Wollondilly Biodiversity Technical Study
Ecological Constraints Assessment – Picton

Wollondilly Shire Council

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Project Number	22SUT 1742
Project Manager	Bethany Lavers
Prepared by	Michael Gregor and Bronwyn Callaghan
Reviewed by	Michelle Frolich
Approved by	Michelle Frolich
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Template 2.8.1

Contents

List of Figures

List of Tables

Executive Summary

Eco Logical Australia (ELA) was engaged by Wollondilly Shire Council (WSC) to prepare a Biodiversity Technical Study for a selection of properties in Picton, NSW (the study area).

The aim of this assessment is to assist WSC by reviewing the suitability of the Picton sites for Light Industrial and other compatible land uses that would be allowable under the proposed rezoning of the indicated land parcels. The study area is currently zoned RU1 – Primary Production under the Wollondilly Local Environment Plan 2011.

This report outlines the terrestrial and riparian ecological constraints across the study area. This includes information relating to relevant environmental planning instruments, threatened species and ecological communities, entry requirements into the Biodiversity Offset Scheme (BOS) and implications this scheme could have on future development.

A desktop review and field survey were undertaken of the study area to identify ecological constraints. The desktop review identified applicable planning instruments, past land use, previous vegetation mapping and records of threatened species previously recorded within and surrounding the study area.

The field survey included validation of previous vegetation mapping and identification of Plant Community Types (PCTs) and vegetation condition zones and fauna habitat assessments.

Two PCTs were identified, in varying condition types, on the study area:

- PCT 1395 *Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion.*
- PCT 850 *Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion*

PCT 1395 is part of a Threatened Ecological Community (TEC), being the Critically Endangered Ecological Community (CEEC), Shale Sandstone Transition Forest in the Sydney Basin Bioregion, listed under the NSW *Biodiversity Conservation Act 2016* (BC Act). PCT 1395 in Intact condition also meets the definition of the TEC under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

PCT 850 is part of a Threatened Ecological Community (TEC), being Critically Endangered Ecological Community (CEEC), Cumberland Plain Woodland in the Sydney Basin Bioregion, listed under the NSW *Biodiversity Conservation Act 2016* (BC Act).

No threatened flora or fauna were recorded on the study area during field surveys however, several habitat features were recorded which provides potential habitat for a range of threatened fauna species.

The study area has a number of high constraints for future development should the study area be rezoned. High constraints include the areas mapped as a TEC, vegetation mapped as Serious and Irreversible Impact (SAII) entity and areas mapped on the NSW Department of Planning and Environment's (DPE) Biodiversity Values (BV) Map. Any impacts on these areas are likely to trigger entry into the NSW Biodiversity Offsets Scheme (BOS), for which assessment using the Biodiversity

Assessment Method (BAM) and preparation of a Biodiversity Development Assessment Report (BDAR) would be required. Any residual impacts would be required to be offset.

However, there are areas mapped to have low and moderate constraints that could be suitable for rezoning to Light Industrial and for future development and comprise exotic vegetation and cleared land and houses, and first order watercourses, farm dams and areas of Waterfront land outside the required vegetated riparian zones, respectively.

Depending on the scale of impacts, a referral to the Commonwealth may be required for impacts to TECs.

1. Introduction

Eco Logical Australia (ELA) was engaged by Wollondilly Shire Council (WSC) to prepare a Biodiversity Technical Study for a selection of properties in Picton, NSW (the study area). Table 1 identifies the Lot and DPs which comprise the study area.

Table 1: Lot and DPs of the study area

Lot	DP	Address
10	583245	5 Stilton Lane PICTON
2	583247	15 Stilton Lane PICTON
141	997490	465 Argyle Street PICTON
1	537245	467 Argyle Street PICTON
15	1105675	469 Argyle Street PICTON
16	979250	475 Argyle Street PICTON
1	207443	485 Argyle Street PICTON
2	570466	28 Wonga Road PICTON
910	1121899	18 Wonga Road PICTON
911	1121899	2225 Remembrance Driveway PICTON, 31 Wonga Road PICTON, 10 Wonga Road PICTON
11	3007	2235 Remembrance Driveway PICTON
1	570466	2245 Remembrance Driveway PICTON (Back) 2247 Remembrance Driveway PICTON (Front)

The study area is zoned RU2 – Rural Landscape under the Wollondilly Local Environment Plan (LEP) 2011. The study area has varied land uses including a working farm (primarily cattle grazing), horse paddocks and other small businesses. The properties border existing light industrial land, agricultural land and Pack Creek to the east.

1.1. Purpose

The aim of this assessment is to assist WSC by reviewing the suitability of the Picton sites for light industrial and other compatible land uses that would be allowable under the proposed rezoning of the indicated land parcels.

This report outlines the terrestrial and riparian ecological constraints across the study area. This includes information relating to relevant environmental planning instruments, threatened species and ecological communities, entry requirements into the Biodiversity Offset Scheme (BOS) and implications this scheme could have on future development.

Figure 1: Study area location

1.2. Terms and Abbreviations

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

- **Study area** – the area being directly assessed in this study including the land identified in Table 1, and shown in **Figure 1**.

Abbreviation	Description
BAM	Biodiversity Assessment Method
BC Act	NSW *Biodiversity Conservation Act 2016*
BC Regulation	NSW *Biodiversity Conservation Regulation 2017*
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offsets Scheme
BS Act	NSW *Biosecurity Act 2015*
BV Map	Biodiversity Values Map
CAA	Controlled Activity Approval
CEEC	Critically Endangered Ecological Community
DA	Development Application
DBH	Diameter at Breast Height
DAWE	Former Commonwealth Department of Agriculture, Water and the Environment (now the DCCEEW)
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water (the former DAWE)
DCP	Development Control Plan
DPI	Department of Primary Industries (NSW)
DPE	Department of Planning and Environment (NSW)
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environmental Protection Licence
FM Act	NSW *Fisheries Management Act 1994*
GIS	Geographic Information System
LEP	Local Environment Plan
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NRAR	Natural Resource Access Regulator
OEH	Former Office of Environment and Heritage (NSW) (now DPE)
PCT	Plant Community Type
PMST	Protected Matters Search Tool
POEO Act	NSW *Protection of the Environment Operations Act 1977*

Abbreviation	Description
SEPP	State Environmental Planning Policy
SSTF	Shale Sandstone Transition Forest
TEC	Threatened Ecological Community
ToS	Test of Significance
VMP	Vegetation Management Plan
VRZ	Vegetated Riparian Zone
WM Act	NSW *Water Management Act 2000*
WSC	Wollondilly Shire Council

2. Legislative Context

Table 2 summarises how relevant legislation may impact future development of the study area.

Table 2: Legislation relevant to the study area

Name	Relevance to the project
	Commonwealth
Environmental Protection and Biodiversity Conservation Act 1999 (EPBC* Act*)	The Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) aims to protect Matters of National Environmental Significance (MNES), including vegetation communities and species listed under the EPBC Act. If a development is likely to have a significant impact on MNES, it is likely to be considered a 'Controlled Action' by the Commonwealth and requires assessment and approval by the Commonwealth in order to proceed. The MNES that have been considered during this assessment are: • Listed threatened species and communities • Listed migratory species Depending on the scale of impacts to MNES listed under the EPBC Act, future development may require a referral under the EPBC Act. MNES of particular concern are threatened ecological communities.
	State
Environmental Planning and Assessment Act 1979 **(EP&A Act)**	The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. This Act provides for the creation of State Environmental Planning Policies (SEPPs), Local Environmental Plans (LEPs) and Development Control Plans (DCPs). If a LEP is to be amended (e.g., to change the zoning of land), the change is made through the preparation of a planning proposal. The planning proposal explains the intent of the proposed changes and the justification for the LEP amendments. This is required, for example, when a council has endorsed and seeks to implement and give effect to its local housing or employment land strategy. A council may initiate an LEP amendment by drafting a planning proposal and submitting it to the Department of Planning and Environment for Gateway determination. Council is responsible for preparing the information and supporting documentation for any council-initiated proposal. Local development is assessed under Part 4 of the EP&A Act. Part 4 assessments must assess whether the proponent will require entry into the BOS. More information on this is discussed below.
Biodiversity Conservation Act 2016 **(BC Act)**	The *Biodiversity Conservation Act 2016* (BC Act) outlines the assessment requirements to determine whether a proposed development (Part 4 of the EP&A Act) is likely to significantly affect threatened species or ecological communities, or their habitats (section 7.3 BC Act) and whether the Biodiversity Offsets Scheme (BOS) will be triggered. Works that exceed the BOS thresholds as set out in Part 7 of the Act and Part 7 of the *Biodiversity Conservation Regulation 2017* (BC Regulation), are required to undertake the ecological assessment in accordance with the Biodiversity Assessment Method (BAM), including the preparation of a Biodiversity Development Assessment Report (BDAR). There are three main triggers for entry into the BOS: • Clearing above the area threshold established under section 7.2 of the BC Regulation 2017. This is based on the minimum lot size allowable under the LEP

Name	Relevance to the project
	• Impacting land mapped as 'biodiversity values' under the Biodiversity Values Map (DPE, 2022) • If a proposal is likely to have a significant impact on threatened ecological values. Each of these triggers is discussed below.
***Biodiversity Conservation Regulation* 2017**	The clearing threshold triggers are based on the minimum lot size allowable. For a minimum lot size of land less than 40 ha but not less than 1 ha, the BOS is triggered by clearing more than 0.5 ha of native vegetation. The lots within the study area range between a minimum lot size of 16 ha and 100 ha. For minimum lot sizes of 1-40 ha, any clearing over 0.5 ha of native vegetation will require the preparation of a BDAR and calculation of biodiversity offsets. Similarly, for lots with a minimum lot size of >40 ha, the clearing threshold is 1 ha. The Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the Biodiversity Conservation Regulation 2017. The BV Map has biodiversity values mapped on five (5) of the 12 lots (**Figure 2**). The BOS is triggered by impacting land mapped under the Biodiversity Values Map. Impacts in a mapped area will require the preparation of a BDAR and calculation of biodiversity offsets. A significant impact triggering the BAM can only be determined through the preparation of a Flora and Fauna Assessment report in relation to a proposed development. If a proposed development within the study area has the potential the significantly impact a threatened entity (as determined through application of the test of significance), the BOS will be triggered.
***Fisheries Management Act 1994* (FM Act)**	The *Fisheries Management Act 1994* (FM Act) governs the management of fish and their habitat in NSW. The schedules of the Act list key threatening processes and threatened species which must be addressed at the DA stage. The FM Act regulates the provision of permits required in relation to harm of protected marine vegetation (seagrass, macroalgae, mangroves and saltmarsh), dredging, reclamation or obstruction of fish passage on or adjacent to Key Fish Habitat (KFH). This includes direct and indirect impacts, whether temporary or permanent. DPI Fisheries has mapped Redbank Creek as KFH (**Figure 3**). The Policy and guidelines for fish habitat conservation and management (Fairfull, 2013) provides a definition for KFH. As such, impacts to KFH along Redbank Creek, including dredging, reclamation or obstruction to fish habitat will require permits under the FM Act and integrated approval from DPI Fisheries.
***Biosecurity Act 2015* (BS Act)**	The *Biosecurity Act 2015* provides a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers. Implementation of the Act for weeds is supported by Regional Strategic Weed Management Plans (RSWMP) developed for each region in NSW.
***Protection of the Environment Operations Act 1977* (POEO Act)**	The *Protection of the Environment Operations Act 1977* (POEO Act) is the key environmental protection and pollution statute. The POEO Act is administered by the Department of Planning and Environment (DPE)) and establishes a licensing regime for waste, air, water and pollution. Relevant sections of the Act are listed below: • Part 5.3 Water Pollution • Part 5.4 Air Pollution • Part 5.5 Noise Pollution • Part 5.6 Land Pollution and Waste. Any work potentially resulting in pollution must comply with the POEO Act. Relevant licences must be obtained if required. Licence requirements will need to be identified prior to works including an Environmental Protection Licence (EPL).
***Water Management Act 2000* (WM Act)**	The main objective of the *Water Management Act 2000* (WM Act) is to manage NSW water in a sustainable and integrated manner that will benefit current generations without compromising future generations' ability to meet their needs. The WM Act is administered by

Name	Relevance to the project
	the Natural Resources Access Regulator (NRAR) and establishes an approval regime for activities within waterfront land, defined as the land 40 m from the highest bank of a river, lake or estuary. A Controlled Activity Approval (CAA) is typically required for work within waterfront land. The study area contains waterfront land as shown in **Figure 3.** Any proposed development within waterfront land will require a CAA and integrated approval under the WM Act. Note that in some cases, 1st order watercourse can be extinguished, following consultation with NRAR, particularly if there are no formed creeks banks and no creek bed. This will require further ground truthing. As per WSC's Water Sensitive Urban Design Guidelines (WSUD), council may still deem a natural drainage feature not recognised by NRAR as a first order stream to be retained and not redirected. Council may request environmental restoration works of these natural drainage features including revegetation. Any riparian areas that need to be retained will also require vegetated riparian zones (VRZ) either side of the stream, of widths according to their Strahler stream order: • 1st order = 10m • 2nd order = 20m • 3rd order = 30m • 4th order = 40m The width of these VRZs is illustrated in **Figure 3**.
DRAFT Cumberland Plain Conservation Plan	The NSW Department of Planning and Environment (DPE) are in the process of preparing the Cumberland Plain Conservation Plan. This strategic assessment was on public exhibition in 2020 but is still in draft form. Once finalised and gazetted, this plan will be the first strategic biodiversity certification under the NSW BC Act. In relation to this plan, the study area has some areas mapped as: • Native Vegetation • Important Koala Habitat • NSW Threatened Ecological Community.
Environmental Planning Instruments	
State Environmental Planning Policy (Biodiversity and Conservation) 2021	<u>Chapter 4 – Koala Habitat Protection 2021</u> The Wollondilly Local Government Area (LGA) is a listed LGA for which the State Environmental Planning Policy (Biodiversity and Conservation) 2021 applies (Koala Habitat Protection). The aim of this chapter is to protect and provide habitat for koalas. If a local development is proposed to occur within a LGA to which this SEPP applies, before granting development consent, the local Council must assess whether the proposed development is likely to impact koalas or their habitat. A Koala assessment report will be required if the council is satisfied that the development will impact on koalas or koala habitat. <u>Chapter 9 – Hawkesbury-Nepean River 1997</u> The study area is located within mapped lands under the Environmental Plan for the Hawkesbury-Nepean River. The aim of this chapter is to protect the environment of the Hawkesbury-Nepean River system by ensuring the impacts of future potential land uses are considered in a regional context. If a local development is proposed to occur within the mapped area to which this SEPP applies, before granting development consent, the local Council must consider the general planning considerations, specific planning policies and recommended strategies outlined in Part 2.

Name	Relevance to the project
	Additional development controls are listed under Part 3 with specific considerations required for specific development types. These development controls should be considered by the consent authority.
Wollondilly Local Environmental Plan 2011	Land to be zoned IN2 Light Industrial. The objectives of the zone include: • To provide a wide range of light industrial, warehouse and related land uses. • To encourage employment opportunities and to support the viability of centres. • To minimise any adverse effect of industry on other land uses. • To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area. • To ensure development does not impact on the viability of land within Zone B1 Neighbourhood Centre. The study area is not included on the Minimum Lot Size (MLS) maps under the LEP. The standard LEP Terrestrial Biodiversity overlay has not been adopted in the Wollondilly LEP and thus does not apply to the study area.

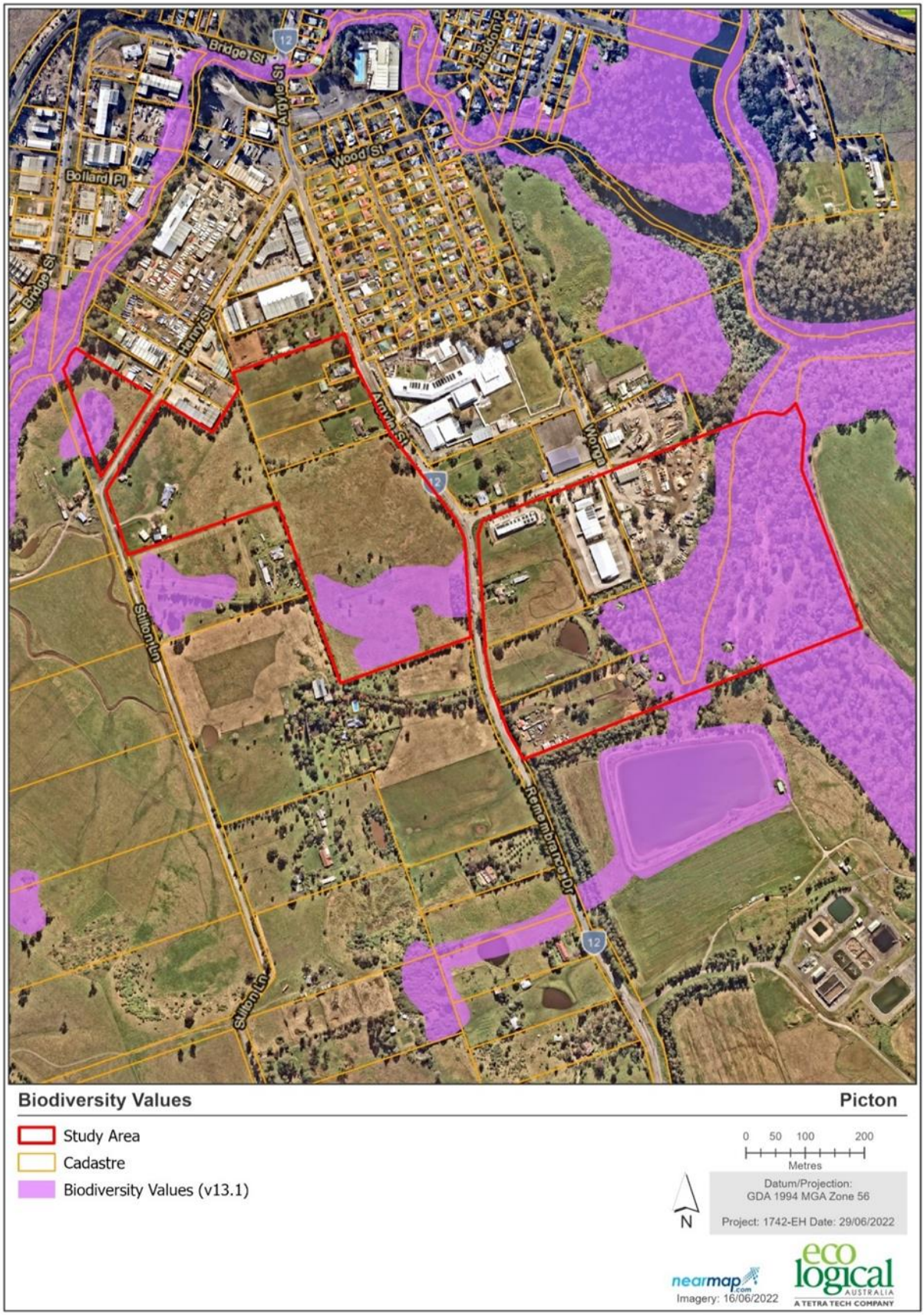

Figure 2: Biodiversity Values Map (DPE 2022)

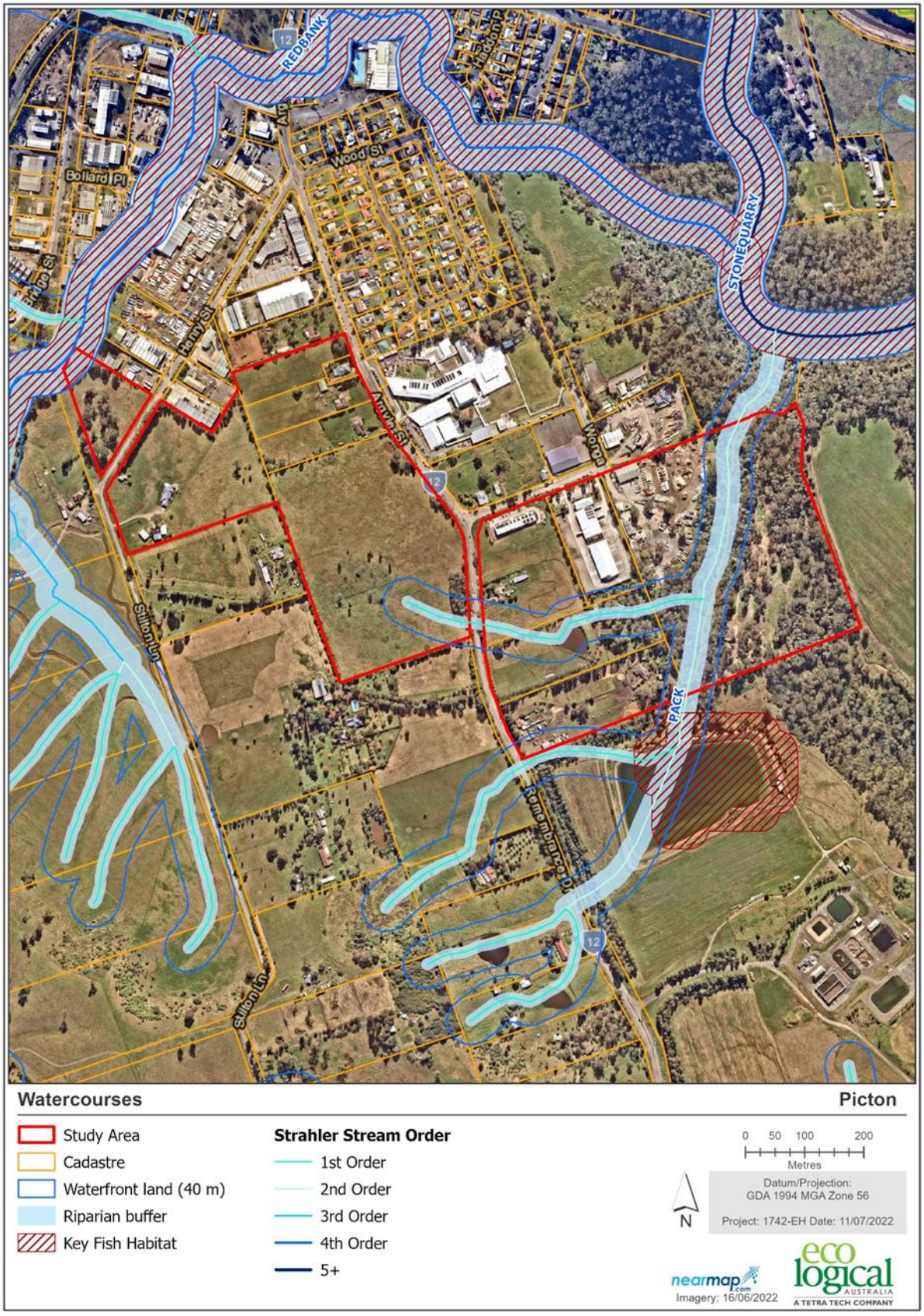

Figure 3: Water courses and key fish habitat in the study area

3. Methodology

3.1. Desktop Assessment

A desktop assessment was undertaken to inform the field assessment. The following resources were consulted to inform this assessment:

- BioNet (Atlas of NSW Wildlife) database search (5 km) for threatened species, endangered populations listed under the BC Act
- EPBC Act Protected Matters Search Tool (PMST) (5km) for Matters of Environmental Significance (MNES) listed under the EPBC Act
- Collation of database results into a 'Likelihood of Occurrence Table'
- Review of applicable SEPP's, in particular the Biodiversity and Conservation SEPP and any other relevant SEPPs applicable to the site
- NSW Government Biodiversity Values Mapping
- State-wide hydroline map of riparian corridors
- DPI Fisheries Spatial Portal for threatened species listed under the Fisheries Management Act 1994 and Key Fish Habitat map
- Aerial photographs, topographical maps and GIS data systems
- Any previous vegetation mapping or ecological studies for the study area and surrounds
- Any additional material relevant to the project such as local and state planning instruments.

3.2. Field Survey

The field survey was conducted on 16th and 27th May 2022 by ELA Ecologists Bronwyn Callaghan (Accredited BAM Assessor) and Michael Gregor. The weather conditions for both survey days was sunny with a top of 24°C on the 16th May 2022and 23°C on the 27th May 2022. The site inspection was conducted to:

- Validate existing vegetation mapping (Office of Environment and Heritage, NSW (OEH) 2013), assign vegetation mapping to Plant Community Types (PCTs), determine the condition of PCTs present and assess whether they conform to any Threatened Ecological Communities (TEC). The condition was assigned based on the features listed in (**Table 3**)
- Identify habitat features for potential threatened flora and fauna species within the study area, including hollow bearing trees, woody debris, wetland areas or creek lines.
- Identify areas of potential aquatic habitat in watercourses and dams identified in the study area.

Table 3: Description of vegetation condition zones

Vegetation Zone	Vegetation features
Intact	Dominated by native flora species within all vegetation stratum No to low cover of exotic species
Weedy	Native canopy trees present Substantial cover of exotic flora species in mid-storey and / or ground layer
Canopy only	Native canopy trees present Cleared mid-storey and ground layer, usually regularly mown or containing garden beds

Vegetation Zone	Vegetation features
Derived Native Grassland (DNG)	Native canopy absent Mid-storey sparse, if present, and dominated by native species Ground layer dominated by native grass and forb species

To assist in validating / determining the PCTs, boundaries and condition of the existing vegetation, a series of rapid assessments were conducted across the study area. These rapid assessments involved recording vegetation structure detail (stratum heights and covers) along with compositional detail, including dominant and indicative flora species within an approximate 20 m radius. Other site detail was collected such as landscape position, slope, aspect, and soils, where relevant. These rapid assessment points, along with boundaries between different vegetation communities and conditions, were recorded in field using the ArcGIS Field Maps app on a smart phone.

All flora species recorded during the field survey are provided in Appendix B.

Important habitat features were also recorded using Field Maps, including detail on the type of feature (e.g. hollow bearing tree), extent / abundance of habitat feature, and other important detail (e.g. tree species, height, diameter at breast height (dbh), height of lowest hollow).

No targeted threatened species surveys were undertaken.

4. Results

4.1. Desktop Assessment

4.1.1. Vegetation communities

Vegetation within the study area was previously mapped by OEH (2013) (**Figure 4**). This shows three PCTs as occurring within the study area:

- PCT 850: *Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion.*
- PCT 1181: *Smooth-barked Apple - Red Bloodwood - Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion*
- PCT 1395: *Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion*

Two of these vegetation communities are associated with threatened ecological communities (TECs) listed under the BC Act or EPBC Act (Table 4).

Table 4: Plant community types mapped within the study area and their associated threatened ecological communities (BioNet 2022)

PCT ID	Associated TEC Name	BC Status	EPBC Status
850	Cumberland Plain Woodland in the Sydney Basin Bioregion (Cumberland Plain Woodland)	CE	-
	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (Cumberland Plain Woodland)	-	CE
1395	Shale Sandstone Transition Forest in the Sydney Basin Bioregion (SSTF)	CE	CE

Status key: CE= Critically Endangered

The Protected Matters Search Tool (PMST) identified 7 Threatened Ecological Communities (TEC) listed under the EPBC Act that could potentially occur within the 5km area of the study area (Appendix A). Of these, only Shale Sandstone Transition Forest of the Sydney Basin Bioregion (SSTF) was found to occur within the study area.

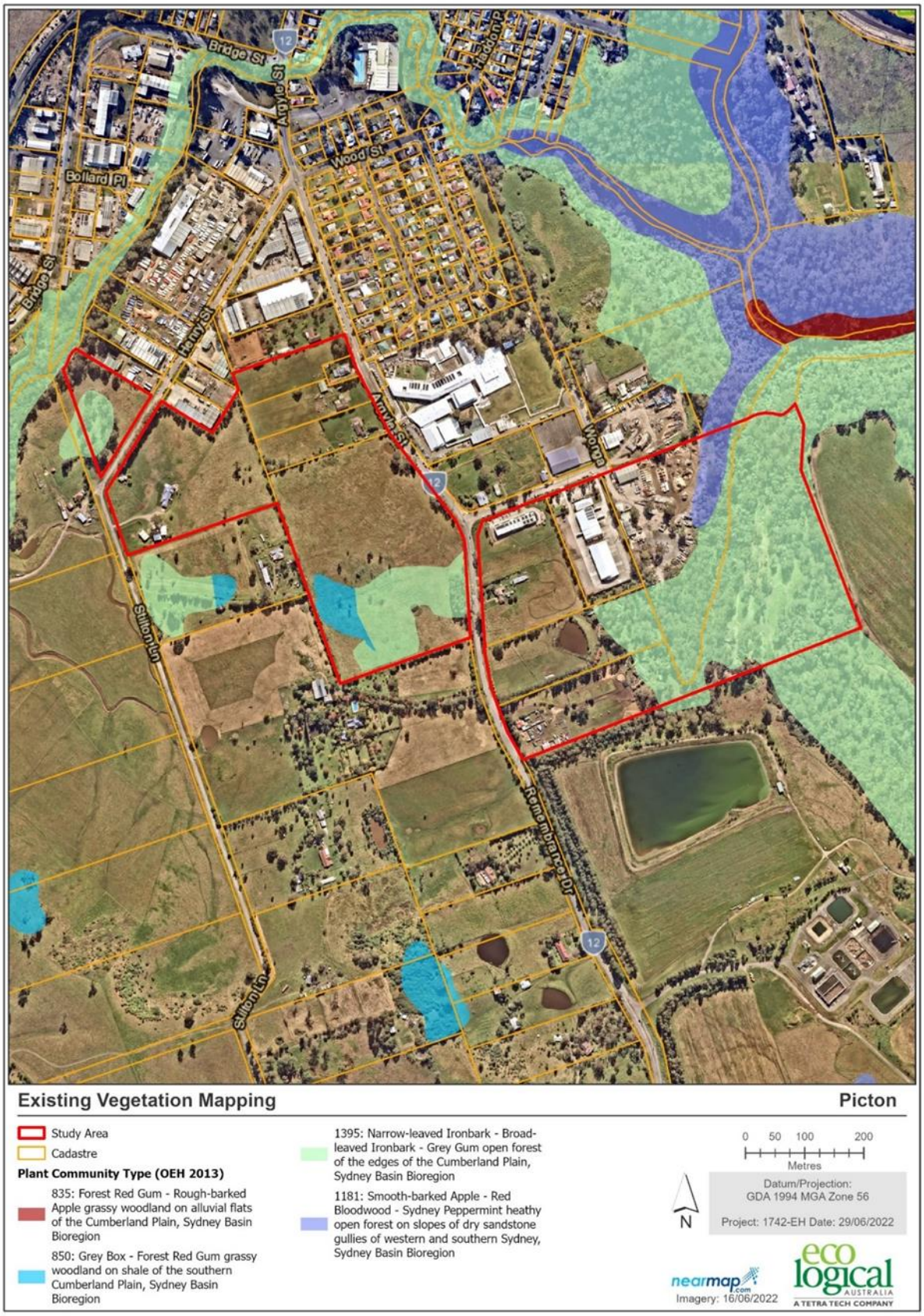

Figure 4: Previous vegetation mapping (OEH 2013)

4.1.2. Threatened species records

The BioNet Atlas and PMST searches identified a total of 67 threatened fauna species and 24 threatened flora species that were recorded within, or having the potential to occur within, a 5 km radius of the study area (full list in Appendix A). Of these, 27 fauna species and 10 flora species have records within 5 km radius of the study area (**Figure 5** and **Figure 6**). Using this data, a Likelihood of Occurrence assessment was conducted (Appendix A). This assessment was used to inform the likelihood of each species occurring within the study area.

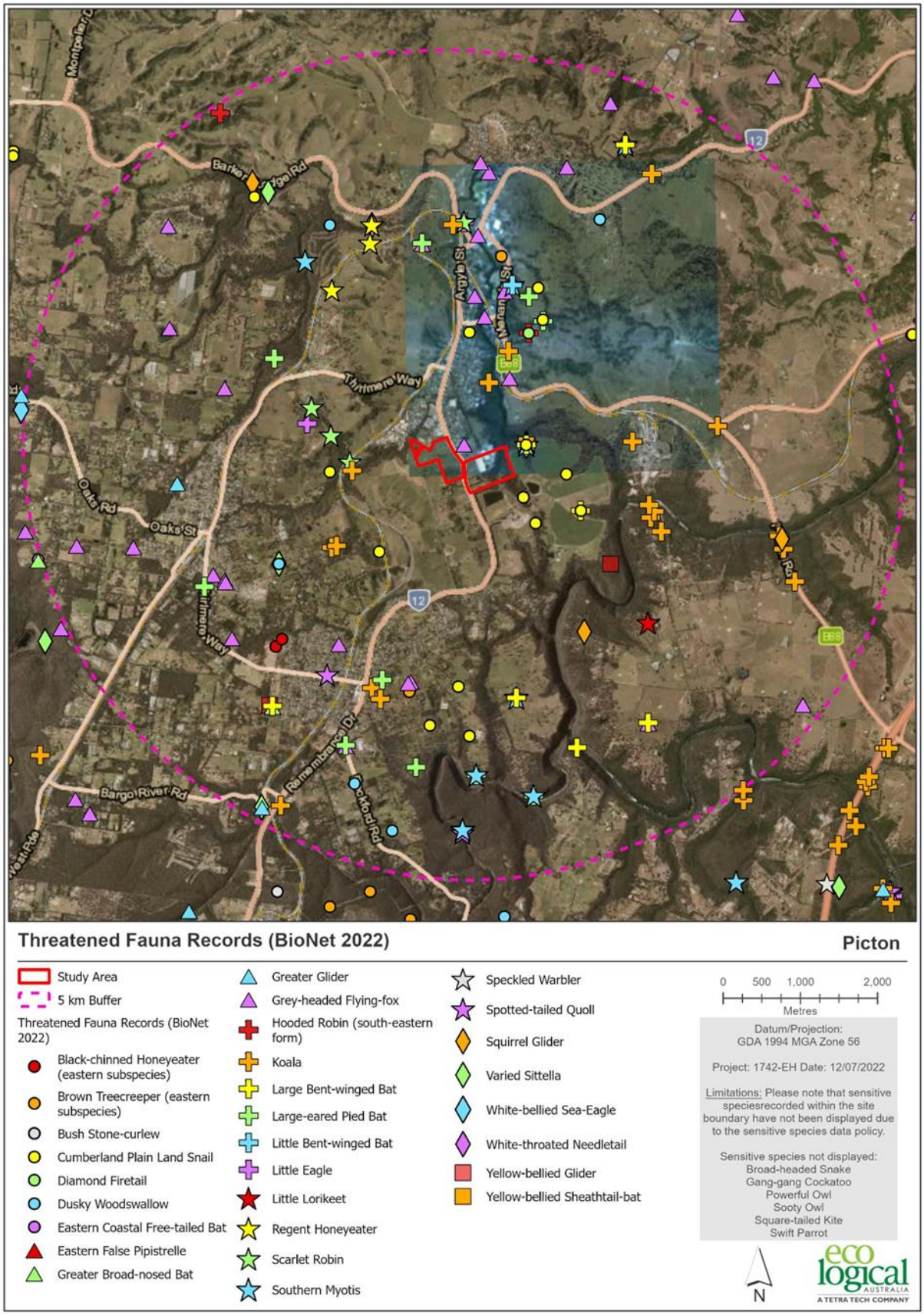

Figure 5: Threatened fauna previously recorded within 5km of the study area

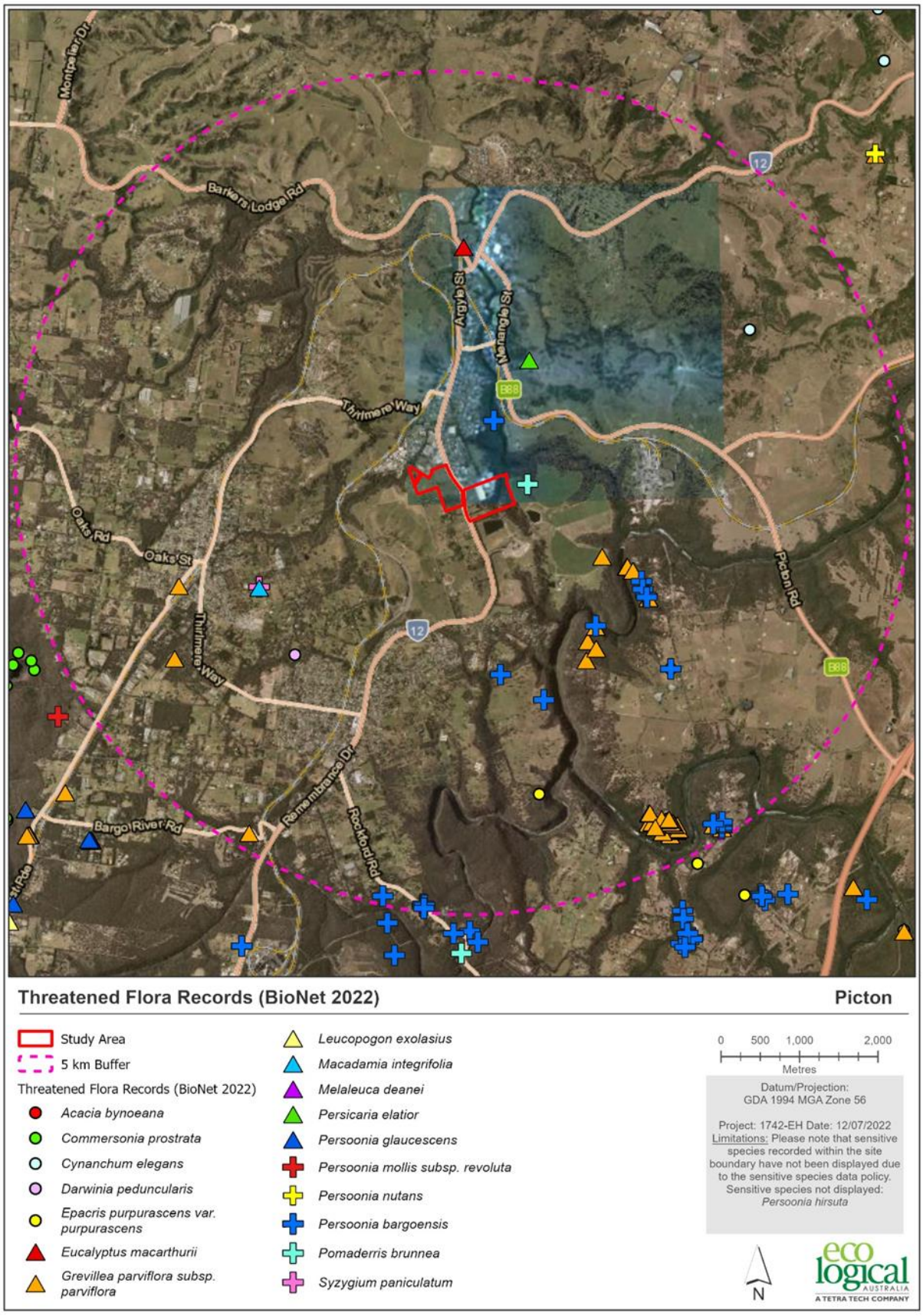

Figure 6: Threatened flora previously recorded within 5km of the study area

No threatened fauna records are located within the study area, although there are multiple records within a 1km radius for several species. Of the 67 threatened fauna species, 24 were assessed as having the potential to occur on the study area (**Table 5**). Species that were assessed as having potential to occur were those known to occur within the PCTs identified within the study area and for which there was suitable habitat within the study area.

Table 5: Threatened fauna with potential to occur within the study area

Scientific name	Common name	BC Act listing	EPBC Act listing
Anthochaera phrygia	Regent Honeyeater	E	CE
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	
Callocephalon fimbriatum	Gang-gang Cockatoo	V	
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	
Chalinolobus dwyeri	Large-eared Pied Bat	V	V
Chthonicola sagittata	Speckled Warbler	V	
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	
Daphoenositta chrysoptera	Varied Sittella	V	
Glossopsitta pusila	Little Lorikeet	V	
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	
Hieraaetus morphnoides	Little Eagle	V	
Hoplocephalus bungaroides	Broad-headed Snake	E	V
Lathamus discolor	Swift Parrot	E	CE
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	
Meridolum corneovirens	Cumberland Plain Land Snail	E	
Miniopterus australis	Little Bentwing-bat	V	
Miniopterus orianaea oceanensis	Large Bent-winged Bat	V	
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	
Myotis macropus	Southern Myotis	V	
Ninox strenua	Powerful Owl	V	
Petauroides volans	Greater Glider		V
Petaurus australis	Yellow-bellied Glider	V	
Petaurus norfolcensis	Squirrel Glider	V	
Petroica boodang	Scarlet Robin	V	
Phascolarctos cinereus	Koala	E	E
Pteropus poliocephalus	Grey-headed Flying-fox	V	V
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	
Scoteanax rueppellii	Greater Broad-nosed Bat	V	
Stagonopleura *guttata*	Diamond Firetail	V	

Status key: V = Vulnerable; E = Endangered; CE= Critically Endangered

No threatened flora records were located within the study area, however, like the fauna species, many records have been made within close proximity (<1km) of the study area. Of the 24 threatened flora species, 5 species were assessed as having the potential to occur within the study area (Table 6). Species that were assessed as having potential to occur were those known to occur within the PCTs identified within the study area and for which there was suitable habitat within the study area.

Table 6: Threatened flora with the potential to occur within the study area

Scientific name	Common name	BC Act listing	EPBC Act listing
Epacris purpurascens var. *purpurascens*		V	
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	V	V
Persicaria elatior	Tall Knotweed	V	V
Persoonia bargoensis	Bargo Geebung	E	V
Persoonia hirsuta	Hairy Geebung	E	

Status key: V = Vulnerable; E = Endangered; CE= Critically Endangered

4.1.3. Biodiversity Values Map

The study area contains three large areas of land mapped under the Biodiversity Values (BV) map (**Figure 2**). The lots which contain land mapped on the BV map are:

- 10//583245 (5 Stilton Lane, PICTON)
- 11//3007 (2235 Remembrance Driveway PICTON)
- 1//570466 (2245 and 2247 Remembrance Driveway PICTON)

If any activity is expected to impact land within the BV map, the Biodiversity Offset Scheme (BOS) will be triggered. It is possible to challenge the BV mapping where there are no biodiversity values, however given most of the current area mapped overlaps with vegetation identified as both TEC and Serious and Irreversible Impacts (SAII) (see 4.2.1, below), the success of such a challenge would be unlikely.

4.1.4. State Environmental Planning Policy (Biodiversity and Conservation) 2021

4.1.4.1. Koala Habitat Protection 2021 (Chapter 4)

As Wollondilly Local Government Area (LGA) is one of the listed LGAs for which Chapter 4 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 applies, Council must assess whether any proposed development is likely to impact koalas or their habitat. If Council is satisfied that the development will impact on koalas or koala habitat, a Koala assessment report will be required.

4.1.4.2. Hawkesbury-Nepean River (Chapter 9)

A very small area (approximately 150 m^2 in Lot 1 DP570466, at 2245 Remembrance Driveway) in the far north-eastern corner of the study area is located within mapped lands under the Environmental Plan for the Hawkesbury-Nepean River. Council must consider the general planning considerations, specific planning policies and recommended strategies outlined in Part 2 for any proposed development on this land. Additional development controls are listed under Part 3 with specific considerations required for specific development types.

4.1.5. Water courses and wetlands

There are three mapped watercourses within the study area (**Figure 3**). The stream order, location and details are in **Table 7**.

Table 7: Watercourses within the study area.

Stream order	VRZ width (each side of watercourse)	Details
1	10 m	This 1st order stream starts in 485 Argyle Street and flows through 2235 Remembrance Driveway connecting with Pack Gully Creek.
2 (Pack Gully Creek)	20 m	This 2nd order stream passes through the eastern section of 2245 Remembrance Driveway.
4 (Redbank Creek)	40 m	This 4th order stream passes through the northern end of 10 Stilton Lane. It is mapped as Key Fish Habitat.

The *Water Management Act 2000* (WM Act) is administered by the Natural Resources Access Regulator (NRAR) and establishes an approval regime for activities within waterfront land, defined as the land 40 m from the highest bank of a river, lake or estuary. A Controlled Activity Approval (CAA) is required for works within waterfront land. Any riparian areas that need to be retained will also require vegetated riparian zones (VRZ) either side of the stream, of widths according to their Strahler stream order (**Table** 7). The NRAR's *Guidelines for controlled activities on waterfront land* allows encroachment of the outer 50% of the VRZ (e.g. 20-40m from top of bank for a 4th order stream) if offsets are provided elsewhere to provide the average VRZ width across the site. The inner 50% VRZ (i.e. 20 m from top of bank) is required to be fully protected as a fully structured riparian community.

There is one 1st order stream mapped in the eastern section of the study area (**Figure 3**). If this meets the definition of a 'river' under the WM Act, this 1st order stream would be classed as waterfront land. However, many 1st order watercourses do not exhibit features of a defined channel with bed and bank, in which case the NRAR may determine that the watercourse is not waterfront land for the purposes of the WM Act. However, As per WSC's WSUD, council may still deem a natural drainage feature not recognised by NRAR as a first order stream to be retained and not redirected. Council may request environmental restoration works of these natural drainage features including revegetation.

4.1.6. Key fish habitat

Redbank Creek to the north of the study area is mapped as Key Fish Habitat (KFH, **Figure 3**). The buffer area for KFH intersects the study area along the north west boundary of Lot 10//583245 (10 Stilton Lane), which can be a trigger for permits or inter-agency consultation under Part 7 of the FM Act for works that involve dredging, reclamation or obstruction of fish passage (e.g. crossings).

4.2. Field Survey Results

4.2.1. Vegetation Communities, Threatened Ecological Communities and SAII entities

The field survey confirmed the presence of two PCTs within the study area, each of which were divided into a number of condition zones (**Figure 7**):

- PCT 850 *Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion* (Intact)
- PCT 850 *Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion* (Weedy)
- PCT 850 *Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion* (DNG)
- PCT 1395 *Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion* (Intact)
- PCT 1395 *Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion* (Weedy)
- PCT 1395 *Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion* (Canopy only)

The study area includes areas of exotic dominated and planted native vegetation which cannot be assigned a PCT. These have been mapped as 'Exotic' (pasture, gardens and lawns) or 'Planted Native' (**Figure 7**). The study area also includes cleared/developed areas devoid of vegetation, mapped as 'Cleared'. A description of each PCT and condition zone is provided below, as well as a justification for each condition assigned.

As detailed in Section4.11, both the PCTs found within the study area are associated with a threatened ecological community (TEC) listed under both the BC Act and EPBC Act. Given the range of conditions in which both these PCTs exist within the study area, not all occurrences conform with the definition of their associated TEC. Therefore, the TEC status for each PCT/condition zone combination is addressed following the description, including justification as to why it does or does not conform to the associated TEC. A summary of the PCT/condition zone found within the study area and whether they correspond to a TEC listed under the BC Act and EPBC Act is shown in Table 8 . Delineation of these different TEC categories are illustrated in **Figure 8**.

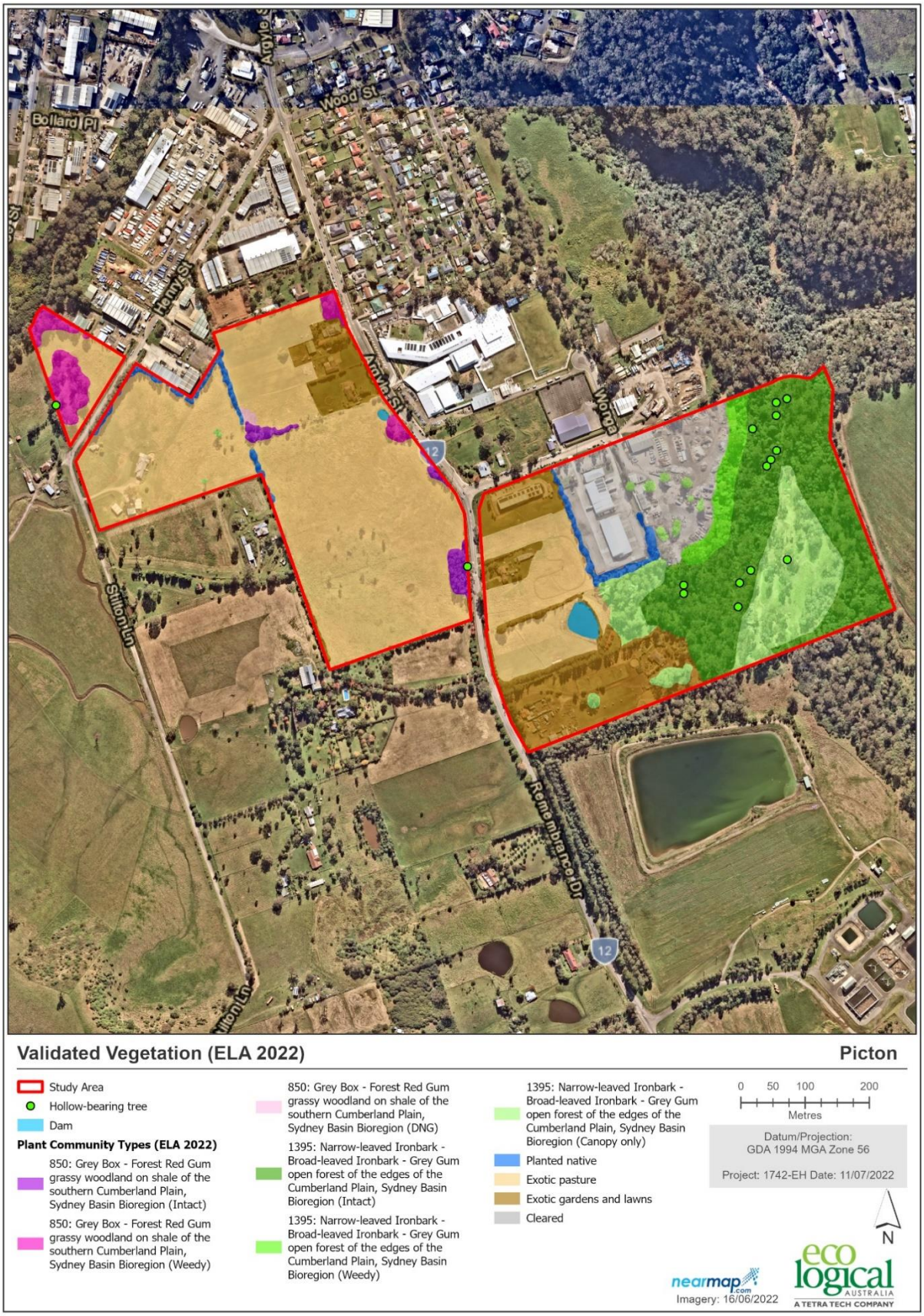

Figure 7: Validated vegetation and Hollow-bearing Trees

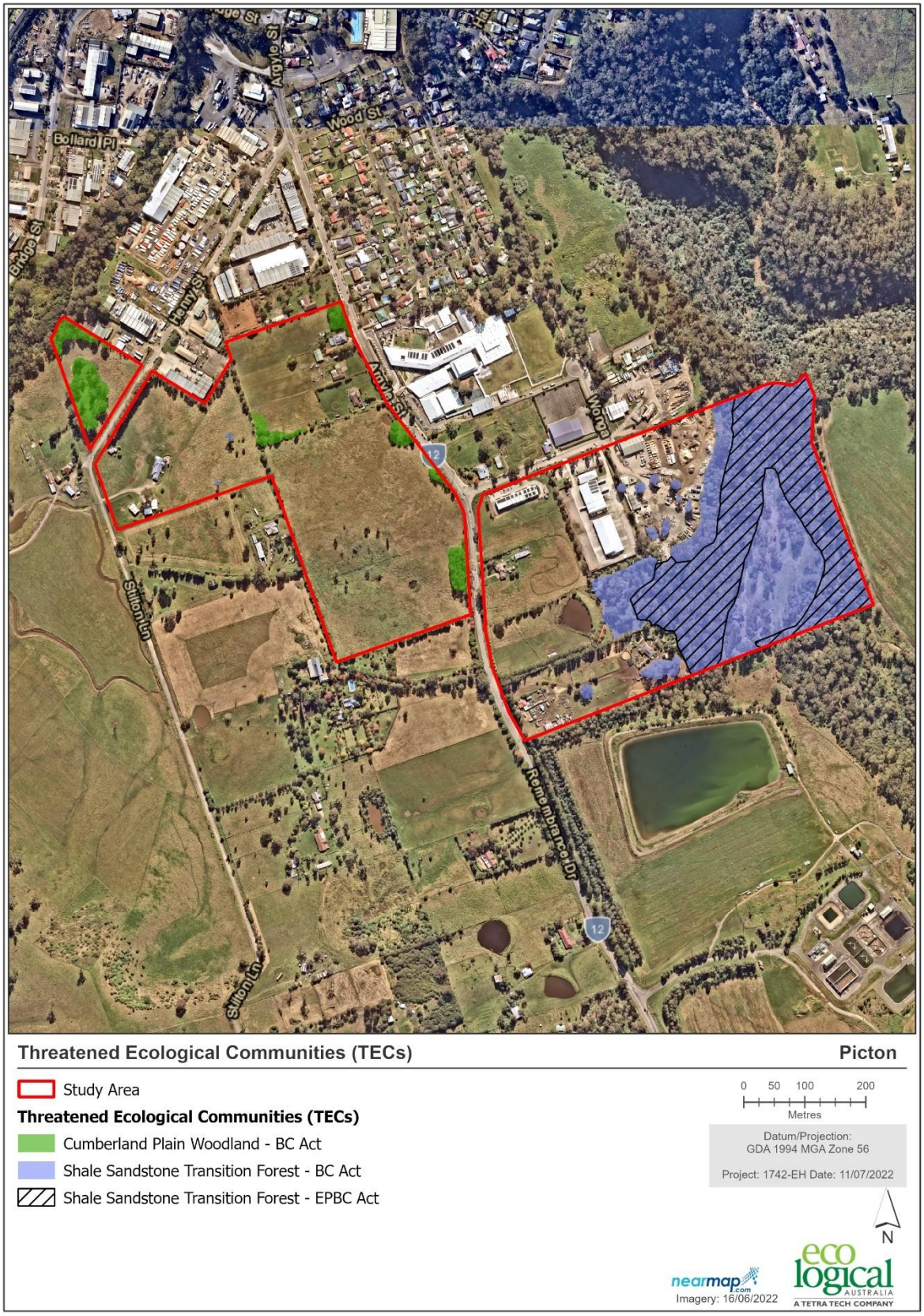

Figure 8 Threatened Ecological Communities, as listed under the BC Act and EPBC Act, within the study area

Table 8: Summary of vegetation condition zones and their correspondence with TECs listed under the BC Act and EPBC Act

PCT	Condition	TEC	Description	BC Act	EPBC Act
850	Intact	Cumberland Plain Woodland	• Native tree canopy cover >10% • Perennial ground cover > 50% native species, many of which are listed as characteristic in the Final Determination	Yes	No (patch size less than <0.5ha)
850	Weedy	Cumberland Plain Woodland	• Native tree canopy cover >10% • Perennial understorey vegetation cover < 50% native species	Yes	No (Understorey vegetation <50% native AND patch size less than <0.5ha)
850	DNG	Cumberland Plain Woodland	• No canopy • Mid-storey sparse but dominated by native species • Perennial ground cover > 50% native species, many of which are listed as characteristic in the Final Determination	Yes	No (native canopy cover <10% AND patch size less than <0.5ha)
1395	Intact	Shale Sandstone Transition Forest	• Canopy contains a mix of species typical of SSTF as listed in BC Act Final Determination and EPBC Act Conservation Advice • Patch size greater than > 0.5ha • Perennial understorey native vegetation cover > 50%	Yes	Yes
1395	Weedy	Shale Sandstone Transition Forest	• Canopy contains a mix of species typical of SSTF as listed in BC Act Final Determination and EPBC Act Conservation Advice • Patch size greater than > 0.5ha • Perennial understorey native vegetation cover <30%	Yes	No (Perennial understorey native vegetation cover <30%)
1395	Canopy Only	Shale Sandstone Transition Forest	• Canopy contains a mix of species typical of SSTF as listed in BC Act Final Determination and EPBC Act Conservation Advice • Patch size greater than > 0.5ha • Perennial understorey native vegetation cover < 30%	Yes	No (Perennial understorey native vegetation cover <30%)

In addition, both TECs are identified as entities at risk of serious and irreversible impacts (SAII). SAII entities are those that are most at risk of extinction from potential development. Four principles have been designed to identify impacts which are likely to contribute significantly to the risk of extinction of a threatened species or ecological community in NSW (DPIE 2019). These are impacts that:

1. will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline;

2. will further reduce the population size of the species that is currently observed, estimated, inferred or reasonably suspected to have a very small population size, or will further degrade or disrupt an ecological community that is already observed, inferred or reasonably suspected to be severely degraded or disturbed;
3. impact on the habitat of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution; and
4. impact on a species or ecological community that is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.

Cumberland Plain Woodland (CPW) is listed ecological community entity at risk of serious and irreversible impacts (SAII) under the NSW Biodiversity Offset Scheme (BOS), due to meeting the first and second principles outlined above. Shale Sandstone Transition Forest (SSTF) is also a listed ecological community entity at risk of serious and irreversible impacts (SAII) under the NSW Biodiversity Offset Scheme (BOS), due to meeting the second and third principles outlined above. Therefore, any vegetation within the study area that has been mapped as CPW or SSTF (as defined by the BC Act) will be subject to SAII entity requirements, that is any applications for development under Part 4 of the EP&A Act must be refused by the decision-maker if it is determined the proposal is likely to have a serious and irreversible impact on the candidate SAII entity.

4.2.1.1. PCT 850 Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (Intact)

Within the study area PCT 850 (Intact) occurs in three small patches in Lots 16//979250 and 1//207443 (475 and 485 Argyle St) (**Figure 7**). PCT 850 (Intact) within the study area was characterised by a canopy dominated by *Eucalyptus tereticornis* (Forest Red Gum) with *E. moluccana* (Grey Box) occurring less frequently. The mid-storey was moderately dense and consisted of a mix of native (*Acacia implexa* (Hickory Wattle), *Bursaria spinosa* (Blackthorn), and *Indigofera australis* (Australian indigo)) and exotic species (*Cotoneaster* sp. and *Ligustrum lucidum* (Large-leaved Privet)). The ground layer was generally moderately dense and was dominated by native grasses, in particular *Microlaena stipoides* (Weeping Grass), but also *Bothriochloa macra* (Red Grass), *Dichanthium sericeum* (Queensland Bluegrass), *Eragrostis brownii* (Brown's Lovegrass), and *Sporobolus creber* (Rat-tail Grass). A diversity of native forbs were also present in the ground layer, such as *Brunoniella australis* (Blue Trumpet), *Dichondra repens* (Kidney Weed), and *Hardenbergia violacea* (False Sarsaparilla). A low cover of exotic species were present within the ground layer, including *Asparagus asparagoides* (Bridal Creeper), *Bidens pilosa* (Cobblers Pegs) and *Sida rhombifolia* (Paddy's lucerne).

As detailed in Section 4.11, this PCT is associated with CPW, which is listed as a Critically Endangered Ecological Community (CEEC) under both the BC Act (as *Cumberland Plain Woodland in the Sydney Basin Bioregion*) and EPBC Act (as *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest*). CPW occurs on soils derived from Wianamatta Shale across the Cumberland Plain in Western Sydney. The dominant tree species include *Eucalyptus moluccana* (Grey Box), *E. tereticornis* (Forest Red Gum) with *E. crebra* (Narrow-leaved Ironbark), *E. eugenioides* (Thin-leaved Stringybark) and *Corymbia maculata* (Spotted Gum) occurring less frequently.

Under the BC Act, the Final Determination for CPW provides additional information to aid recognition of this community. The occurrences of PCT 850 (Intact) within the study area meet the Final Determination definition of CPW (NSW Scientific Committee 2014) for the following reasons:

- The patches occur at around 310 m elevation, which is within the described range of up to 350 m
- The landform pattern where the patches are found matches that described in the Final Determination of *flat to undulating or hilly terrain*
- The species composition within all strata of the patches overlaps well with the assemblage of species detailed in the Final Determination as being characteristic of CPW.

Under the EPBC Act, a patch of vegetation must meet condition thresholds for it to be considered CPW. These criteria are based on the percent cover of native canopy and ground layer as well as the patch size (Appendix C). The patches mapped as PCT 850 (Intact) within the study area do not meet the patch-size criteria, i.e. greater than 0.5 ha and, therefore, does not represent Critically Endangered Cumberland Plain Woodland, as defined by the EPBC Act.

4.2.1.2. PCT 850 Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (Weedy)

Within the study area PCT 850 (Weedy) occurs in Lots 141//997490, 1//207443 and 10//583245 (465 and 485 Argyle St, 5 Stilton Land) (**Figure 7**). PCT 850 (Weedy) within the study area was characterised by a canopy dominated by *Eucalyptus tereticornis* (Forest Red Gum) and *E. moluccana* (Grey Box) along with an exotic mid-storey and ground layer. The mid-storey of these patches was completely absent in the western patch, which is regularly grazed, whilst it was moderately dense in the two patches on Remembrance Driveway and dominated exotic species such as *Cotoneaster* sp. and *Ligustrum lucidum* (Large-leaved Privet). The cover of exotic species in the ground layer of these areas was over 50% with the following species common: *Cirsium vulgare* (Spear Thistle), *Paspalum dilatatum* (Paspalum), *Senecio madagascariensis* (Fireweed), *Seteria parviflora* (Pidgeon Grass) and *Sida rhombifolia* (Paddy's Lucerne).

Under the BC Act, the Final Determination for CPW provides additional information to aid recognition of this community. The occurrences of PCT 850 (Weedy) within the study area meet the Final Determination definition of CPW (NSW Scientific Committee 2014) for the following reasons:

- The patches occur at around 310 m elevation, which is within the described range of up to 350m
- The landform pattern where the patches are found matches that described in the Final Determination of *flat to undulating or hilly terrain*
- The dominant canopy species match those listed in the Final Determination as being characteristic of CPW.

Under the EPBC Act, a patch of vegetation must meet condition thresholds for it to be considered CPW. These criteria are based on the percent cover of native canopy and ground layer as well as the patch size (Appendix C). The patches mapped as PCT 850 (Weedy) do not meet the condition criteria because the perennial understorey vegetation cover is not made up of more than 50% native species. They also do not meet the patch-size criteria, i.e. greater than 0.5 ha. Therefore, the patches of PCT 850 (Weedy) within the study area do not represent Critically Endangered Cumberland Plain Woodland, as defined by the EPBC Act.

4.2.1.3. PCT 850 Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (DNG)

Within the study area PCT 850 (DNG) occurs as a single small patch on the western border of Lot 16//979250 (475 Argyle St) (**Figure 7**). PCT 850 (DNG) within the study area was characterised by a ground layer dominated by native grass species, including *Bothriochloa macra* (Red Grass), *Dichanthium*

sericeum (Queensland Bluegrass), *Eragrostis brownii* (Brown's Lovegrass), and *Panicum* sp. A low cover of exotic species was also present within the ground layer, including *Bidens pilosa* (Cobblers Pegs), *Chloris virgata* (Feathertop Rhodes Grass), *Senecio madagascariensis* (Fireweed), and *Sida rhombifolia* (Paddy's lucerne).

Under the BC Act, the Final Determination for CPW provides additional information to aid recognition of this community. The occurrence of PCT 850 (DNG) within the study area meets the Final Determination definition of this TEC (NSW Scientific Committee 2014) for the following reasons:

- The patch occurs at around 310 m elevation, which is within the described range of up to 350m limit.
- The landform pattern where the patch is found matches that described in the Final Determination of *flat to undulating or hilly terrain.*
- The Final Determination states that: *Native grasslands derived from clearing of the woodland and forest are also part of this community if they contain the listed characteristic nonwoody species.*
- The species composition within ground layer of the patch overlaps well with the assemblage of species detailed in the Final Determination as being characteristic of CPW.

Under the EPBC Act, a patch of vegetation must meet condition thresholds for it to be considered CPW. These criteria are based on the percent cover of native canopy and ground layer as well as the patch size (**Appendix C**). The patch mapped as PCT 850 (DNG) does not have a minimum canopy cover of 10% and, therefore, does not represent Critically Endangered Cumberland Plain Woodland, as defined by the EPBC Act, in the study area.

4.2.1.4. PCT 1395 Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion (Intact)

Within the study area PCT 1395 (intact) occurs as a large contiguous patch in the eastern section of the study area, covering land in Lots 911//1121899 and 11//3007 (2235 and 2245 Remembrance Driveway) (**Figure 7**). This area of 'intact' condition consisted of remnant native trees, a high diversity of native species within each stratum, had little to no exotic species and a high percentage of ground litter and rocky outcrops. The canopy was dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *E. globoidea* (White Stringybark), *E. punctata* (Grey Gum) and *E. tereticornis* (Forest Red Gum) and lower occurrences of *E. fibrosa* (Broad-leaved Ironbark) in the eastern half of the patch and *Angophora floribunda* (Rough-barked Apple) along the creekline which runs north-east to south-west through the patch.

The mid-storey was moderately to very dense and included a high diversity of native shrubs including *Acacia binervia* (Coast Myall), *A. implexa* (Hickory Wattle), *Allocasuarina littoralis* (Black She-oak), *Beyeria viscosa* (Sticky wallaby Bush), *Breynia oblongifolia* (Coffee Bush), *Bursaria spinosa* (Blackthorn), *Leucopogon juniperinus* (Prickly Beard-heath), *Notelaea longifolia* (Large Mock-olive), *Ozothamnus diosmifolius* (Rice flower), *Persoonia linearis* (Narrow-leaved Geebung), and *Pittosporum revolutum* (Wild Yellow Jasmin).

The ground layer ranged in cover from sparse, where shrub cover was high, to dense and was dominated by native grasses, such as *Aristida vagans* (Three-awn Grass), *Echinopogon caespitosus* (Forest Hedgehog Grass), *Entolasia stricta* (Wiry Panic), *Eragrostis brownii* (Brown's Lovegrass), *Microlaena stipoides* (Weeping Grass) and *Themeda triandra* (Kangaroo Grass), and forbs, such as *Billardiera*

scandens (Hairy Apple Berry), *Carex appressa* (Tall Sedge), *Dichondra repens* (Kidney Weed), *Glycine clandestina* (Twining Glycine), *Lobelia purpurascens* (Whiteroot), *Lomandra longifolia* (Spiny-headed Mat-rush), and *Pomax umbellata*.

As detailed in **Section 4.1.1**, this PCT is associated with Shale Sandstone Transition Forest (SSTF), which is listed as a Critically Endangered Ecological Community (CEEC) under both the BC Act and EPBC Act. SSTF occurs at the edges of the Cumberland Plain where clay soils from the shale rock intergrade with earthy and sandy soils from sandstone, or where shale caps overlay sandstone. The boundaries are indistinct, and the species composition varies depending on the soil influences. The main tree species include *Eucalyptus tereticornis* (Forest Red Gum), *E. punctata* (Grey Gum), stringybarks (*E. globoidea* and *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, whilst areas of high sandstone influence include sandstone species, such as *Kunzea ambigua* (Tick bush) and *Persoonia linearis* (Narrow-leaved Geebung).

Under the BC Act, the Final Determination for SSTF provides additional information to aid recognition of this community. The occurrence of PCT 1395 (Intact) within the study area meets the Final Determination definition of SSTF (NSW Scientific Committee 2014) for the following reasons:

- The patch occurs within the Wollondilly LGA, which is one of the LGAs listed in which it occurs.
- The patch occurs at around 280 m elevation, which is within the described range of up to 400 m.
- The patch occurs within the broad shale/sandstone boundary where the soil and geology profile is linked to both the Wianamatta Shale and underlying sandstone formations.
- The species composition within all strata of the patch overlaps well with the assemblage of species detailed in the Final Determination as being characteristic of SSTF.

Under the EPBC Act, a patch of vegetation must be consistent with the key diagnostic characteristics and condition thresholds for it to be considered SSTF. The patch mapped as PCT 1395 (Intact) within the study area aligns with all the key diagnostic characteristics related to location, soils, structure and species composition of different strata. Condition threshold criteria are based on patch size and the percent cover of perennial understorey vegetation (Appendix C). The patch mapped as PCT 1395 (Intact) within the study area does meet the patch-size criteria, i.e. greater than 0.5 ha and, in most cases, had a perennial understorey cover of greater than 50%. Therefore, the patch of PCT 1395 (Intact) represents at least the Moderate condition class of the Critically Endangered Shale Sandstone Transition Forest, as defined by the EPBC Act.

4.2.1.5. PCT 1395 Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion (Weedy)

Within the study area PCT 1395 (Weedy) occurs as a single narrow patch on the western side of Pack Gully Creek in the eastern section of the study area in Lot 2//570466 (28 Wonga Rd) (**Figure 7**). PCT 1395 (Weedy) within the study area was characterised by a canopy dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *E. globoidea* (White Stringybark), *E. punctata* (Grey Gum) and *E. tereticornis* (Forest Red Gum) and lower occurrences of *E. fibrosa* (Broad-leaved Ironbark) and *Angophora floribunda* (Rough-barked Apple). The mid-storey and ground layers were dominated by exotic species. The mid-storey cover often consisted of very dense patches of high-threat weeds such as *Lantana camara*

(Lantana), *Ligustrum lucidum* (Broad-leaved Privet), and *Ricinus communis* (Caster Oil Plant), with the vine *Araujia sericifera* (Mothvine) overlaying.

The ground layer cover was usually over 50%, and almost entirely composed of exotic weed species such *Bidens pilosa* (Farmer's Friend), *Cyprus eragrostis* (Tall Nut Sedge), *Datura stramonium* (Common thornapple), *Eragrostis curvula* (African Lovegrass), *Pennisetum clandestinum* (Kikuyu), *Rumex sagittatus* (Turkey Rhubarb), *Sida rhombifolia* (Paddy's lucerne) and *Tagetes minuta* (Stinking Roger).

Under the BC Act, the Final Determination for SSTF provides additional information to aid recognition of this community. The occurrence of PCT 1395 (Weedy) within the study area meets the Final Determination definition of this TEC (NSW Scientific Committee 2014) for the following reasons:

- The patch occurs within the Wollondilly LGA, which is one of the LGAs listed in which it occurs.
- The patch occurs at around 280 m elevation, which is within the described range of up to 400 m.
- The patch occurs within the broad shale/sandstone boundary where the soil and geology profile is linked to both the Wianamatta Shale and underlying sandstone formations.
- The species composition of the canopy overlaps well with the assemblage of species detailed in the Final Determination as being characteristic of SSTF.

Under the EPBC Act, a patch of vegetation must be consistent with the key diagnostic characteristics and condition thresholds for it to be considered SSTF. The patch mapped as PCT 1395 (Weedy) within the study area only aligns with the key diagnostic characteristics related to location, soils, and species composition of the canopy. Condition threshold criteria are based on patch size and the percent cover of perennial understorey vegetation (Appendix C). The patch mapped as PCT 1395 (Weedy) within the study area does meet the patch-size criteria, i.e. greater than 0.5 ha, however, the perennial understorey cover was less than 30%. Therefore, the patch of PCT 1395 (Weedy) within the study area does not represent Critically Endangered Shale Sandstone Transition Forest, as defined by the EPBC Act.

4.2.1.6. PCT 1395 Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion (Canopy only)

Within the study area PCT 1395 (Canopy only) was mapped in the eastern section of the study area in Lots 911//1121899 and 11//3007 (2235 and 2245 Remembrance Driveway) (**Figure 7**). PCT 1395 (Canopy only) within the study area was characterised by a tree canopy consisting of isolated *Eucalyptus crebra* (Narrow-leaved Ironbark), *E. globoidea* (White Stringybark), *E. punctata* (Grey Gum) and *E. tereticornis* (Forest Red Gum) and lower occurrences of *E. fibrosa* (Broad-leaved Ironbark) and *Angophora floribunda* (Rough-barked Apple). The mid-layer was usually absent. The ground layer was either cleared bare ground, regularly mown lawn, or consisted of exotic garden species such as *Agapanthus orientalis*.

Under the BC Act, the Final Determination for SSTF provides additional information to aid recognition of this community. The occurrence of PCT 1395 (Canopy only) within the study area meets the Final Determination of this TEC (NSW Scientific Committee 2014) for the following reasons:

- The patch occurs within the Wollondilly LGA, which is one of the LGAs listed in which it occurs.
- The patch occurs at around 280 m elevation, which is within the described range of up to 400 m.

- The patch occurs within the broad shale/sandstone boundary where the soil and geology profile is linked to both the Wianamatta Shale and underlying sandstone formations.
- The species composition of the canopy overlaps well with the assemblage of species detailed in the Final Determination as being characteristic of SSTF.

Under the EPBC Act, a patch of vegetation must be consistent with the key diagnostic characteristics and condition thresholds for it to be considered SSTF. The patch mapped as PCT 1395 (Canopy only) within the study area only aligns with the key diagnostic characteristics related to location, soils, and species composition of the canopy. Condition threshold criteria are based on patch size and the percentage cover of perennial understorey vegetation (Appendix C). The patch mapped as PCT 1395 (Canopy only) within the study area does meet the patch-size criteria, i.e. greater than 0.5 ha, however, the perennial understorey cover was less than 30%. Therefore, the patch of PCT 1395 (Canopy only) within the study area does not represent Critically Endangered Shale Sandstone Transition Forest, as defined by the EPBC Act.

4.2.1.7. Planted Native

Lines of native *Eucalyptus* spp. trees have been planted along the eastern and northern boundaries of Lot 2//583247 (15 Stilton Lane) in the west of the study area. Whilst some of species were native to this region (e.g. *Angophora costata* (Sydney Red Gum), *Eucalyptus paniculata* (Grey Ironbark)), the composition of these did not allow allocation to a PCT and included species not native to the region, e.g. *Corymbia tessellaris* (Moreton Bay Ash) and *E. microcorys* (Tallowwood). In addition, the businesses at Lot 910//1121899 (18 Wonga Rd) included several heavily mulched garden beds and perimeter plantings of mixed native/exotic species (**Figure 7**). This included *Cupressus* spp. (Cypress Pines), *Callistemon citrinus* (Crimson Bottlebrush), *Dianella caerulea* (Blue Flax Lily), *Lomandra longifolia* (Spiny-head Mat-rush), *Melaleuca armillaris* (Bracelet Honey Myrtle), *M. styphelioides* (Prickly Paperbark) and *Westringia fruticosa* (Coastal Rosemary).

4.2.1.8. Exotic pasture

The exotic pasture areas within the study area were located in nearly all the properties with the eastern section of Lot 1//570466 (2245 Remembrance Driveway) being the exception (**Figure 7**). Most of these areas were currently used for grazing horses or cattle. These areas had no canopy or mid-storey and the ground layer was dominated by exotic pasture and weed species such as *Bidens pilosa* (Cobblers Pegs), *Paspalum dilatatum* (Paspalum), *Setaria parviflora* (Pigeon Grass), *Sida rhombifolia* (Paddy's lucerne).

4.2.1.9. Exotic gardens and lawns

The vegetation mapped as exotic gardens and lawns were located around most of the buildings on the properties and along boundaries (**Figure 7**). This included mown lawns or exotic grasses (usually dominated by *Cenchrus clandestinus* (Kikuyu)), dense lines of privacy / windbreak plantings of exotic *Pinus radiata* (Radiata Pine) and *Cupressus* sp. (Cypress Pine), and garden beds and shrubs, usually comprising predominantly exotic species.

4.2.2. Threatened species

There were no threatened fauna species recorded within the study area during the field survey. However, large areas of intact vegetation, waterbodies, connectivity to intact vegetation, large trees and numerous fallen logs suggest potential habitat features for threatened fauna. Many of the species listed in **Table 5** would likely use this area for foraging habitat.

No threatened flora species were recorded within the study area during the field survey. However, given the large areas of native vegetation, which represent suitable habitat for some of the species listed in **Table 6**, and that the field survey was conducted in winter, it is possible threatened flora species could not be detected at this time of year. Targeted surveys at the recommended time of year for each species would need to be conducted to discount the presence of any of the species listed in **Table 6** .

4.2.3. Fauna habitat

Fauna habitat features recorded in the study area is listed in **Table 9** below. This included thirteen hollow-bearing trees (HBT) (**Figure 7**).

Table 9: Habitat features recorded in the study area

Habitat feature	Associated species	Presence
Large expanse of native vegetation	Birds, microchiropteran bats (microbats), megachiropteran bats (fruit bats), arboreal mammals and reptiles	Yes, the western side of most properties in the subject site contains large expanses of native vegetation with connectivity with vegetation to the west.
Nectar producing species	Arboreal mammals/birds and fruit bats	Common throughout all areas mapped as PCT 1395 and Planted native vegetation
Hollow-bearing trees	Microbats, birds, mammals, amphibians, reptile	Thirteen HBT located within the vegetation in the eastern lots
Coarse woody debris (fallen logs)	Terrestrial mammals, reptiles, invertebrates	Common within PCT 1395 (Intact) and PCT 1395 (Weedy)
Leaf litter	Reptiles, amphibians, invertebrates	Abundant within areas mapped as PCT 1395 (Intact). Scarce elsewhere within the study site.
Water body	Amphibians, reptiles, microbats	Farm dams present on 4 of the lots
Rocky outcrops	Microbats, reptiles	Present in the bushland along Pack Gully
Mistletoe	Arboreal mammals/birds and fruit bats	Not observed during the field survey
Winter flowering species	Winter migratory birds, arboreal mammals and megachiropteran bats (fruit bats)	Yes, throughout all the properties

4.2.4. Koala Habitat

All instances of PCT 850 and 1395 that contained a canopy (i.e. all condition zones except DNG) were comprised of the following tree species, that are listed for the Central Coast koala management area in Schedule 3 (Koala use tree species) of the State Environmental Planning Policy (Biodiversity and Conservation) 2021:

- PCT 850 – *Eucalyptus moluccana* (Grey Box), *E. tereticornis* (Forest Red Gum)

- PCT 1395 – *Angophora floribunda* (Rough-barked Apple)*, Eucalyptus crebra* (Narrow-leaved Ironbark), *E. fibrosa* (Broad-leaved Ironbark), *E. globoidea* (White Stringybark), *E. punctata* (Grey Gum), *E. tereticornis* (Forest Red Gum)

Therefore, all these patches are considered likely koala habitat and Council would need to take into account a koala assessment report for any development proposed in these vegetation zones.

5. Ecological constraints

The ecological constraints of the study area have been assessed based on the ecological features and values criteria listed in **Table 10**. This table has been used to assign the overall ecological constraints of the study area, which is illustrated in **Figure 9**.

Table 10: Ecological constraint classes, ecological features and report section in which they are addressed

Ecological Constraint	Ecological features/values	Section
Low	• Exotic and non-native vegetation • Highly disturbed landscapes with low fauna habitat value • Cleared land and houses	4.1.1, **Figure 7**
Moderate	• First order watercourses • Planted native species (potential foraging habitat for threatened species) • Farm dams (potential foraging habitat for threatened species) • Waterfront land beyond the required vegetated riparian zones	4.1.5, **Figure 3** 4.2.1.7 and 4.2.3 4.2.3 4.1.5
High	• Vegetation mapped as a threatened ecological community under the BC Act or EPBC Act • Vegetation identified as a SAII entity • Land mapped on the Biodiversity Values map • Vegetation considered Koala Habitat • Vegetated riparian zones from stream orders 2 and 4 • Land mapped as Key Fish Habitat	4.2.1, **Figure 7** 4.2.1 4.1.3, **Figure 2** 4.2.4 4.1.5, **Figure 3** 4.1.6, **Figure 3**

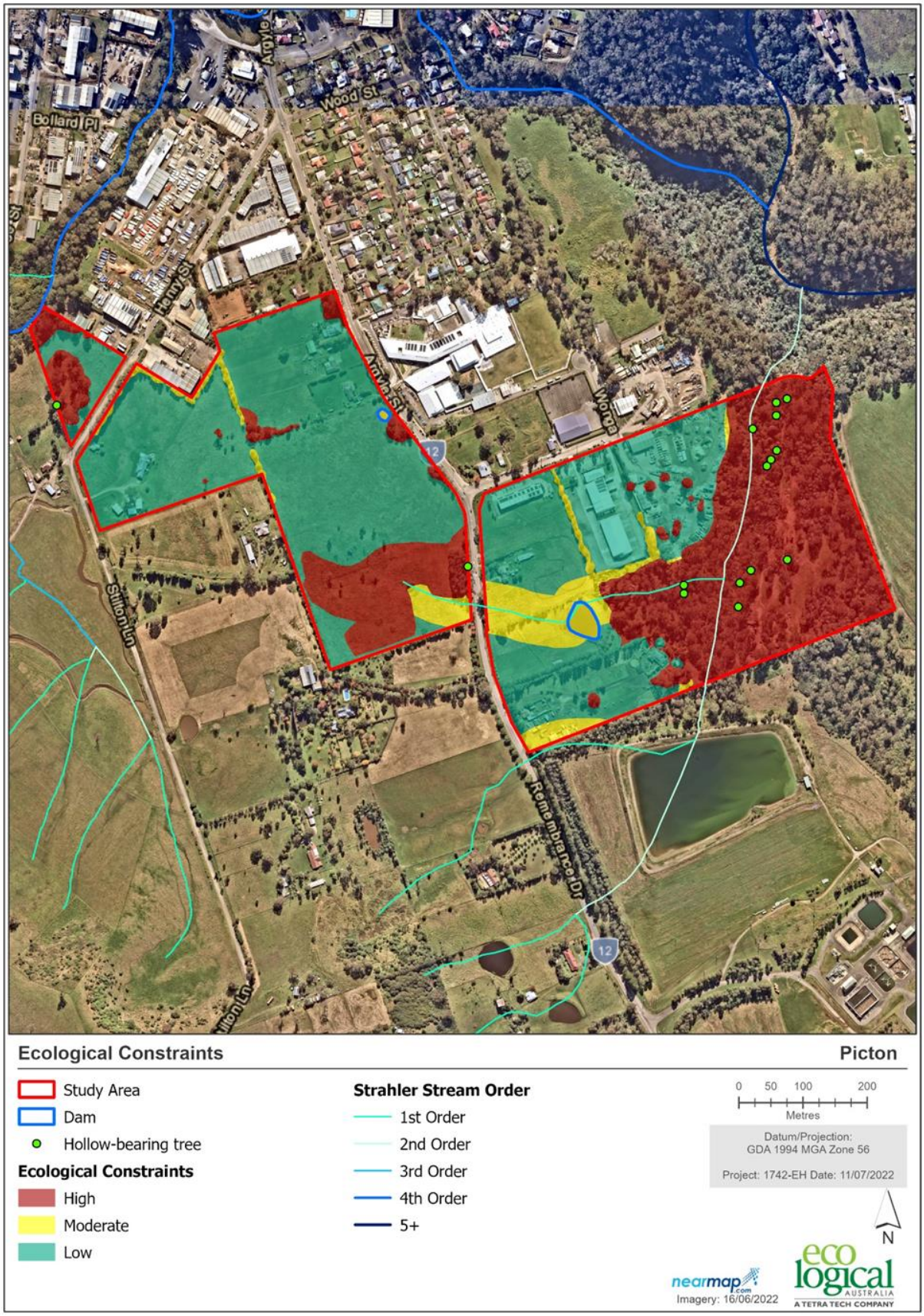

Figure 9: Ecological constraints of the study area

All areas of both validated PCTs within the study area meet the definition of 'high constraint' due to being assessed as representing a TEC listed under the BC Act. In addition, as both TECs (Cumberland Plain Woodland and Shale Sandstone Transition Forest) are SAII entities, the consent authority would have to be convinced that there is no likelihood that any proposed development will have a serious and irreversible impact on these areas.

Areas mapped on the BV map are considered high constraint as any potential impact to these areas automatically triggers the Biodiversity Offset Scheme (BOS). Whilst it is possible to challenge the BV mapping where there are no biodiversity values, given most of the current area mapped overlaps with vegetation identified as both TEC and SAII, the success of such a challenge would be unlikely. However, it is noted that there is a large patch mapped on the BV map in Lot 1//207443, at 465 Argyle St, which corresponds to "exotic pasture" in the validated vegetation map (**Figure 7**). It may be possible for a landowner to apply to have the BV mapping removed from this part of the study area.

Areas of high constraint should be retained and conserved where possible. Proposed development within these areas may pose an approvals risk as impacts to vegetation will likely trigger the NSW Biodiversity Offset Scheme (BOS), including assessment of significance under both the BC Act and the EPBC Act. Likewise, impacts to vegetated riparian zones for streams orders greater than 2 are likely to trigger the requirement for a Controlled Activity Approval (CAA) under the WM Act.

First order watercourses are considered moderate constraint as these can be exempt from CAA requirements if the NRAR is convinced that they don't exhibit features of a defined channel with bed and bank, and therefore is not waterfront land for the purposes of the WM Act. Planted native vegetation and dams within the study area are considered moderate constraint due to being potential foraging habitat for threatened fauna species, which may trigger impact assessment requirements. In addition, removal of certain amounts of native vegetation may trigger further assessment under the NSW Biodiversity Offset Scheme (BOS).

6. Conclusion

Development within areas of low ecological constraint is considered a suitable use of the land. The areas mapped as low ecological constraint with the study area are the most appropriate to locate potential build/construct design footprints (**Figure 9**). As these areas contain no native vegetation, habitat features, waterfront land or riparian corridors, no ecological impact assessments or approvals would likely be required for development in these areas. Rezoning areas mapped as low ecological constraint for more intensive landuse purposes, e.g. Light Industrial, would be appropriate, as there would be minimal ecological constraint to future development applications (DA).

The areas mapped as moderate ecological constraint may be suitable for development but would pose a more difficult approval pathway for proponents (**Figure 9**). Dams and native planted vegetation provide potential foraging habitat for threatened species, therefore impact assessment would likely be required as a part of any DA. In addition, if removal of planted native vegetation is above the area clearing threshold for the particular Lot, the BOS will be triggered and a BDAR will need to be prepared and any offset obligations met. Impacts on mapped 1st order streams are considered moderate constraint as it is possible to show that these do not represent a watercourse for the purposes of the WM Act if they lack a defined channel with bed and bank. If areas mapped as moderate ecological constraint were rezoned for more intensive landuse purposes, e.g. Light Industrial, owners are likely to face a more difficult development pathway for proposed developments that potentially impact on the ecological values identified.

The areas mapped as high ecological constraint within the study area pose the highest risk to any potential development gaining approval. All mapped native vegetation (PCT 850 and PCT 1395) corresponds to a TEC that is listed under the BC Act or both the BC Act and EPBC Act. Any potential impacts to this vegetation will need to be assessed by applying a test of significance (ToS) under the BC Act, as well as the EPBC Act for those patches that meet the EPBC Act definition of the TEC. If the BC Act ToS finds a significant impact, the BOS will be triggered and a BDAR will need to be prepared and offset obligations met through the purchase and retirement of biodiversity credits. If the EPBC Act ToS finds a significant impact, a referral to the Commonwealth will be required which will require approval and compliance provisions under the EPBC Act prior to development.

All areas currently mapped on the BV map are also considered high ecological constraint. This is because any potential impacts on an area mapped on the BV map automatically triggers the BOS. As most of these areas within the study area also correspond with vegetation mapped as both TEC and SAII, this reinforces the high ecological constraint of these patches. However, as noted above, it may be possible to apply to have the majority of the BV mapping in Lot 1 DP207443 (465 Argyle St) removed based on this area being exotic pasture.

All areas mapped as waterfront land (40m from the top of bank) are also considered high ecological risk. This is because any activity in this zone requires a controlled activity approval (CAA) under the WM Act, unless exempt. Conditions of a CAA would outline the need for a Vegetation Management Plan (VMP) to rehabilitate and restore riparian corridors within the required vegetated riparian zone (VRZ). As per Council's WSUD Guidelines, Council recognises the significance in maintaining natural water balances

and flows. Therefore, recommend that the first order creek lines be rehabilitated with adequate buffer zones should industrial development take place.

Rezoning areas mapped as high ecological constraint for more intensive landuse purposes, e.g. Light Industrial, would be inappropriate, as this may indicate to future owners / developers that this land is suitable for high impact development. Proponents would then face a very challenging and expensive development pathway for any proposed developments, which are unlikely to be approved.

It is recommended that areas mapped as high ecological constraint should not be rezoned to IN2 Light Industrial.

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Appendix A: Likelihood of occurrence tables

An assessment of likelihood of occurrence was made for all threatened ecological communities (**Table 11**), and flora, fauna and migratory species (**Table 12**) 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; and

'no' = habitat within the subject site and in the vicinity is unsuitable for the species.

A test of significance was conducted for threatened species that were recorded within the subject site 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 subject site intermittently for foraging. For these fauna species, the habitat present and likely to be affected 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.

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 11: Likelihood of occurrence table for threatened ecological communities (TEC) listed under the BC Act and EPBC Act

Scientific Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
ECOLOGICAL COMMUNITIES				
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	V / CE	E	Dominated by *Eucalyptus parramattensis* subsp. *parramattensis*, *Angophora bakeri* and *E. sclerophylla*. A small tree stratum of *Melaleuca decora* is sometimes present, generally in areas with poorer drainage. It has a well-developed shrub stratum consisting of sclerophyllous species such as *Banksia spinulosa* var. *spinulosa*, *Melaleuca nodosa*, *Hakea sericea* and *H. dactyloides* (multi-stemmed form). The ground stratum consists of a diverse range of forbs including *Themeda australis*, *Entolasia stricta*, *Cyathochaeta diandra*, *Dianella revoluta* subsp. *revoluta*, *Stylidium graminifolium*, *Platysace ericoides*, *Laxmannia gracilis* and *Aristida warburgii*. Occurs within the local government areas of Bankstown, Blacktown, Campbelltown, Hawkesbury, Liverpool and Penrith. Mainly found in the Castlereagh area of the Cumberland Plain, with small patches occurring at Kemps Creek and Longneck Lagoon; also present around Holsworthy	No - this community was not identified during the field survey
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland			The most widespread and abundant dominant trees include *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) and, south from Sydney, *Eucalyptus botryoides* (bangalay) and *Eucalyptus longifolia* (woollybutt). Shrubs include *Acacia longifolia*, *Dodonaea triquetra*, *Ficus coronata*, *Leptospermum polygalifolium* subsp. *polygalifolium* and *Melaleuca* spp. Occasional vines include *Parsonsia straminea*, *Morinda jasminoides* and *Stephania japonica* var. *discolor*. The groundcover is composed of abundant sedges, ferns, forbs, and grasses including *Gahnia clarkei*, *Pteridium esculentum*, *Hypolepis muelleri*, *Calochlaena dubia*, *Dianella caerulea*, *Viola hederacea*, *Lomandra longifolia*, *Entolasia marginata* and *Imperata cylindrica*. Known from parts of the Local Government Areas of Tweed, Byron, Lismore, Ballina, Richmond Valley, Clarence Valley, Coffs Harbour, Bellingen, Nambucca, Kempsey, Hastings, Greater Taree, Great Lakes and Port Stephens, Lake Macquarie, Wyong, Gosford, Hornsby, Pittwater, Warringah, Manly, Liverpool, Rockdale, Botany Bay, Randwick, Sutherland, Wollongong, Shellharbour, Kiama and Shoalhaven.	No - this community was not identified during the field survey
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	E	CE	Ranges from open forest to low woodland, with a canopy dominated by *Eucalyptus fibrosa* (Broad-leaved Ironbark) and *Melaleuca decora* (Paperbark). The canopy may also include other eucalypts such as *E. longifolia* (Woolybutt). The dense shrubby understorey consists of *Melaleuca nodosa* (Prickly-leaved Paperbark) and *Lissanthe strigosa* (Peach Heath), with a range of 'pea' flower shrubs, such as *Dillwynia tenuifolia*, *Pultenaea villosa* (Hairy Bush-pea) and *Daviesia ulicifolia* (Gorse Bitter Pea). The sparse ground layer contains a range of grasses and herbs. Occurs in western Sydney, with the most extensive stands occurring in the Castlereagh and Holsworthy areas. Smaller remnants occur in the Kemps Creek area and in the eastern section of the Cumberland Plain.	No - this community was not identified during the field survey
River-flat eucalypt forest on coastal	E		The structure of the community may vary from tall open forests (>40m) to woodlands. The most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum*), E. amplifolia* (cabbage gum), *Angophora*	No - this community was not identified

Scientific Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
floodplains of southern New South Wales and eastern Victoria			*floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). *Eucalyptus baueriana* (blue box), *E. botryoides* (bangalay) and *E. elata* (river peppermint) may be common south from Sydney. *E. ovata* (swamp gum) occurs on the far south coast, *E. saligna* (Sydney blue gum) and *E. grandis* (flooded gum) may occur north of Sydney, while *E. benthamii* is restricted to the Hawkesbury floodplain. A layer of small trees may be present, including *Melaleuca decora*, *M. styphelioides* (prickly-leaved teatree), *Backhousia myrtifolia* (grey myrtle), *Melia azadarach* (white cedar), *Casuarina cunninghamiana* (river oak) and *C. glauca* (swamp oak). Scattered shrubs include *Bursaria spinosa*, *Solanum prinophyllum*, *Rubus parvifolius, Breynia oblongifolia, Ozothamnus diosmifolius, Hymenanthera dentata, Acacia floribunda* and *Phyllanthus gunnii*. The groundcover is composed of abundant forbs, scramblers and grasses. Found on the river flats of the coastal floodplains. Known from parts of the Local Government Areas of Port Stephens, Maitland, Singleton, Cessnock, Lake Macquarie, Wyong, Gosford, Hawkesbury, Baulkham Hills, Blacktown, Parramatta, Penrith, Blue Mountains, Fairfield, Holroyd, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Sutherland, Wollongong, Shellharbour, Kiama, Shoalhaven, Palerang, Eurobodalla and Bega Valley.	during the field survey
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	**CE**	**CE**	**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. 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.**	**Yes – this community was identified during the field survey and desktop assessment**
Western Sydney Dry Rainforest and Moist Woodland on Shale	E	CE	Typically a low closed forest, slightly more open in the moist woodland form, with emergent trees up to 25 m high and a lower tree layer. In sheltered gullies and on lower slopes the canopy layer is typically dominated by *Melaleuca styphelioides* (prickly-leaved paperbark). Other diagnostic tree species include *Acacia implexa*(hickory wattle),*Alectryon subcinereus* (native quince), *Brachychiton populneus* (kurrajong), *Corymbia maculata* (spotted gum), *Melicope micrococca* (white euodia) and *Streblus pendulinus* (whalebone tree).	No - this community was not identified during the field survey
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	E	CE	Open woodland community (sometimes occurring as a forest formation), in which the most obvious species are one or more of the following: *Eucalyptus albens* (White Box), *E. melliodora* (Yellow Box) and *E. blakelyi* (Blakely's Red Gum). Intact sites contain a high diversity of plant species, including the main tree species, additional tree species, some shrub species, several climbing plant species, many grasses and a very high diversity of herbs. Modified sites include areas where the main tree species are present ranging from an open woodland formation to a forest structure, and the groundlayer is predominantly composed of exotic species; and sites where the trees have been removed and only the grassy groundlayer and some herbs remain. Occurs on the Tablelands and Western Slopes of NSW.	No - this community was not identified during the field survey

Status key: V = Vulnerable; E = Endangered; CE= Critically Endangered

Table 12: Likelihood of occurrence table for threatened species and populations listed under the BC Act and EPBC Act

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Actitis hypoleucos	Common Sandpiper		M	Summer migrant. In NSW, widespread along coastline and also occurs in many areas inland. Coastal wetlands and some inland wetlands, especially muddy margins or rocky shores. Also estuaries and deltas, lakes, pools, billabongs, reservoirs, dams and claypans, mangroves.	Unlikely – the study area lacks suitable habitat for this species.
Anthochaera phrygia	**Regent Honeyeater**	**E4A**	**CE**	**Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Found in eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of *Casuarina cunninghamiana* (River Oak).**	**Potential – records have been made for this species within a 5 km radius of the subject site. The subject site likely contains foraging habitat.**
Apus pacificus	Fork-tailed Swift		M	Recorded in all regions of NSW. Found in riparian woodland., swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes.	Unlikely – the study area lacks suitable habitat for this species.
Artamus cyanopterus cyanopterus	**Dusky Woodswallow**	**V**		**Dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalyptus saplings, acacias and other shrubs.**	**Potential – records have been made for this species within a 5 km radius of the subject site. The subject site likely contains foraging habitat.**
Botaurus poiciloptilus	Australasian Bittern	E1	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly *Typha* spp. (bullrushes) and *Eleocharis* spp. (spikerushes).	Unlikely – the study area lacks suitable habitat for this species.
Burhinus grallarius	Bush Stone-curlew	E1		In NSW, found sporadically in coastal areas, and west of the divide throughout the sheep-wheat belt. In NSW, it occurs in lowland grassy woodland and open forest.	Unlikely – the subject site lacks suitable habitat for this species
Bubulcus ibis	Cattle Egret			Grasslands, wooded lands and terrestrial wetlands.	Unlikely – no records of this species have been made within a 5 km radius of the study area. Marginal foraging habitat may be present.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Calidris acuminata	Sharp-tailed Sandpiper		M	Summer migrant. Widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions. Shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	Unlikely – the study area lacks suitable habitat for this species.
Calidris melanotos	Pectoral Sandpiper		M	Summer migrant to Australia. Widespread but scattered in NSW. East of the Great Divide, recorded from Casino and Ballina, south to Ulladulla. West of the Great Divide, widespread in the Riverina and Lower Western regions. Shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	Unlikely – the study area lacks suitable habitat for this species.
Callocephalon fimbriatum	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E2,V		The population is believed to be largely confined to an area bounded by Thornleigh and Wahroonga in the north, Epping and North Epping in the south, Beecroft and Cheltenham in the west and Turramurra/South Turramurra to the east. Forest and woodland, urban fringes.	No – the population for this species is too far from the study area.
Callocephalon fimbriatum	**Gang-gang Cockatoo**	**V**		**In NSW, distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. Isolated records known from as far north as Coffs Harbour and as far west as Mudgee. Tall mountain forests and woodlands in summer; in winter, may occur at lower altitudes in open eucalypt forests and woodlands, and urban areas.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat.**
Calyptorhynchus lathami	Glossy Black-Cockatoo, Riverina population	E2,V		Within the Narrandera Range and to the north-west in the Brobenah Hills, McPhersons Range, Cocoparra Range, Lachlan Range and Jimberoo State Forests, and the Naradhan Range. Largely restricted to hills and low ridges where suitable stands of its food plant *Allocasuarina verticillata* (Drooping Sheoak) remain.	No – the population for this species is too far from the study area.
Calyptorhynchus lathami	**Glossy Black-Cockatoo**	**V**		**In NSW, widespread along coast and inland to the southern tablelands and central western plains, with a small population in the Riverina. Open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat.**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Cercartetus nanus	Eastern Pygmy-possum	V		In NSW it extents from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Rainforest, sclerophyll forest (including Box-Ironbark), woodland and heath.	Unlikely – records have been made within a 5km radius however it is unlikely the habitat within the study area is suitable.
Chalcites osculans	Black-eared Cuckoo		M	The Black-eared Cuckoo is found in drier country where species such as mulga and mallee form open woodlands and shrublands. It is often found in vegetation along creek beds.	Unlikely – no records of this species have been made within a 5 km radius of the study area. Marginal foraging habitat may be present.
Chalinolobus dwyeri	**Large-eared Pied Bat**	**V**	**V**	**Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat and possible roosting habitat.**
Chthonicola sagittata	**Speckled Warbler**	**V**		**Lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rock ridges or in gullies**	**Potential – records have been made for this species within a 5 km radius of the subject site. The subject site likely contains foraging habitat.**
Climacteris picumnus victoriae	**Brown Treecreeper (eastern subspecies)**	**V**		**From eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. Eucalypt woodlands and dry open forest.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat.**
Daphoenositta chrysoptera	**Varied Sittella**	**V**		**Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, mallee and Acacia woodland.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat.**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Dasyurus maculatus maculatus (SE mainland population)	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Unlikely – records have been made within a 5km radius however it is unlikely the habitat within the subject site is suitable.
Delma impar	Striped Legless Lizard	V	V	In NSW, occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina.	Unlikely – no records of this species have been made within a 5 km radius of the study area. Study area is outside of known and predicted distribution.
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.	Unlikely – no records have been made within a 5 km radius. The study area is unlikely to contain suitable habitat.
Falco subniger	Black Falcon	V		Sparsely distributed in NSW, occurring mostly in inland regions. Shrubland, forests, wetlands, grasslands, woodlands and rainforests.	Unlikely – records of this species have been made within a 5 km radius of the study area. Marginal foraging habitat may be present.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		South-east coast and ranges of Australia, from southern Qld to Victoria and Tasmania. In NSW, records extend to the western slopes of the Great Dividing Range. Tall (greater than 20m) moist habitats.	Unlikely – records have been made within a 5 km radius of the study area however the habitat on site in unlikely to be suitable.
Gallinago hardwickii	Latham's Snipe		M	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	Unlikely – the study area lacks suitable habitat for this species.
Grantiella picta	Painted Honeyeater	V	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	Unlikely – no records have been made for this species within a 5km radius of the study area.
Glossopsitta pusila	**Little Lorikeet**	**V**		**Found in open Eucalyptus forest and woodlands Isolated flowering trees in open country, eg. Paddocks, roadside remnants and urban trees.**	**Potential – records have been made for this species within a 5**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
					km radius of the subject site. The subject site likely contains foraging habitat.
Haliaeetus leucogaster	**White-bellied Sea-Eagle**	**V**		**Distributed along the coastline of mainland Australia and Tasmania, extending inland along some of the larger waterways, especially in eastern Australia. Freshwater swamps, rivers, lakes, reservoirs, billabongs, saltmarsh and sewage ponds and coastal waters. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest and urban areas.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat.**
Heleioporus australiacus	Giant Burrowing Frog	V	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	Unlikely – no records have been made for this species within a 5km radius of the study area.
Hieraaetus morphnoides	**Little Eagle**	**V**		**Throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment. Open eucalypt forest, woodland or open woodland, including sheoak or Acacia woodlands and riparian woodlands of interior NSW.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat.**
Hirundapus caudacutus	White-throated Needletail		M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Unlikely – records have been made within a 5 km radius of the study area however the habitat on site in unlikely to be suitable.
Hoplocephalus bungaroides	**Broad-headed Snake**	**E1**	**V**	**Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney. Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area contains suitable habitat.**
Lathamus discolor	**Swift Parrot**	**E1**	**CE**	**Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.**	**Potential – records have been made for this species within a 5 km radius of the subject site. The**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
					subject site likely contains foraging habitat.
Melithreptus gularis gularis	**Black-chinned Honeyeater (eastern subspecies)**	**V**		**Widespread in NSW from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Also Richmond and Clarence River areas and a few scattered sites in the Hunter, Central Coast and Illawarra regions.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat.**
Meridolum corneovirens	**Cumberland Plain Land Snail**	**E1**		**Areas of the Cumberland Plain west of Sydney, from Richmond and Windsor south to Picton and from Liverpool, west to the Hawkesbury and Nepean Rivers at the base of the Blue Mountains. Primarily inhabits Cumberland Plain Woodland. Also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area contains suitable habitat.**
Merops ornatus	Rainbow Bee-eater			Distributed across much of mainland Australia, including NSW. Open forests and woodlands, shrublands, farmland, areas of human habitation, inland and coastal sand dune systems, heathland, sedgeland, vine forest and vine thicket.	Unlikely – no records have been made for this species within a 5km radius of the study area.
Miniopterus australis	**Little Bentwing-bat**	**V**		**East coast and ranges south to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains suitable habitat.**
Miniopterus orianaea 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.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains suitable habitat.**
Micronomus norfolkensis	**Eastern Coastal Free-tailed Bat**	**V, P**		**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.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains suitable habitat.**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Monarcha melanopsis	Black-faced Monarch		M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park and Wombeyan Caves. It is rarely recorded farther inland. Rainforest, open eucalypt forests, dry sclerophyll forests and woodlands, gullies in mountain areas or coastal foothills, Brigalow scrub, coastal scrub, mangroves, parks and gardens.	Unlikely – no records have been made for this species within a 5km radius of the study area.
Motacilla flava	Yellow Wagtail		M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA. Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	Unlikely – no records have been made for this species within a 5km radius of the study area.
Myiagra cyanoleuca	Satin Flycatcher		M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Eucalypt dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies.	Unlikely – no records have been made for this species within a 5km radius of the study area.
Myotis macropus	**Southern Myotis**	**V**		**In NSW, found in the coastal band. It is rarely found more than 100 km inland, except along major rivers. Foraging habitat is waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetation up to 20m.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area contains suitable habitat.**
Neophema pulchella	Turquoise Parrot	V		Occurs along the length of NSW from the coastal plains to the western slopes of the Great Dividing Range. Eucalypt and cypress pine open forests and woodlands, ecotones between woodland and grassland, or coastal forest and heath.	Unlikely – no records have been made for this species within a 5km radius of the subject site.
Ninox strenua	**Powerful Owl**	**V**		**In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. Woodland, open sclerophyll forest, tall open wet forest and rainforest.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat.**
Numenius madagascariensis	Eastern Curlew		CE, M	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records. Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	Unlikely – no records have been made for this species within a 5km radius of the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Onychoprion fuscata	Sooty Tern	V		In NSW only known to breed at Lord Howe Island. Occasionally seen along coastal NSW, especially after cyclones. Breeds in large colonies in sand or coral scrapes on offshore islands and cays including Lord Howe and Norfolk Islands	Unlikely – records have been made within a 5 km radius of the study area however the habitat on site in unlikely to be suitable.
Petauroides volans	Greater Glider population in the Eurobodalla local government area	E2	V	This population on the south coast of NSW is bounded by the Moruya River to the north, Coila Lake to the south and the Princes Highway and cleared land exceeding 700 m in width to the west. Eucalypt forests and woodlands.	No – this population is too far from the study area.
Petauroides volans	**Greater Glider**		**V**	**The greater glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area is connected to a large area of habitat to the east.**
Petaurus australis	Yellow-bellied Glider population on the Bago Plateau	E2,V		The endangered population of the Yellow-bellied Glider occurs on the Bago Plateau; a westward extension of the Kosciuszko highlands in southern NSW.	No – this population is too far from the study area.
Petaurus australis	**Yellow-bellied Glider**	**V**		**Along the eastern coast to the western slopes of the Great Dividing Range, from southern Qld to Victoria. Tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.**	**Potential – records have been made for this species within a 5 km radius of the subject site. The subject site contains large hollows**
Petaurus norfolcensis	Squirrel Glider in the Wagga Wagga Local Government Area	E2,V		The extent of the endangered population is legally defined by the boundaries of the Wagga Wagga LGA.	No – this population is too far from the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Petaurus norfolcensis	Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill	E2,V		The endangered population is within the Pittwater Local Government Area on the Barrenjoey Peninsula, north of Bushrangers Hill.	No – this population is too far from the study area.
Petaurus norfolcensis	**Squirrel Glider**	**V**		**Widely though sparsely distributed on both sides of the Great Dividing Range in eastern Australia, from northern Qld to western Victoria.**	**Potential – records have been made for this species within a 5 km radius of the subject site. The subject site contains potential habitat**
Petrogale penicillata	Brush-tailed Rock-wallaby	E1	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	Unlikely – the study area lacks suitable habitat for this species.
Petroica boodang	**Scarlet Robin**	**V**		**In NSW, it occurs from the coast to the inland slopes. Dry eucalypt forests and woodlands, and occasionally in mallee, wet forest, wetlands and tea-tree swamps.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains foraging habitat.**
Phascolarctos cinereus	**Koala**	**E**	**E**	**In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. Eucalypt woodlands and forests.**	**Likely - records have been made for this species all around the study area. The study area contains suitable habitat.**
Pseudomys novaehollandiae	New Holland Mouse		V	Fragmented distribution across eastern NSW. Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	Unlikely – no records have been made for this species within a 5km radius of the study area.
Pseudophryne australis	Red-crowned Toadlet	V		Confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains. Open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings.	Unlikely – records have been made within a 5 km radius of the study area however the habitat on site in unlikely to be suitable.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Pteropus poliocephalus	**Grey-headed Flying-fox**	**V**	**V**	**Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.**	**Likely – records have been made within the study area. The study area contains suitable foraging habitat**
Rhipidura rufifrons	Rufous Fantail		M	Coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW. Wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands	Unlikely – no records have been made for this species within a 5km radius of the study area.
Rostratula australis	Australian Painted Snipe	E1	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas.	Unlikely – no records have been made for this species within a 5km radius of the study area.
Saccolaimus flaviventris	**Yellow-bellied Sheathtail-bat**	**V**		**There are scattered records of this species across the New England Tablelands and North West Slopes. Rare visitor in late summer and autumn to south-western NSW. Almost all habitats, including wet and dry sclerophyll forest, open woodland, open country, mallee, rainforests, heathland and waterbodies.**	**Potential – records have been made for this species within a 5 km radius of the subject site. The subject site contains suitable habitat.**
Scoteanax rueppellii	**Greater Broad-nosed Bat**	**V**		**Both sides of the great divide, from the Atherton Tableland in Qld to north-eastern Victoria, mainly along river systems and gullies. In NSW it is widespread on the New England Tablelands. Woodland, moist and dry eucalypt forest and rainforest.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area contains suitable habitat.**
Stagonopleura guttata	**Diamond Firetail**	**V**		**Widely distributed in NSW, mainly recorded in the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina, and less commonly found in coastal areas and further inland. Grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, secondary derived grassland, riparian areas and lightly wooded farmland.**	**Potential – records have been made for this species within a 5 km radius of the study area. The study area likely contains suitable habitat.**
Tyto tenebricosa	Sooty Owl	V		Rainforest, including dry rainforest, subtropical and warm temperature rainforest as well as moist eucalyptus forests	Unlikely – there are limited records of this species within a 5km radius of the subject site.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Varanus rosenbergi	Rosenberg's Goanna	V		In NSW, found on the Sydney Sandstone in Wollemi National Park, in the Goulburn and ACT regions and near Cooma in the south. Also recorded from the South West Slopes near Khancoban and Tooma River. Found in heath, open forest and woodland	Unlikely – records have been made within a 5 km radius of the study area however the habitat on site in unlikely to be suitable.
FLORA					
Acacia bynoeana	Bynoe's Wattle	E1	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils.	Unlikely – there are limited records of this species within a 5km radius of the subject site.
Allocasuarina glareicola		E1	E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Castlereagh woodland on lateritic soil. Found in open woodland with Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla and Melaleuca decora.	Unlikely – there are no records of this species within a 5km radius of the study area.
Commersonia prostrata	Dwarf Kerrawang	E1	E	In NSW, found in the Southern Highlands and Southern Tablelands (Penrose State Forest, Tallong, near the Corang, and Rowes Lagoon), the Thirlmere Lakes area and on the North Coast (Tomago sandbeds north of Newcastle). Occurs on sandy, sometimes peaty soils in a wide variety of habitats.	Unlikely – there are no records of this species within a 5km radius of the study area.
Cynanchum elegans	White-flowered Wax Plant	E1	E	Restricted to eastern NSW, from Brunswick Heads on the north coast to Gerroa in the Illawarra region, and as far west as Merriwa in the upper Hunter River valley. Dry rainforest; littoral rainforest; Leptospermum laevigatum-Banksia integrifolia subsp. integrifolia (Coastal Tea-tree– Coastal Banksia) coastal scrub; Eucalyptus tereticornis (Forest Red Gum) or Corymbia maculata (Spotted Gum) open forest and woodland; and Melaleuca armillaris (Bracelet Honeymyrtle) scrub.	Unlikely – there are no records of this species within a 5km radius of the study area.
Darwinia peduncularis		V		Grows on or near rocky outcrops on sandy, well drained, low nutrient soil over sandstone. It has been recorded from Brooklyn, Berowra, Galston Gorge, Hornsby, Bargo River, Glen Davis, Mount Boonbourwa and Kings Tableland.	Unlikely – records have been made within a 5 km radius of the subject site however the habitat on site in unlikely to be suitable.
Epacris purpurascens* var. *purpurascens		**V**		**Recorded from Gosford in the north, to Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. Found in a range of habitat types, most of which have a strong shale soil influence.**	**Potential – this species is known to occur within the PCTs listed as occurring within the study area.**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Eucalyptus macarthurii	Paddys River Boc	E1		Occurs on grassy woodland on relatively fertile soils on broad cold flats	Unlikely – records have been made within a 5 km radius of the subject site however the habitat on site in unlikely to be suitable.
Genoplesium baueri	Bauer's Midge Orchid	E1	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Dry sclerophyll forest and moss gardens over sandstone.	Unlikely – there are no records of this species within a 5km radius of the subject site.
Grevillea raybrownii		V		Generally occurs on ridgetops and, less often, slopes and benches of Hawkesbury Sandstone and Mittagong Formation. It occurs in Eucalyptus open forest and woodland with a shrubby understorey on sandy, gravelly loam soils derived from sandstone that are low in nutrients	Unlikely – records have been made within a 5 km radius of the study area however the habitat on site in unlikely to be suitable.
Grevillea parviflora subsp. ***parviflora***	**Small-flower Grevillea**	**V**	**V**	**Sporadically distributed throughout the Sydney Basin and in the Hunter in the Cessnock - Kurri Kurri area. Also known from Putty to Wyong and Lake Macquarie on the Central Coast. Heath and shrubby woodland to open forest on sandy or light clay soils usually over thin shales.**	**Potential – records have been made for this species east of the study area. The study area contains suitable habitat.**
Haloragis exalata subsp. *exalata*	Square Raspwort	V	V	Disjunct distribution in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Protected and shaded damp situations in riparian habitats.	Unlikely – there are no records of this species within a 5km radius of the study area.
Leucopogon exolasius	Woronora Beard-heath	V	V	Upper Georges River area and in Heathcote National Park.	Unlikely – there are limited records of this species within a 5km radius of the subject site.
Melaleuca deanei	Deane's Paperbark	V	V	Ku-ring-gai/Berowra area, Holsworthy/Wedderburn area, Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Heath on sandstone.	Unlikely – records have been made within a 5 km radius of the study area however the habitat on site in unlikely to be suitable.
Persicaria elatior	**Tall Knotweed**	**V**	**V**	**In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). Beside streams and lakes, swamp forest or disturbed areas.**	**Potential – this species has been known to occur within the PCTs listed as occurring within the subject site.**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Persoonia bargoensis	**Bargo Geebung**	**E1**	**V**	**Restricted to a small area south-west of Sydney on the western edge of the Woronora Plateau and the northern edge of the Southern Highlands. Woodland or dry sclerophyll forest on sandstone and on heavier, well drained, loamy, gravelly soils of the Wianamatta Shale and Hawkesbury Sandstone.**	**Potential – this species has been known to occur within the PCTs listed as occurring within the study area.**
Persoonia hirsuta	**Hairy Geebung**	**E1**		**Found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation on the upper Hawkesbury Sandstone**	**Potential – this species has been known to occur within the PCTs listed as occurring within the subject site.**
Persoonia glaucescens	Mittagong Geebung	E1	V	Recent surveys place the present southern limit near Berrima and the northern limit near Buxton.	Unlikely – records have been made within a 5 km radius of the study area however the habitat on site in unlikely to be suitable.
Persoonia mollis subsp. *revoluta*		V		Mittagong, Paddys River and High Range in the Southern Highlands with an outlying population in the Bindook Highlands. Mainly on relatively deep sandy soils on broad ridgetops and upper slopes.	Unlikely – there are no records of this species within a 5km radius of the study area.
Pimelea spicata	Spiked Rice-flower	E1	E	Two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama).	Unlikely – there are no records of this species within a 5km radius of the study area.
Pomaderris brunnea	Brown Pomaderris	E1	V	In NSW, found around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands. Moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	Unlikely – records have been made within a 5 km radius of the study area however the habitat on site in unlikely to be suitable.
Pomaderris cotoneaster	Cotoneaster Pomaderris	E1	E	Recorded in NSW from the Nungatta area, northern Kosciuszko National Park (near Tumut), the Tantawangalo area in South-East Forests National Park and adjoining freehold land, Badgery's Lookout near Tallong, the Yerranderie area, the Canyonleigh area and Ettrema Gorge in Morton National Park. Generally dry sclerophyll forest, often on skeletal soil.	Unlikely – there are no records of this species within a 5km radius of the study area
Pterostylis saxicola	Sydney Plains Greenhood	E1	E	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. Small pockets of shallow soil in depressions on sandstone rock shelves above	Unlikely – there are no records of this species within a 5km radius of the study area

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
				cliff lines, adjacent to sclerophyll forest or woodland on shale/sandstone transition soils or shale soils.	
Rhodamnia rubescens	Scrub Turpentine	CE		Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of R. rubescens typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Unlikely – there are no records of this species within a 5km radius of the study area
Rhizanthella slateri	Rhizanthella slateri (Rupp) M.A. Clem. & Cribb in the Great Lakes local government area	E2,V	E	The population occurs near Bulahdelah (within the Great Lakes LGA). Sclerophyll forest in shallow to deep loams.	No – this population is too far from the study area
Rhizanthella slateri	Eastern Australian Underground Orchid	V	E	In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Sclerophyll forest in shallow to deep loams.	Unlikely – there are no records of this species within a 5km radius of the study area
Thelymitra kangaloonica	Kangaloon Sun Orchid	E4A	CE	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.	Unlikely – there are no records of this species within a 5km radius of the study area
Syzygium paniculatum	Magenta Lily Pily	E1		Grows in subtropical and littoral rainforest on sandy soils or stabilised dues, often near the sea.	Unlikely – records have been made within a 5 km radius of the subject site however the habitat on site in unlikely to be suitable.
Thelymitra kangaloonica	Kangaloon Sun Orchid	E4A	CE	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.	Unlikely – there are no records of this species within a 5km radius of the subject site

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence
Thesium australe	Austral Toadflax	V	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. Grassland on coastal headlands or grassland and grassy woodland away from the coast.	Unlikely – there are no records of this species within a 5km radius of the study area

Status key: BC Act: E1 = Endangered, E2 = Endangered Population, E4 = Extinct, E4A = Critically Endangered, V = Vulnerable,
EPBC Act: M = Migratory, CD = Conservation Dependent, CE = Critically Endangered, E = Endangered, V = Vulnerable, X = Extinct

Appendix B: Flora species list

Family	Species	Common Name	Growth Form Group
Fabaceae (Mimosoideae)	*Acacia binervia*	Coast Myall	Tree (TG)
Fabaceae (Mimosoideae)	*Acacia decurrens*	Black Wattle	Tree (TG)
Fabaceae (Mimosoideae)	*Acacia floribunda*	White Sally	Shrub (SG)
Fabaceae (Mimosoideae)	*Acacia implexa*	Hickory Wattle	Shrub (SG)
Fabaceae (Mimosoideae)	*Acacia longifolia* subsp. *longifolia*	Sydney Golden Wattle	Shrub (SG)
Fabaceae (Mimosoideae)	*Acacia melanoxylon*	Blackwood	Tree (TG)
Fabaceae (Mimosoideae)	*Acacia parramattensis*	Parramatta Wattle	Tree (TG)
Fabaceae (Mimosoideae)	*Acacia ulicifolia*	Prickly Moses	Shrub (SG)
Sapindaceae	*Acer negundo*^	Box Elder	
Polygonaceae	*Acetosa sagittata*^	Rambling Dock	
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair	Fern (EG)
Adiantaceae	*Adiantum hispidulum* var. *hispidulum*	Rough Maidenhair	Fern (EG)
Alliaceae	*Agapanthus* sp.*	Agapanthus	
Asteraceae	*Ageratina adenophora*^	Crofton Weed	
Casuarinaceae	*Allocasuarina littoralis*	Black She-Oak	Tree (TG)
Casuarinaceae	*Allocasuarina torulosa*	Forest Oak	Tree (TG)
Myrtaceae	*Angophora floribunda*	Rough-barked Apple	Tree (TG)
Apocynaceae	*Araujia sericifera*^	Moth Vine	
Poaceae	*Aristida vagans*	Threeawn Speargrass	Grass & grasslike (GG)
Asparagaceae	*Asparagus aethiopicus*^	Asparagus Fern	
Asparagaceae	*Asparagus asparagoides*^	Bridal Creeper	
Rubiaceae	*Asperula conferta*	Common Woodruff	Forb (FG)
Aspleniaceae	*Asplenium flabellifolium*	Necklace Fern	Fern (EG)
Araliaceae	*Astrotricha latifolia*		Shrub (SG)
Poaceae	*Austrostipa ramosissima*	Stout Bamboo Grass	Grass & grasslike (GG)
Poaceae	*Austrostipa* sp.	A Speargrass	Grass & grasslike (GG)
Myrtaceae	*Backhousia myrtifolia*	Grey Myrtle	Shrub (SG)
Euphorbiaceae	*Beyeria viscosa*	Sticky Wallaby Bush	Shrub (SG)
Asteraceae	*Bidens pilosa* var. *pilosa**	Cobbler's Pegs	
Blechnaceae	*Doodia aspera*	Prickly Rasp Fern	Fern (EG)
Poaceae	*Bothriochloa macra*	Red Grass	Grass & grasslike (GG)
Malvaceae	*Brachychiton populneus* subsp. *populneus*	Kurrajong	Tree (TG)
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush	Shrub (SG)

Family	Species	Common Name	Growth Form Group
Acanthaceae	*Brunoniella australis*	Blue Trumpet	Forb (FG)
Pittosporaceae	*Bursaria spinosa* subsp. *spinosa*	Native Blackthorn	Shrub (SG)
Myrtaceae	*Callistemon citrinus*	Crimson Bottlebrush	Shrub (SG)
Myrtaceae	*Callistemon salignus*	Willow Bottlebrush	Shrub (SG)
Asteraceae	*Calotis dentex*	Burr-daisy	Shrub (SG)
Theaceae	*Camellia* sp.*	Camellia	
Poaceae	*Capillipedium sp.*	Scented-top Grass	Grass & grasslike (GG)
Vitaceae	*Cayratia clematidea*	Native Grape	Other (OG)
Poaceae	*Cenchrus clandestinus*^	Kikuyu Grass	
Poaceae	*Chloris gayana*^	Rhodes Grass	
Asteraceae	*Cirsium vulgare**	Spear Thistle	
Ranunculaceae	*Clematis aristata*	Old Man's Beard	Other (OG)
Asteraceae	*Conyza* sp.*	A Fleabane	
Goodeniaceae	*Coopernookia barbata*	Purple Goodenia	Forb (FG)
Rutaceae	*Correa reflexa*	Common Correa	Shrub (SG)
Myrtaceae	*Corymbia maculata*	Spotted Gum	Tree (TG)
Myrtaceae	*Corymbia citriodora*	Lemon-scented Gum	Tree (TG)
Myrtaceae	*Corymbia tessellaris*	Carbeen	Tree (TG)
Malaceae	*Cotoneaster sp.*^*	Cotoneaster	
Asteraceae	*Cotula australis*	Common Cotula	Forb (FG)
Cupressaceae	*Cupressus* sp.*	Cypress Pine	
Poaceae	*Cynodon dactylon*	Common Couch	Grass & grasslike (GG)
Cyperaceae	*Cyperus eragrostis*^*	Umbrella Sedge	
Goodeniaceae	*Dampiera purpurea*		Forb (FG)
Solanaceae	*Datura ferox**	Fierce Thornapple	
Fabaceae (Faboideae)	*Desmodium varians*	Slender Tick-trefoil	Other (OG)
Phormiaceae	*Dianella caerulea* var. *caerulea*	Blue Flax Lily	Forb (FG)
Poaceae	*Dichanthium sericeum* subsp. *sericeum*	Queensland Bluegrass	Grass & grasslike (GG)
Convolvulaceae	*Dichondra repens*	Kidney Weed	Forb (FG)
Sapindaceae	*Dodonaea* sp.	A Hopbush	Shrub (SG)
Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass	Grass & grasslike (GG)
Boraginaceae	*Echium plantagineum**	Patterson's Curse	
Poaceae	*Ehrharta erecta*^*	Panic Veldtgrass	
Chenopodiaceae	*Einadia hastata*	Berry Saltbush	Forb (FG)
Poaceae	*Entolasia stricta*	Wiry Panic	Grass & grasslike (GG)
Poaceae	*Eragrostis brownii*	Brown's Lovegrass	Grass & grasslike (GG)

Family	Species	Common Name	Growth Form Group
Poaceae	*Eragrostis curvula*^*	African Lovegrass	
Fabaceae (Faboideae)	*Erythrina x sykesii*^*	Coral tree	
Myrtaceae	*Eucalyptus baueriana*	Blue Box	Tree (TG)
Myrtaceae	*Eucalyptus crebra*	Narrow-leaved Ironbark	Tree (TG)
Myrtaceae	*Eucalyptus fibrosa*	Red Ironbark	Tree (TG)
Myrtaceae	*Eucalyptus globoidea*	White Stringybark	Tree (TG)
Myrtaceae	*Eucalyptus microcorys*	Tallowwood	Tree (TG)
Myrtaceae	*Eucalyptus moluccana*	Grey Box	Tree (TG)
Myrtaceae	*Eucalyptus paniculata* subsp. *paniculata*	Grey Ironbark	Tree (TG)
Myrtaceae	*Eucalyptus punctata*	Grey Gum	Tree (TG)
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany	Tree (TG)
Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum	Tree (TG)
Asteraceae	*Euchiton sphaericus*	Star Cudweed	Forb (FG)
Moraceae	*Ficus rubiginosa*	Port Jackson Fig	Tree (TG)
Cyperaceae	*Gahnia aspera*	Rough Saw-sedge	Grass & grasslike (GG)
Fabaceae (Caesalpinioideae)	*Gleditsia triacanthos*^*	Honey Locust	
Fabaceae (Faboideae)	*Glycine clandestina*	Twining glycine	Other (OG)
Amaranthaceae	*Gomphrena celosioides**	Gomphrena Weed	
Proteaceae	*Grevillea robusta*	Silky Oak	Tree (TG)
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla	Other (OG)
Poaceae	*Hyparrhenia hirta*^*	Coolatai Grass	
Clusiaceae	*Hypericum gramineum*	Small St John's Wort	Forb (FG)
Asteraceae	*Hypochaeris radicata**	Catsear	
Poaceae	*Imperata cylindrica*	Blady Grass	Grass & grasslike (GG)
Fabaceae (Faboideae)	*Indigofera australis*	Australian Indigo	Shrub (SG)
Bignoniaceae	*Jacaranda* sp.*	Jacaranda	
Verbenaceae	*Lantana camara*^*	Lantana	
Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge	Grass & grasslike (GG)
Cyperaceae	*Lepidosperma urophorum*		Grass & grasslike (GG)
Ericaceae	*Leucopogon juniperinus*	Prickly Beard-heath	Shrub (SG)
Oleaceae	*Ligustrum lucidum*^*	Large-leaved Privet	
Oleaceae	*Ligustrum sinense*^*	Small-leaved Privet	
Campanulaceae	*Lobelia purpurascens*	whiteroot	Forb (FG)
Lomandraceae	*Lomandra gracilis*		Grass & grasslike (GG)
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush	Grass & grasslike (GG)

Family	Species	Common Name	Growth Form Group
Lomandraceae	*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush	Grass & grasslike (GG)
Solanaceae	*Lycium ferocissimum*^*	African Boxthorn	
Primulaceae	*Lysimachia arvensis**	Scarlet Pimpernel	
Lythraceae	*Lythrum hyssopifolia*	Hyssop Loosestrife	Forb (FG)
Malvaceae	*Malva parviflora**	Small-flowered Mallow	
Fabaceae (Faboideae)	*Medicago* sp.*	A Medic	
Myrtaceae	*Melaleuca armillaris* subsp. *armillaris*	Bracelet Honey-myrtle	Shrub (SG)
Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree	Shrub (SG)
Poaceae	*Microlaena stipoides* var. *stipoides*	Weeping Grass	Grass & grasslike (GG)
Primulaceae	*Myrsine variabilis*		Shrub (SG)
Oleaceae	*Notelaea longifolia f. longifolia*	Large Mock-olive	Tree (TG)
Asteraceae	*Olearia viscidula*	Wallaby Weed	Shrub (SG)
Poaceae	*Oplismenus aemulus*	Basket Grass	Grass & grasslike (GG)
Asteraceae	*Ozothamnus diosmifolius*	White Dogwood	Shrub (SG)
Bignoniaceae	*Pandorea pandorana* subsp. *pandorana*	Wonga Wonga Vine	Other (OG)
Poaceae	*Paspalum dilatatum*^*	Paspalum	
Passifloraceae	*Passiflora caerulea**	Blue Passionflower	
Passifloraceae	*Passiflora cinnabarina*	Red Passionfruit	Other (OG)
Adiantaceae	*Pellaea falcata*	Sickle Fern	Fern (EG)
Polygonaceae	*Persicaria decipiens*	Slender Knotweed	Forb (FG)
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung	Shrub (SG)
Phytolaccaceae	*Phytolacca octandra**	Inkweed	
Pinaceae	*Pinus radiata*^*	Radiata Pine	
Pittosporaceae	*Pittosporum revolutum*	Rough Fruit Pittosporum	Shrub (SG)
Plantaginaceae	*Plantago lanceolata**	Lamb's Tongues	
Lamiaceae	*Plectranthus parviflorus*	Cockspur Flower	Forb (FG)
Fabaceae (Faboideae)	*Podolobium ilicifolium*	Prickly Shaggy Pea	Shrub (SG)
Rubiaceae	*Pomax umbellata*	Pomax	Forb (FG)
Lamiaceae	*Prostanthera rhombea*	Sparkling Mint-bush	Shrub (SG)
Euphorbiaceae	*Ricinus communis*^*	Castor Oil Plant	
Rosaceae	*Rubus anglocandicans*^*	Blackberry	
Polygonaceae	*Rumex crispus**	Curled Dock	
Poaceae	*Rytidosperma* sp.	Wallaby Grass	Grass & grasslike (GG)
Asteraceae	*Senecio madagascariensis*^*	Fireweed	
Poaceae	*Setaria parviflora**	Pigeon Grass	
Malvaceae	*Sida rhombifolia**	Paddy's Lucerne	

Family	Species	Common Name	Growth Form Group
Asteraceae	*Sigesbeckia orientalis* subsp. *orientalis*	Indian Weed	Forb (FG)
Solanaceae	*Solanum nigrum**	Black-berry Nightshade	
Solanaceae	*Solanum prinophyllum*	Forest Nightshade	Forb (FG)
Solanaceae	*Solanum pseudocapsicum**	Madeira Winter Cherry	
Solanaceae	*Solanum sisymbriifolium**		
Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass	Grass & grasslike (GG)
Caryophyllaceae	*Stellaria media**	Common Chickweed	
Stylidiaceae	*Stylidium laricifolium*	Tree Triggerplant	Forb (FG)
Phormiaceae	*Stypandra glauca*	Nodding Blue Lily	Forb (FG)
Asteraceae	*Tagetes minuta**	Stinking Roger	
Asteraceae	*Taraxacum officinale**	Dandelion	
Poaceae	*Themeda triandra*	Kangaroo Grass	Grass & grasslike (GG)
Ulmaceae	*Trema tomentosa* var. *aspera*	Native Peach	Shrub (SG)
Fabaceae (Faboideae)	*Trifolium dubium**	Yellow Suckling Clover	
Fabaceae (Faboideae)	*Trifolium repens**	White Clover	
Typhaceae	*Typha orientalis*	Broad-leaved Cumbungi	Grass & grasslike (GG)
Ulmaceae	*Ulmus parvifolia**	Chinese Elm	
Verbenaceae	*Verbena bonariensis**	Purpletop	
Verbenaceae	*Verbena rigida* var. *rigida**	Veined Verbena	
Lamiaceae	*Westringia fruticosa*	Coastal Rosemary	Shrub (SG)

** = exotic species*

^ = high threat weed

Appendix C: CPW and SSTF Condition Thresholds and categories as defined by the EPBC

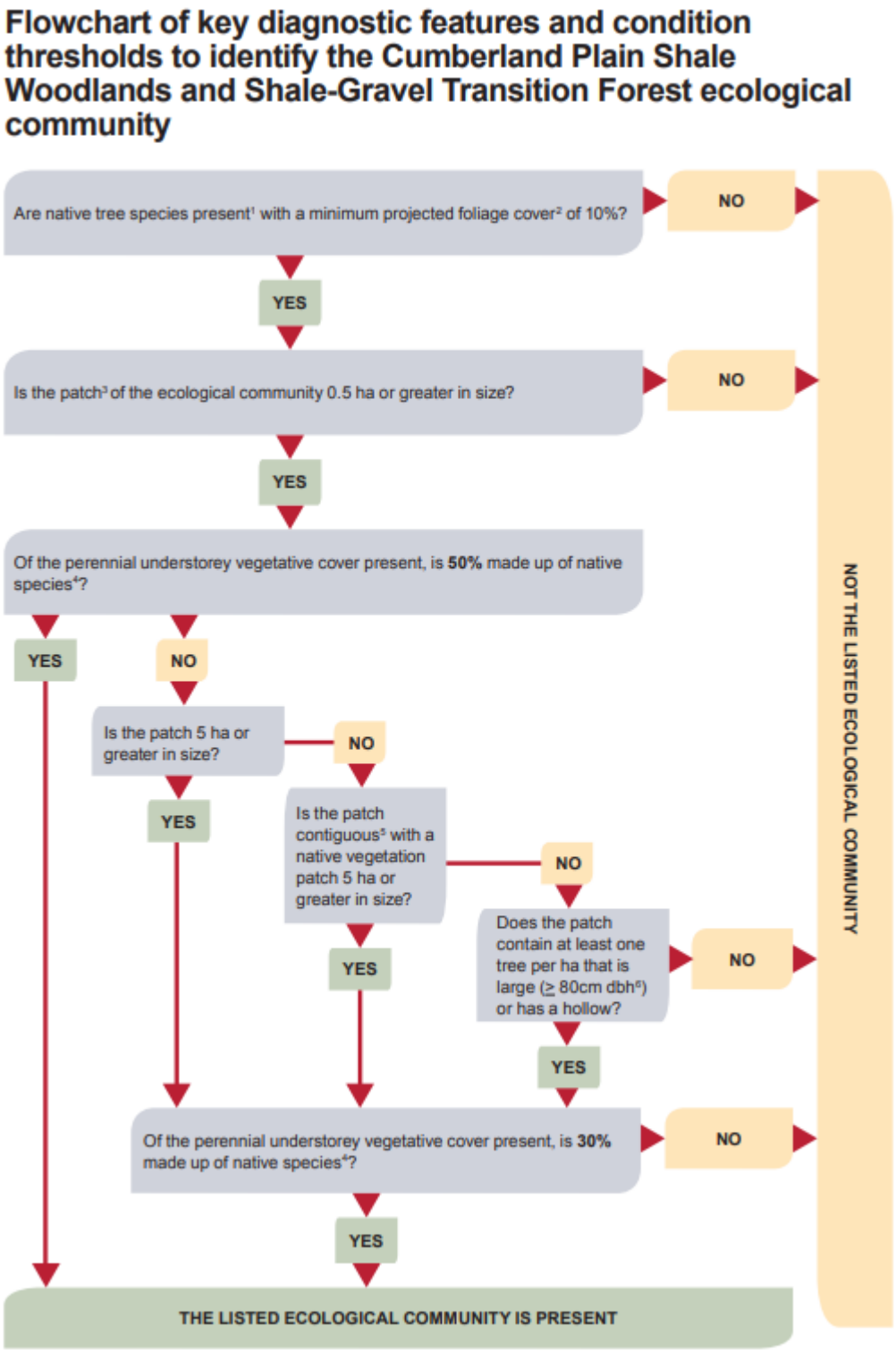

Figure 10: Condition thresholds and categories for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community listed under the EPBC Act

<table>
<tr><th>Category and Rationale</th><th colspan="3">Thresholds</th></tr>
<tr><td rowspan="2">A. Moderate condition class
Represented by medium to large-size patch as part of a larger native vegetation remnant and/or with mature trees</td><td colspan="3">Patch size ≥0.5ha
And
≥30% of the perennial understorey vegetation cover is made up of native species.
And</td></tr>
<tr><td>The patch is contiguous with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) ≥1ha in area.</td><td>Or</td><td>The patch has at least one tree with hollows or at least one large locally indigenous tree (>80cm dbh).</td></tr>
<tr><td>B. Moderate condition class
Represented by medium to large size patch with high quality native understorey</td><td colspan="3">Patch size ≥0.5ha
And
≥50% of the perennial understorey vegetation cover is made up of native species.</td></tr>
<tr><td>C. High condition class
Represented by medium to large size patch with very high quality native understorey</td><td colspan="3">Patch size ≥0.5ha
And
≥70% of the perennial understorey vegetation cover is made up of native species.</td></tr>
<tr><td>D. High condition class
Represented by larger size patch with high quality native understorey</td><td colspan="3">Patch size ≥2ha
And
≥50% of the perennial understorey vegetation cover is made up of native species.</td></tr>
<tr><td colspan="4">Perennial understorey vegetation cover includes vascular plant species of both the ground layer and mid/shrub layer (where present) with a lifecycle of more than two growing seasons. Measurements of perennial understorey vegetation cover exclude annuals, cryptogams, leaf litter or exposed soil.
Contiguous means the patch of the ecological community is continuous with, or in close proximity (within 100 m) to another area of vegetation that is dominated by native species in each vegetation layer present.</td></tr>
</table>

Figure 11: Condition thresholds and categories for Shale Sandstone Transition Forest ecological community listed under the EPBC act