable habitat not present within the study area, no local records	No
				MAMMALS (BATS)			
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country. Roosts in caves, rock overhangs and disused mine shafts.	0	No – suitable habitat not present within the study	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
						area, no local records	
Falsistrellus tasmaniensis	**Eastern False Pipistrelle**	**V**	**-**	**Prefers moist habitats with trees taller than 20m. Roosts in tree hollows but has also been found roosting in buildings or under loose bark.**	**4**	**Likely – BioNet records within 5 km of the study area and suitable foraging and potential roosting habitat (hollow-bearing trees) present within the study area**	**Yes**
Micronomus norfolkensis	**Eastern Coastal Free-tailed Bat**	**V**	**-**	**Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.**	**33**	**Likely – BioNet records within 5 km of the study area and suitable foraging habitat**	**Yes**
Miniopterus australis	**Little Bentwing-bat**	**V**	**-**	**Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub.**	**5**	**Likely – BioNet records within 5 km of the study area and suitable foraging habitat**	**Yes**
Miniopterus orianae oceanensis	**Large Bent-winged Bat**	**V**	**-**	**Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Hunt in forested areas, catching moths and other flying insects above the treetops.**	**40**	**Potential – foraging only. Roosting habitat (i.e. caves, stormwater tunnels etc. not present within the study area, however**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
						BioNet records within 5 km of the study area and potential foraging habitat available within the study area.	
Myotis macropus	Southern Myotis	V	-	The Large-footed Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Will occupy most habitat types such as mangroves, paperbark swamps, riverine monsoon forest, rainforest, wet and dry sclerophyll forest, open woodland and River Red Gum woodland, as long as they are close to water. While roosting (in groups of 10-15) it is most commonly associated with caves, this species has been observed to roost in tree hollows, amongst vegetation, in clumps of Pandanus, under bridges, in mines, tunnels and stormwater drains. It forages over streams, dams and pools catching insects and small fish by raking their feet across the water surface.	31	Likely – BioNet records within 5 km of the study area and suitable foraging habitat	Yes
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas. Camps are often located in gullies, typically close to water, in vegetation with a dense canopy.	109	Yes – foraging habitat only. No breeding camps present within the study area. Known BioNet records within 5 km of the study area and foraging habitat present within the study area	Yes

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Saccolaimus flaviventris	**Yellow-bellied Sheathtail-bat**	**V**	**-**	**It forages for insects above the canopy in eucalypt forests, and closer to the ground in more open country. It is dependent on suitable hollow-bearing trees to provide roost sites. The species has also been recorded using caves and abandoned sugar glider nests as roost sites.**	**4**	**Likely – Known BioNet records within 5 km of the study area and foraging habitat present within the study area**	**Yes**
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Associated with moist gullies in mature coastal forest, or rainforest, east of the Great Dividing Range, tending to be more frequently located in more productive forests. Within denser vegetation types, use is made of natural and man-made openings such as roads, creeks and small rivers, where it hawks backwards and forwards for prey.	20	Unlikely, suitable habitat was not recorded.	No
				MAMMALS			
Dasyurus maculatus	Spot-tailed Quoll	V	E	The Spotted-tailed Quoll inhabits a range of forest communities including wet and dry sclerophyll forests, coastal heathlands and rainforests (Mansergh 1984; DECC 2007j), more frequently recorded near the ecotones of closed and open forest and in NSW within 200km of the coast. Preferred habitat is mature wet forest (Belcher 2000b; Green & Scarborough 1990; Watt 1993), especially in areas with rainfall 600 mm/year (Edgar & Belcher 2008; Mansergh 1984). Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable (Catling et al. 1998, 2000). This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage in (DECC 2007). Maternal den sites are logs with cryptic entrances; rock outcrops; windrows; burrows (Environment Australia 2000).	0	No – suitable habitat not present within the study area, no local records.	No
Notamacropus parma	Parma Wallaby	V	V	Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest.	0	Unlikely, suitable habitat was not recorded.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Records within 5 km radius of the study area	Likelihood of occurrence within the subject site	Test of Significance Required (Y/N)
Petrogale penicillate	Brush-tailed Rock-wallaby	E1	V	In NSW, they occur from the QLD border to Shoalhaven in the south, utilising rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges	0	No – suitable habitat not present within the study area, no local records.	No
Phascolarctos cinereus	Koala	V	V	Associated with both wet and dry Eucalypt forest and woodland that contains a canopy cover of approximately 10 to 70%, with acceptable Eucalypt food trees. Some preferred Eucalyptus species are: *Eucalyptus tereticornis*, *E. punctata*, *E. cypellocarpa, E. viminalis*.	75	Unlikely – study area is fragmented and isolated from koala populations.	No
Pseudomys	New Holland Mouse	-	V	Fragmented distribution across eastern NSW in open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes. Lives predominately in burrows shared with other individuals	0	Unlikely, suitable habitat was not recorded.	No
				REPTILES			
Delma impar	Striped Legless Lizard, Striped Snake-lizard	V	V	Found predominately in temperate grassland and sometimes in Box-Gum Woodland or modified grasslands with significant exotic grasses and/or surface rocks.	0	Unlikely, suitable habitat was not recorded.	No
Hoplocephalus bungaroides	Broad-headed Snake	E1	V	Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands. Nocturnal. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in hollows in large trees within 200 m of escarpments in summer. Feeds mostly on geckos and snake skinks; will also eat frogs and small mammals occasionally.	0	No – suitable habitat not present within the study area, no local records.	No

BC Act: E1 = Endangered, E2 = Endangered Population, E4 = Extinct, E4A = Critically Endangered, V = Vulnerable.

Appendix B Species List

Scientific Name	Common Name	Native / Exotic / WoNS
Acacia binervia	Coast Myall	Native
Acacia decurrens	Black Wattle	Native
Acacia falcata		Native
Aristida vagans	Threeawn Speargrass	Native
Bidens pilosa var. pilosa		Exotic
Briza subaristata		Exotic
Bursaria spinosa subsp. spinosa	Native Blackthorn	Native
Cenchrus clandestinus	Kikuyu Grass	Exotic
Centella asiatica	Indian Pennywort	Native
Cheilanthes sieberi subsp. sieberi	Rock Fern	Native
Chloris gayana	Rhodes Grass	Exotic
Chorizema parviflorum	Eastern Flame Pea	Native
Conyza spp.	A Fleabane	Exotic
Cynodon dactylon	Common Couch	Native
Dillwynia sieberi		Native
Entolasia marginata	Bordered Panic	Native
Eragrostis curvula	African Lovegrass	Exotic/Priority Weed
Eucalyptus amplifolia subsp. amplifolia		Native
Eucalyptus moluccana	Grey Box	Native
Eucalyptus tereticornis	Forest Red Gum	Native
Glycine clandestina	Twining glycine	Native
Goodenia hederacea subsp. hederacea		Native
Hypochaeris radicata	Catsear	Exotic
Leucopogon juniperinus	Prickly Beard-heath	Native
Ligustrum lucidum	Large-leaved Privet	Exotic
Lomandra multiflora subsp. multiflora	Many-flowered Mat-rush	Native
Lycium ferocissimum	African Boxthorn	Exotic/WoNS/Priority Weed
Microlaena stipoides var. stipoides	Weeping Grass	Native
Olea europaea subsp. cuspidata	African Olive	Exotic/Priority weed
Paspalum dilatatum	Paspalum	Exotic
Pinus elliottii	Slash Pine	Exotic
Plantago lanceolata	Lamb's Tongues	Exotic
Pultenaea villosa	Hairy Bush-pea	Native

Scientific Name	Common Name	Native / Exotic / WoNS
Rubus spp.		Native
Schoenus apogon	Fluke Bogrush	Native
Senecio madagascariensis	Fireweed	Exotic/WoNS/Priority Weed
Sonchus oleraceus	Common Sowthistle	Exotic
Themeda triandra		Native
Verbena bonariensis	Purpletop	Exotic
Veronica plebeia	Trailing Speedwell	Native

Appendix C Test of Significance

The 'Assessment of significance' (5-part test) is applied to species, populations and ecological communities listed on Schedules 1 and 2 of the BC 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. Test of significance have been undertaken for the following communities and species:

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
- *Pimelea spicata* (Spiked Rice Flower)
- Woodland Birds
    - Artamus cyanopterus cyanopterus (Dusky Woodswallow)
    - *Circus assimilis* (Spotted Harrier)
    - Daphoenositta chrysoptera (Varied Sittella)
    - *Falco subniger* (Black Falcon)
    - Glossopsitta pusilla (Little Lorikeet)
    - Hieraaetus morphnoides (Little Eagle)
    - Lathamus discolor (Swift Parrot)
- Microchiroptera Bats
    - *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
    - *Miniopterus australis* (Little Bentwing-bat)
    - Miniopterus orianae oceanensis (Large Bent-winged Bat)
    - *Myotis Macropus* (Southern Myotis)
    - *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
    - *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

CUMBERLAND PLAIN WOODLAND IN THE SYDNEY BASIN BIOREGION

Cumberland Plain Woodland is listed as critically endangered under the BC Act. This ecological community is comprised of woodland dominated by eucalypt species in the canopy, a shrub layer dominated by *Bursaria spinosa* and a diverse understory of herbs and grasses. Pre-European settlement, this community was extensive across western Sydney, however only a small proportion of its original extent remains.

The study contains approximately 0.51 ha of Cumberland Plain Woodland. The proposed works would affect approximately 0.01 ha of this community. A Test of Significance was undertaken for Cumberland Plain Woodland of 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	Not applicable.
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	There would be a direct impact to 0.01 ha of *Cumberland Plain Woodland in the Sydney Basin Bioregion* (CPW) which occurs within a small patch of the ecological community (approximately 0.50 ha will be retained within the study area). It is considered unlikely that the loss of 0.01 ha of Cumberland Plain Woodland which is located within an area containing larger patches would adversely impact on this ecological community to an extent that its local occurrence (within a 5km radius of the study area) will be placed at risk of becoming extinct. Indirect impacts associated to construction include dust, vibration, and sedimentation. These are not anticipated to affect the ecological community subject to the implementation of required mitigation measures.
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 proposed works would result in a direct impact to 0.01 ha of CPW. The remainder of the CPW within the study area was observed to contain a similar assemblage of flora species to those observed within the impact area. All flora species recorded during the surveys are common in the study area and locality. Therefore, it is considered unlikely that the direct impacts would result in substantial and adverse modifications to such an extent to place this community 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	The proposed works would directly affect 0.01 ha of CPW.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community:	The vegetation to be removed is relatively small compared with the remaining extent of this community within the study

BC Act	Question	Response
	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	area and surrounding landscape. It is located on the edge of a smaller patch of disturbed CPW. Connectivity of the CPW community will be marginally reduced as the impacts are confined to 0.01 ha on the edge of patch of vegetation. Therefore, it is considered unlikely that the impacts will fragment or isolate areas of this ecological community.
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 proposed works would result in a direct impact to 0.01 ha of low condition CPW, it is unlikely that this would impact upon the long-term survival of this ecological community in the locality as the direct impact will not significantly affect the long-term viability, tenure, quality, and integrity of the habitat within the remaining patch and within locality. The vegetation to be directly affected is minimal in comparison with that remaining unaffected in the study area (0.50 ha) and surrounding landscape (70+ ha) of which is in land subject to the Edmondson Park Regional Park.
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).	The proposed works would not impact any 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.	Several Key Threatening Processes (KTP) are relevant to this proposal with respect to CPW. These include: • clearing of native vegetation • invasion of native plant communities by exotic perennial grasses The removal of approximately 0.01 ha of CPW would contribute to the above KTPs. However, this vegetation is located on the edge of a patch which has undergone previous disturbance and is currently subject to edge effects as it is directly adjacent to the cleared area which currently contains exotic perennial grasses. Therefore, it is considered unlikely that the proposal would significantly exacerbate these KTPs.
Conclusion	Is there likely to be a significant impact?	No. The proposed development is unlikely to significantly impact upon Cumberland Plain Woodland given that: • A relatively small proportion of vegetation is to be removed (0.01 ha) compared to what will be retained within (0.5 ha) and adjacent to the study area (70+ ha). • The proposed development will marginally reduce a small patch of CPW by removing a strip off the edge, however, it will not fragment or isolate it from patches of the same community outside the study area. • Any indirect impacts to abiotic factors (such as water and soil) to this ecological community will be mitigated through sediment and erosion control measures.

PIMELEA SPICATA (SPIKED RICE-FLOWER)

A shrub, to 50cm tall, *Pimelea spicata* was once widespread across the Cumberland Plain. It is known to occur in Grey Box communities (particularly Cumberland Plain Woodland) and in areas of ironbark. The nearest individual was located over 2 km away to the west. The study area contains 0.5 ha of potential suitable habitat for this species (PCT 3320) with 0.35 ha within the impact area.

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	Vegetation removal will be minimal, approx. 0.01 ha removed, and 0.5 ha retained. Impacts to potential habitat for this species would be negligible given the small area relative to the large areas of potential habitat to be retained throughout study area and adjacent to the study area, within land that is zoned for conservation. Additionally, no species have been previously recorded within the study area. Therefore, it is unlikely that the proposed works would have an adverse impact on this threatened flora species such that a viable local population would be placed at risk of extinction.
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	Not applicable
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.	Not applicable
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	The proposed works involve direct impacts to 0.01 ha of native vegetation which may provide habitat for this threatened flora species. This vegetation is of a low condition with its groundcover dominated by exotic species. There are large amounts of suitable, intact vegetation available within the study area (0.5 ha) and surrounds (70+ ha) therefore the area to be affected is considered negligible.
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 proposed works involve direct impacts to 0.01 ha of native vegetation which may provide habitat for this threatened flora species. Given that the impacts will occur in the southern section of isolated vegetation surrounded by cleared and exotic pastures, it is unlikely that the impact will lead to any further fragmentation or isolation of potential habitat for this species as the

BC Act	Question	Response
		impact is small and located on the edge of a vegetation patch.
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.	Given the small area of potential habitat that will be affected (0.01 ha) relative to the large area of potential habitat within the study area (0.5 ha), the habitat to be removed is not considered important to the survival of this threatened flora species as it is of low condition CPW and the groundcover is dominated by exotic vegetation.
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).	The proposed works will not affect any 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.	One Key Threatening Process, the removal of native vegetation, is relevant to this proposal. The proposed works are unlikely to contribute significantly to this process as only a small amount of vegetation will be removed (0.01 ha) compared to that which will be retained (0.5 ha).
Conclusion	Is there likely to be a significant impact?	No. The proposed activity is unlikely to have a significant impact on *Pimelea spicata* for the following reasons: • Habitat for this threatened species will be retained within the study area. • The proposal would not isolate or fragment any connecting areas of habitat that are not already fragmented. • The species has not been recorded previously within the study area.

WOODLAND BIRDS

The following species were not observed during field survey but have the potential to occur within the subject site:

- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow) listed as vulnerable
- *Daphoenositta chrysoptera* (Varied Sittella) listed as vulnerable
- *Glossopsitta pusilla* (Little Lorikeet), listed as vulnerable
- *Lathamus discolor* (Swift Parrot), listed as endangered.
- *Circus assimilis* (Spotted Harrier)
- *Falco subniger* (Black Falcon)
- *Hieraaetus morphnoides* (Little Eagle).

These species have varying habitat associations (Appendix A). However, within the context of the proposed works foraging habitat within the subject site was limited to areas mapped as PCT 3320. The proposed works would remove 0.01 ha of this vegetation. As no HBTs would be removed as a result of the proposed works, no breeding habitat would be impacted. Given the similarity between foraging habitat within the subject land, a single Test of Significance was applied for the above 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 works would remove 0.01 ha of vegetation, containing foraging habitat for woodland bird species. About 0.5 ha of foraging habitat would be retained within the study area. Additionally, these species are highly mobile and would still be able to access foraging habitat in the locality. No breeding habitat would be affected as part of the proposed works. Therefore, it is considered unlikely that the proposed works would place a viable population of any of these species at risk of extinction. Similar habitat would be retained within the study area and is also present in the broader 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	Not applicable
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.	Not applicable

BC Act	Question	Response
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	The proposed works would remove 0.01 ha of vegetation, containing foraging habitat for the threatened bird species listed above. No breeding habitat would be affected as part of the proposed works.
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 proposed works would remove 0.01 ha of native vegetation. Impacts are isolated to the southern section of already fragmented vegetation. Therefore, the proposed works would not contribute to further fragmenting or isolating of habitat for the threatened species. The species are highly mobile and will still be able to access foraging habitat within the study area and surrounds.
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 works would remove 0.01 ha of foraging habitat for woodland bird species while 0.5 ha will be retained. This habitat to be removed is not considered vital to the long-term survival of these species within the locality because the species are highly mobile and would be able to continue foraging in similar vegetation within the study area and surrounds, of which there is approximately >70 ha, in land that is zoned for conservation purposes within the Edmondson Park Regional Park. Furthermore, the proposed works would not remove vegetation that is considered breeding habitat.
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).	The proposed works would not impact any 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.	One key threatening process, clearing of native vegetation, is associated with the proposed works and is relevant to the threatened species. The impacts of this key threatening process resulting from the proposed works are considered minimal. The species are highly mobile and would be able to continue foraging in similar vegetation retained within the study area and in the surrounding landscape.
Conclusion	Is there likely to be a significant impact?	No. The proposed activity is unlikely to have a significant impact on woodland bird species for the following reasons: • The 0.01 ha of habitat is relatively small and therefore considered marginal. • Similar habitat for this species will be retained within the study area and more is available adjacent to the study area. • No breeding habitat would be removed.

MICROCHIROPTERA BATS (MICROBATS)

The following species were not observed during field survey but have the potential to occur within the subject land:

- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) - Vulnerable
- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat) - Vulnerable
- *Miniopterus australis* (Little Bentwing-bat) – Vulnerable
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat) - Vulnerable
- *Myotis Macropus* (Southern Myotis) - Vulnerable
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat) – Vulnerable

These species have varying habitat associations (Appendix A). However, within the context of the proposed works foraging habitat within the subject site was limited to areas mapped as PCT 3320. The proposed works would remove 0.01 ha of foraging habitat. As no HBTs would be removed as a result of the proposed works, no breeding habitat would be impacted. Given the similarity between foraging habitat within the subject site, a single Test of Significance was applied for the above 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 works would remove 0.01 ha of vegetation which would provide foraging habitat for these species. About 0.5 ha would be retained within the study area.. Additionally, these species are highly mobile and would have access to > 70ha of similar habitat immediately surrounding the study area, within land zoned for conservation purposes within the Edmondson Park Regional Park. No breeding habitat would be affected as part of the proposed works. It is considered unlikely that the proposed works would place a viable population of the species at risk of extinction.
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	Not applicable
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.	Not applicable
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community:	The proposed works would remove 0.01 ha of foraging habitat for the species. These impacts are considered negligible given that similar foraging habitat will be retained within the study area (0.5 ha) and is available adjacent to the study area (>

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	70ha). The species are highly mobile and could continue to access additional habitat. No breeding habitat would be affected.
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 proposed works would remove 0.01 ha of foraging habitat and retain 0.5 ha within the study area. Vegetation to be removed is located on the edge of an existing patch and as such would not fragment this patch of vegetation. In addition there is a vast array of higher quality potential foraging habitat adjacent to impact area. Additionally, these species are highly mobile and would have access to suitable ample foraging habitat in the broader locality. Therefore, the proposed works would not contribute to further fragmenting or isolating of habitat for the threatened species. The species are highly mobile and will still be able to access foraging habitat in the study area and surrounds.
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 works would remove 0.01 ha of foraging habitat for the listed microbat species. This habitat to be removed is not considered vital to the long-term survival of these species within the locality because the species are highly mobile and would be able to continue foraging in similar vegetation within the study area (0.5 ha) and surrounds (> 70ha). Furthermore, the proposed works would not remove breeding habitat.
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).	The proposed works would not impact any 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.	One key threatening process, clearing of native vegetation, is associated with the proposed works and is relevant to the threatened species. The impacts of this key threatening process resulting from the proposed works are considered minimal due to the relatively small area of vegetation being removed. The species are highly mobile and would be able to continue foraging in similar vegetation retained within the study area and surrounds.
Conclusion	Is there likely to be a significant impact?	No. The proposed activity is unlikely to have a significant impact on the microbats for the following reasons: • The extent of habitat to be removed is minimal (0.1 ha). • Similar habitat for these species will be retained within the study area (0.5 ha) and more is available adjacent to the study area. • No breeding habitat would be removed.

PTEROPUS POLIOCEPHALUS (GREY-HEADED FLYING FOX)

The Grey-headed Flying-fox is listed as vulnerable under the BC Act. The description and habitat associations of this species are presented in Appendix A. This species was not observed during field survey. The subject site contains habitat for the species in areas of vegetation identified as PCT 3320. The proposed works would remove 0.01 ha of this habitat. No breeding habitat (camps) would be impacted. The closest Nationally Important Flying-fox camp is approximately 3 km to the southeast of the study area in Macquarie Fields and had an individual count of 10,000-15,999 in February 2020 (Department of Agriculture, Water and the Environment (DAWE) 2021).

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 works would remove 0.01 ha of foraging habitat for the Grey-headed Flying-fox. No breeding habitat in the form of camps would be impacted as part of the proposed works. The nearest camp is 3.5 km away. This species travels up to 50km on feeding forays. They therefore require access to a wide range of feed sources in addition to that within the subject site. It is considered unlikely that the proposed works would place a viable population of the species at risk of extinction given that foraging habitat would be retained within the study area (0.5 ha) and surrounds which the highly mobile species could access.
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	Not applicable
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.	Not applicable
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	The proposed works would remove 0.01 ha of foraging habitat for this species. These impacts are considered minor given that foraging habitat would be retained within the study area 0.5 ha) and surrounds. In addition, the species travels up to 50 km on feeding forays, and require access to a wide range of feed sources. It is unlikely this patch would provide a key foraging resource for the species. No breeding habitat (camps) would be affected.
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	The proposed works would remove 0.1 ha of foraging habitat from the study area. The proposed works would not contribute to further fragmenting or isolating habitat for the Grey-headed Flying Fox. The species travels up to 50km on feeding forays and will still be able to access foraging habitat

BC Act	Question	Response
	areas of habitat as a result of the proposed development or activity	in the study area (0.5 ha) and surrounds. A small increase in patch gap is unlikely to sever a population, the species or limit access to other habitat areas.
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 works would remove 0.01 ha of foraging habitat the Grey-headed Flying-fox. This habitat to be removed is not considered vital to the long-term survival of this species within the locality because the species is highly mobile and would be able to continue foraging in similar vegetation within the study area (0.5 ha) and surrounds. Furthermore, the proposed works would not remove breeding habitat.
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).	The proposed works would not impact any 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 key threatening process, clearing of native vegetation, is associated with the proposed works. However, impacts resulting from these processes are considered to be minimal. The species is highly mobile and would be able to continue foraging in similar vegetation within and adjacent to the study area.
Conclusion	Is there likely to be a significant impact?	No. The proposed activity is unlikely to have a significant impact on the Grey-headed Flying-fox for the following reasons: • The extent of habitat to be removed is minimal (0.01 ha). • Similar habitat for this species will be retained within the study area (0.5 ha) and more is available adjacent to the study area. • Species is highly mobile and would be able to access food sources in the surrounding area and much further away. • No breeding habitat would be removed.

Appendix D Significance Assessment

This assessment has been prepared in accordance with the *EPBC Act Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (DAWE 2013). These guidelines have been established to assist proponents to determine whether a proposed action is likely to result in a significant impact on a matter of national environmental significance.

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

Significance assessments have been undertaken for the following communities and species:

- *Pimelea spicata* (Spiked Rice Flower)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)

Assessment of significance for Spiked Rice Flower

Criterion	Question	Response
1)	lead to a long-term decrease in the size of a population of a species	The site is unlikely to support a population of *Pimelea spicata*, given the absence of records and level of site disturbance. No individuals have been identified in the site during the survey. There are no historical records for the species within the site (BioNet 2022). The proposed action is unlikely to decrease the size of an important population.
2)	reduce the area of occupancy of the species	*Pimelea spicata* occurs in Cumberland Plain Woodland in areas of low – moderate shade. The site overlaps with the known distribution of the species, however, the site is unlikely to support a population of *Pimelea spicata*. The species has never been recorded in the site (BioNet 2022) and the survey did not identify the species. In addition, the site is unlikely to support a population given the intensive and ongoing history of disturbance (use as an army base) and the dominance of exotic groundcover in the patches of low Cumberland Plain Woodland which is to be impacted by the proposed works Therefore, the proposed action is unlikely to reduce the area of occupancy of an important population.
3)	fragment an existing important population into two or more populations	No. The two closest known populations are located at Mt Annan Botanical Gardens and at Lakeside Golf Club which are approximately 12 km and 6 km from the study area. There is no vegetative link capable of spreading seed from either of these areas to the site. Further, the proposal is only removing 0.01 ha of low condition CPW from the edge of an existing patch. As such the proposed action is unlikely to result in the fragmentation of an existing population into two or more.
4)	adversely affect habitat critical to the survival of a species	No. The vegetation that is to be impacted is unlikely to support a population given the lack of records and no individuals identified during survey. The site is unlikely to contain tap roots of the species that would re-sprout due to previous use of the land as a military base. The proposed action is unlikely to adversely affect habitat critical to the survival of the species.

Criterion	Question	Response
5)	disrupt the breeding cycle of a population	Seed dispersal of *Pimelea spicata* is relatively unknown. It is known to re-sprout from the tap root. This can occur at any time but is more likely to occur after low levels of disturbance. High and consistent levels of disturbance discourage and eventually inhibit re-sprouting from the tap root. Given the history of disturbance throughout the site and lack of records, the site is unlikely to support any *Pimelea spicata* habitat or tap roots and therefore the proposed action would be unlikely to disrupt the breeding cycle of an important population.
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. The vegetation that is to be impacted is unlikely to support potential habitat capable of supporting a population given the size 0.01 ha and the dominance of exotic ground cover intensive. The site is unlikely to provide habitat for Pimelea spicata and therefore, the proposed action is unlikely to decrease the extent of the species habitat such that it is likely to decline.
7)	result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	*Pimelea spicata* prefers a more open, sunny woodland and therefore overcrowding of the mid-storey layer with exotic flora species can increase shading and be harmful to this species. The site already contains exotic species in the midstorey level and groundcover. Further, the site is unlikely to contain potential habitat capable of supporting a population given the history of disturbance. In addition, mitigation measures are provided to manage weeds and reduce the potential of weed species to be transported to site. The proposed action is unlikely to result in an invasive species becoming established.
8)	introduce disease that may cause the species to decline, or	There are no known diseases that are likely to impact Pimelea spicata.
Conclusion	Is there likely to be a significant impact?	NNo. The proposed activity is unlikely to have a significant impact on *Pimelea spicata* for the following reasons: 1. No record of the species has been historically recorded in the site (BioNet 2022) and the survey did not identify the species. 2. Impacts are limited to 0.01 ha of low condition CPW. 3. The proposed activity will not fragment or further isolate the potnetialn habitat for *Pimelea spicata* as impacts are located on an edge of existing vegetation and it is well connected to an abundance of suitable habitat.

Assessment of significance for Grey-headed Flying-fox

Criterion	Question	Response
1)	lead to a long-term decrease in the size of an important population of a species	No Grey-headed Flying-foxes were opportunistically encountered during the survey. The proposed works involve the removal of 0.01 ha of low condition CPW. The removal of vegetation is minor, relative to the large area of potential habitat adjacent, >70 ha. No camps will be removed. The nearest camp is at Macquarie Fields, approximately 3.5km to the south east of the study area, this camp is not mapped as being of national importance. The proposed action is unlikely to lead to a long-term decrease in the size of an important population.
2)	reduce the area of occupancy of an important population	The closest camp is not mapped as a nationally significant camp
3)	fragment an existing important population into two or more populations	The proposed works would remove 0.1 ha of foraging habitat from the study area. The proposed works would not contribute to further fragmenting or isolating habitat for the Grey-headed Flying Fox. The species travels up to 50km on feeding forays and will still be able to access foraging habitat in the study area (0.5 ha) and surrounds. A small increase in patch gap is unlikely to sever a population, the species or limit access to other habitat areas.
4)	adversely affect habitat critical to the survival of a species	The 2021 Recovery Plan for this species identifies 'a continuous temporal sequence of productive foraging habitats, linked by migration corridors or stopover habitats, and suitable roosting habitat within nightly commuting distance of foraging areas' as habitat critical to the survival of the species. Considering the small area of potential habitat to be affected and the absence of an established camp within the study area, the proposed works are considered unlikely to adversely affect habitat critical to the survival of this species.
5)	disrupt the breeding cycle of an important population	The proposed action does not involve impacts to breeding habitat and will only minimally affect foraging habitat. Therefore, it is unlikely to disrupt the breeding cycle of an important population of this species.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action would remove about 0.01 ha of potential foraging habitat. The species rely on large areas for foraging. The vegetation within the impact area was of relatively low quality due to a prevalence of exotic species, spares midstory and younger canopy trees which are not considered to be good producers of nectar. The proposed action is unlikely to alter the availability or quality of habitat to the extent that this species is likely to decline.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is unlikely to result in the establishment of an invasive species in the habitat of the Grey-headed Flying-Fox, as the vegetation removal is unlikely to significantly alter the existing vegetation structure in such a way as to encourage the introduction of invasive species.
8)	introduce disease that may cause the species to decline, or	The action is unlikely to introduce disease, such as Lyssavirus, Hendra, or Menangle virus, that would cause this species to decline.
9)	interfere with the recovery of the species.	The 2021 Recovery Plan identifies habitat loss as the key threat to this species. The proposed action is unlikely to exacerbate the threat of habitat loss or interfere substantially with the recovery of the species.

Criterion	Question	Response
Conclusion	Is there likely to be a significant impact?	No. The proposed activity is unlikely to have a significant impact on the Grey-headed Flying fox for the following reasons: 1. Impacts are limited to 0.01 ha of low condition CPW 2. The proposed activity will not fragment or further isolate the foraging or breeding habitat of the Grey-headed Flying-fox as it is well connected to an abundance of suitable habitat in adjacent lots, >70 ha 3. No existing camps will be impacted by the proposed action

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