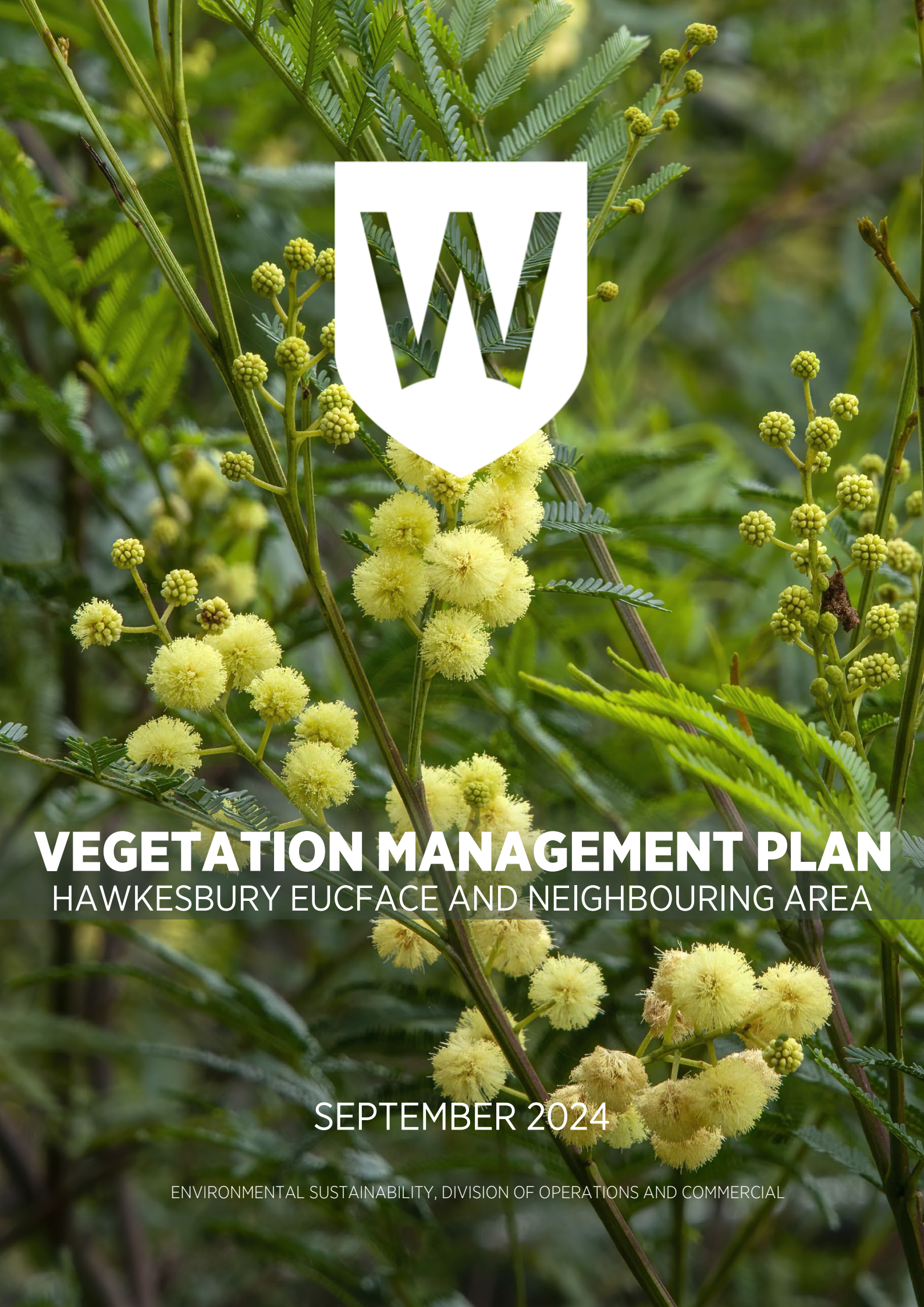

VEGETATION MANAGEMENT PLAN

HAWKESBURY EUCFACE AND NEIGHBOURING AREA

SEPTEMBER 2024

ENVIRONMENTAL SUSTAINABILITY, DIVISION OF OPERATIONS AND COMMERCIAL

CONTENTS

1. INTRODUCTION

Western Sydney University's Hawkesbury campus is located on the outer northwest of Sydney (approx. 50km from the Sydney CBD). The campus has a large remnant of Cumberland Plain vegetation, which is utilised for both teaching and research purposes (Figure 1 – Site Location).

This document deals specifically with an area of 0.33km^2 that includes the EucFACE research area (see Figure 2) and the area immediately to its south on the corner of Londonderry Rd and the Driftway.

The area was assessed in 2009 by Bangalay Botanical Surveys and in 2021 by AMBS (Figure 3 – Ecological Community Mapping). AMBS indicated that the area is consistent with Cumberland Plain Shale Plains .

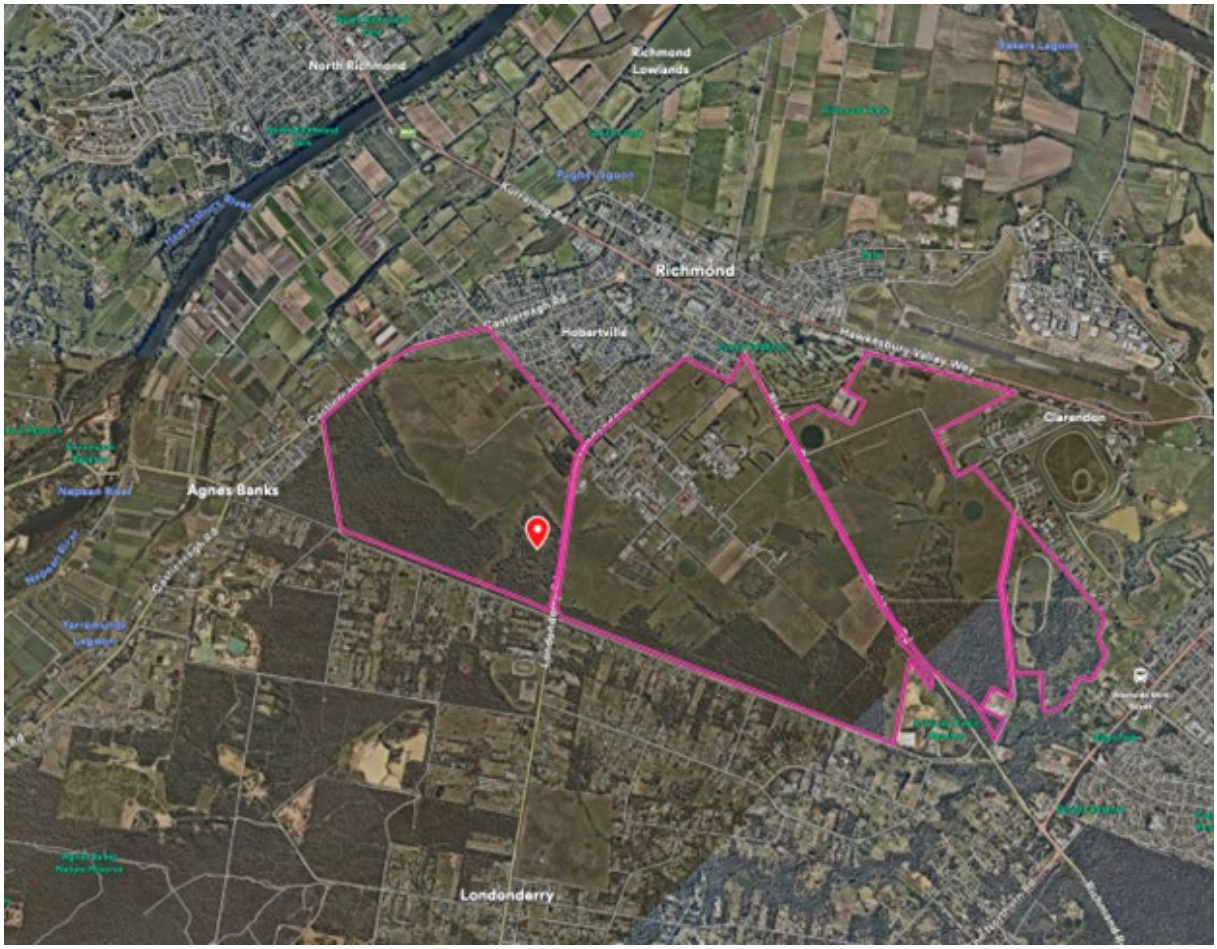

Figure 1: Hawkesbury campus – showing bushland works site

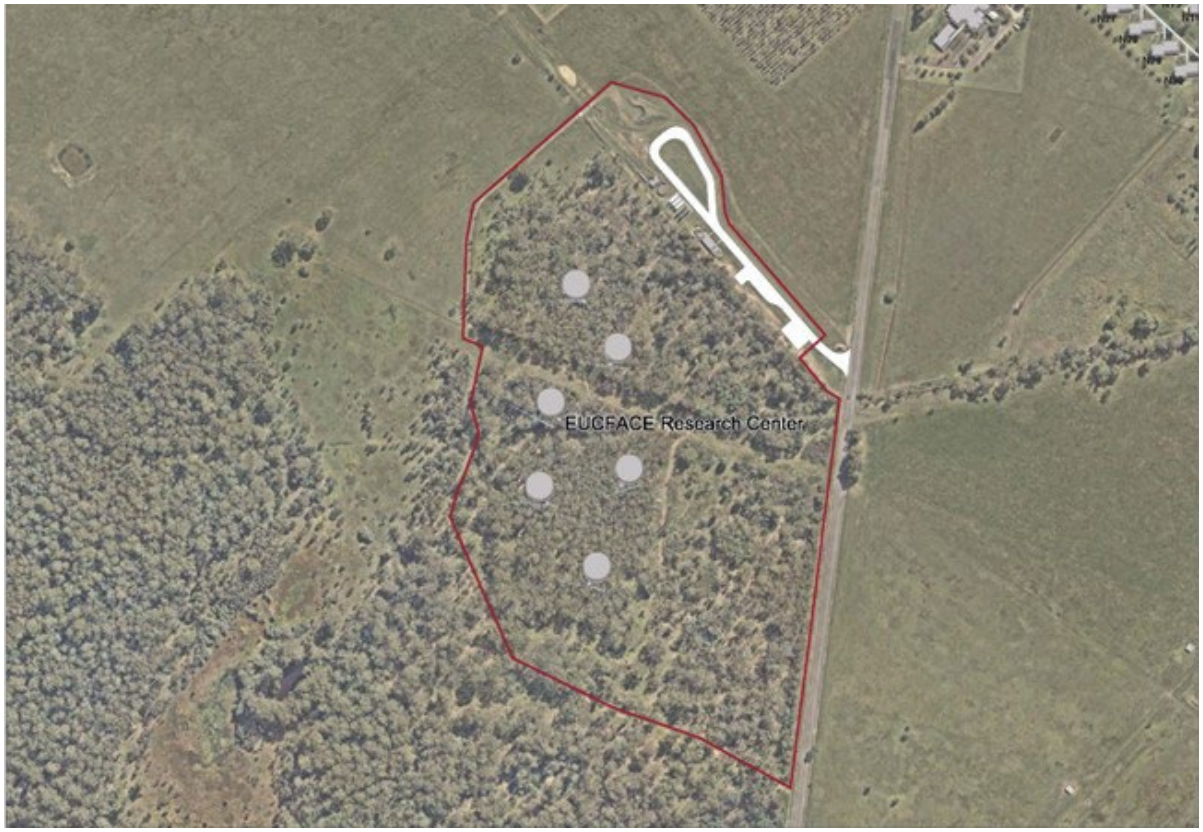

Figure 2 – EucFACE site.

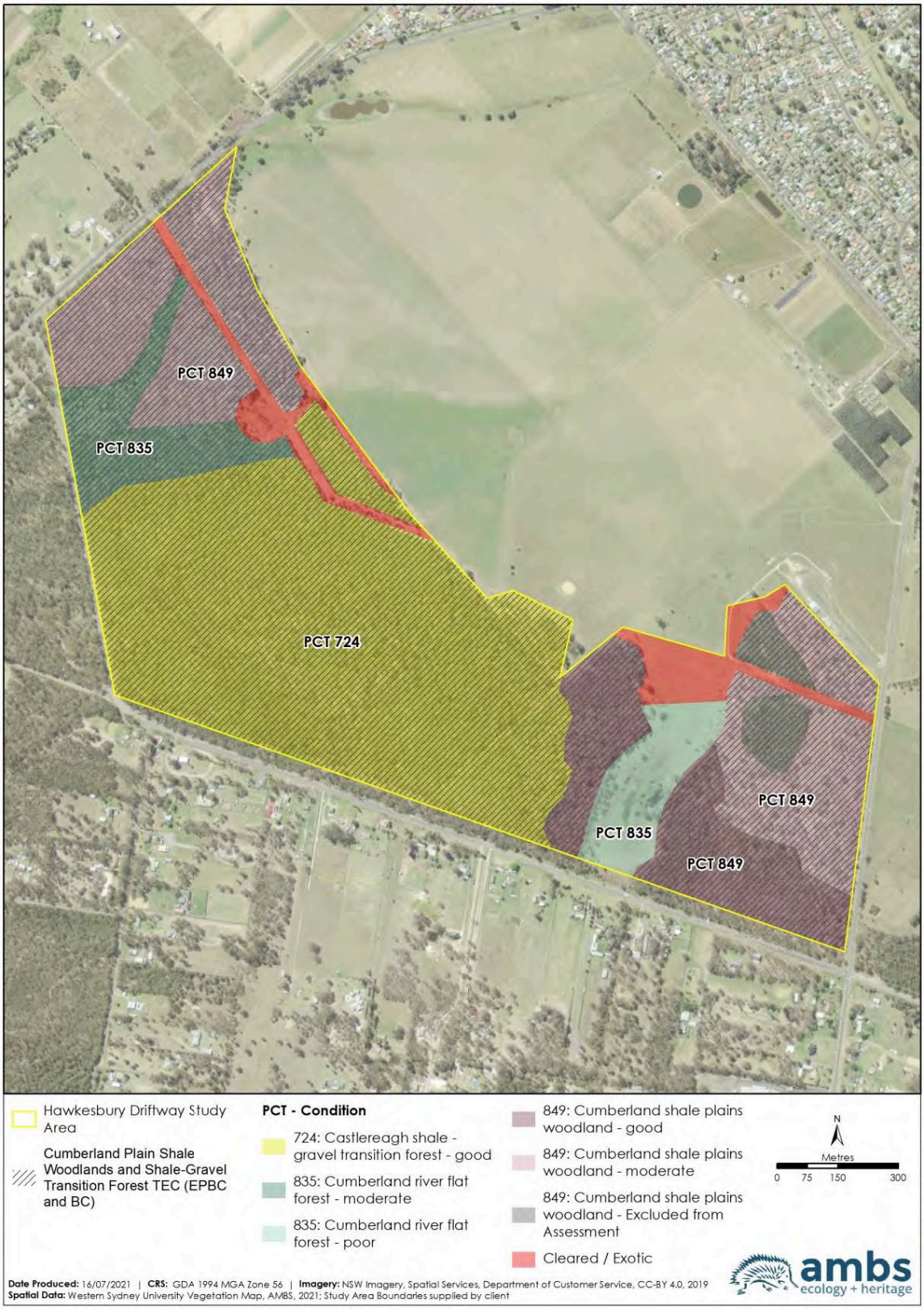

Figure 3: Ecological Community identification for section of Hawkesbury campus

2. SITE DESCRIPTION

The overall area has a canopy cover of approx. 40% and dominated by *Eucalyptus tereticornis* (Forest Redgum) with occasional occurrences of *Angophora floribunda* (Rough Barked Apple), *Eucalyptus moluccana* (Grey Box) and large *Melaleuca decora* trees. There is a range of tree sizes from large remnant trees with hollows to young regeneration.

The native shrub cover is approx. 10% and dominated by *Melaleuca nodosa* (Prickly Leaved Paperbark), *Melaleuca decora, Bursaria spinosa* (Blackthorn) and *Ozothamnus diosmifolius* (Dogwood).

The native ground layer species cover of approx. 55% and is primarily native grasses. Typical grass species include *Cymbopogon refractus* (Barbwire Grass), *Microlaena stipoides var. stipoides* (Weeping Grass), *Eragrostis leptostachya* (Paddock Lovegrass),

Echinopogon caespitosa (Hedgehog Grass) and *Eragrostis brownii* (Browns Lovegrass). Forbs include *Lobelia* (syn. *Pratia*) *purpurascens* (Whiteroot), *Hypericum gramineum* (Small St Johns Wart), *Cyanthillium cinereum var. cinereum* (syn. Vernonia cinerea), *Brunoniella australis* (Blue Trumpet), Centella asiatica (Indian Pennywort), *Hydrocotyle laxiflora* (Stinking Pennywort), *Oxalis perennans, Cyperus gracilis, Arthropodium milleflorum* (Pale Vanilla Lily), *Lomandra longifolia* (Spiny-headed Matt Rush), Dianella longifolia (Blue Flax Lily) and the fern *Cheilanthes sieberi* subsp. *sieberi* (Poison Rock Fern). The functional litter cover is approx. 70% and an estimate of 2m of fallen logs.

Exotic species occur sporadically and generally in low numbers. Species present include *Hypochaeris radicata* (Catsear), *Conyza bonariensis* (Flaxleaf Fleabane), *Sida rhombifolia* **(**Paddy's Lucerne), *Seteria parviflora*, *Bidens pilosa* (Cobblers Peg) and *Senecio madagascariensis* (Fireweed). However, the area is also persistently infested with *Lantana camara* (Lantana), *Olea europaea subsp. cuspidata* (African Olive) and *Rubus fruticosus agg. spp.* (Blackberry).

3. THREATENED FLORA AND FAUNA

The Bionet Atlas of NSW Wildlife lists 16 flora and 38 fauna species as vulnerable/endangered within a 10km radius of the site, as shown in Appendix 1.

A formal fauna survey has not been conducted. however, the area is known to be inhabited by the Cumberland Plain Land Snail (*Meridolum corneovirens*), Eastern Grey Kangaroos (*Macropus giganteus*) and various reptiles.

It is likely that some of the larger trees may be used by bird or bat species while transiting from adjacent areas, and this appears to be evident in the NSW SEED mapping (Figure 4). Reported sightings include, the Little Eagle (*Hieraaetus morphoides*), Eastern Rosella (*Platycerus eximiusi)* and the Southern Myotis bat (*Myotis Macropus*).

No threatened plant species have been observed on site. This has been confirmed not only by the previous assessments, but also by Toolijooa Environmental Restorations, who regularly visit the area.

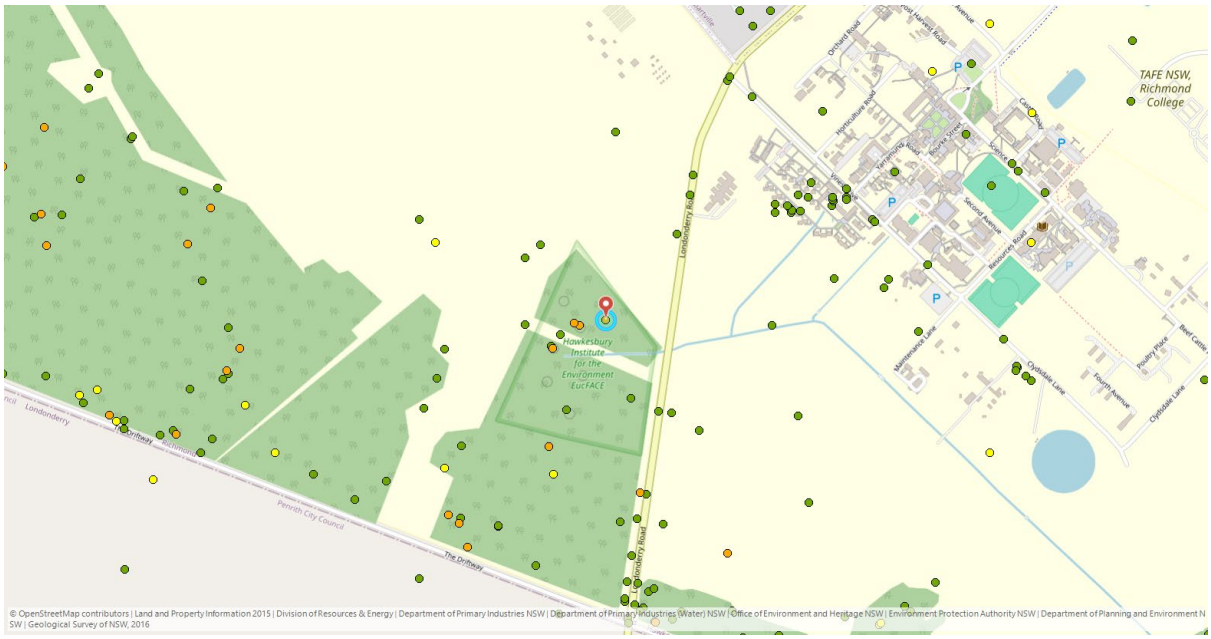

Figure 4: NSW SEED mapping of species sightings indicate that there have been previous reports of vulnerable/threatened/endangered species within the site. Only the Cumberland Plain Land Snail are permanent inhabitants of the area.

4. WEED MANAGEMENT

Weed management will aim to free up available resources such as light, soil moisture and nutrients required by native plants to commence regeneration of the area. In areas adjacent to bushland good weed management will help prevent the spread of these weeds.

Weed control should be targeted; with resources allocated to where the greatest benefit can be achieved. It should be undertaken in a methodical way, recognising that some weeds are utilised by small native mammals, reptiles and birds as protective habitat, e.g. blackberry and lantana. Weed species is not impinging upon the ecological structure and function of the site should be controlled to allow for natural regeneration.

Weed control should focus upon:

- Control of weeds of national significance and habitat changing environmental weeds such as Blackberry and Lantana
- Control of weed species that impeded the recruitment and establishment of native species
- Reducing the quantity of weed seed in the soils seed bank and restricting further recruitment.

To ensure effective weed management can be undertaken within the site primary weed control has been employed across the site and treatment of those weeds that met the above criteria has been undertaken.

Follow up weed control is ongoing, particularly in areas where Blackberry and Lantana has been persistent. Repeated treatment of any surviving or regenerating weeds, is ongoing.

Weed management is undertaken utilising the methods in Table 1.

Table 1: Weed Management Techniques

VEGETATION TYPES	APPROVED METHOD OF WEED CONTROL	
Tree and shrub weeds	Large Plants • Cut stem and paint with systemic herbicide • Scrape stem and paint with systemic herbicide • Frill/chip and paint stem with systemic herbicide • Stem injection with systemic herbicide	Small Plants • Hand pull • Burn or steam weed • Spray foliage with systemic herbicide
Vine weeds	Large Plants • Cut stem and paint with systemic herbicide • Scrape stem and paint with systemic herbicide • Spray foliage with systemic herbicide • Crown, dig or lever	Small Plants • Hand pull • Burn or steam weed • Spray foliage with systemic herbicide • Crown, dig or lever
Grass, grass like & forb weeds	Large Plants • Cut stem and paint with systemic herbicide • Scrape stem and paint with systemic herbicide • Rope or wick wiper application of systemic herbicide • Slash/mow and apply systemic herbicide to regrowth • Burn and apply systemic herbicide to regrowth • Steam weed and apply systemic herbicide to regrowth • Spray foliage with systemic herbicide • Crown, dig or lever	Small Plants • Hand pull • Rake/roll and spray with systemic herbicide • Crown, dig or lever • Burn or steam weed • Spray foliage with systemic herbicide
Other weeds	Large Plants • Cut stem and paint with systemic herbicide • Scrape stem and paint with systemic herbicide • Frill/chip and paint stem with systemic herbicide • Spray foliage with systemic herbicide • Crown, dig or lever	Small Plants • Hand pull • Crown, dig or lever • Burn or steam weed • Spray foliage with systemic herbicide

5. ASSISTED REGENERATION

The preference in all areas is for endemic species to be allowed to regenerate naturally. However, it may be necessary to undertake replanting in those areas where regeneration efforts have been unsuccessful.

If replanting is required, the following will be observed:

- Plants used must be obtained from locally collected provenances, unless there are reasons to do otherwise (e.g., to ensure genetic variability or for adaptation to climate change).
- Planting must be undertaken during the months of March, April and/or May.
- Planting sizes should be tubestock or hiko cells unless otherwise stated.
- Plants must be installed by hand or auger with native fertiliser applied to the hole.
- Plantings should be watered at least twice, once immediately after planting. Planting can be scheduled immediately before rain events to satisfy this condition.
- It is expected that an 80% survival rate of new plants is maintained.

6. SEED COLLECTION

If required, collection techniques, seed preparation, and growing should be as per Florabank Best Practice Guidelines (https://www.florabank.org.au/guidelines/).

7. MONITORING AND EVALUATION

Monitoring is critical and regular monitoring can quickly highlight and avert negative impacts on the site, as well as the success of natural regeneration.

7.1. Photo Monitoring

Ongoing photographic evidence will be maintained, highlighting before and after shots of treated areas. These photos will be submitted along with a completed works undertaken report and before payment is made to the contractor.

7.2. Vegetation Monitoring

The area is reviewed annually, in conjunction with a university representative, to assess weed reduction, regeneration of endemic species and to plan future works.

APPENDIX 1

Table 2: Fauna – Bionet Atlas results showing vulnerable/endangered species observed within 10km of the site.

SCIENTIFIC NAME	COMMON NAME	STATUS – NSW	STATUS - COMMONWEALTH
Litoria aurea	Green and Golden Bell Frog	Endangered	Vulnerable
Stictonetta naevosa	Freckled Duck	Vulnerable	
Hirundapus caudacutus	White-throated Needletail	Vulnerable	Vulnerable
Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	
Botaurus poiciloptilus	Australasian Bittern	Endangered	Endangered
Ixobrychus flavicollis	Black Bittern	Vulnerable	
Circus assimilis	Spotted Harrier	Vulnerable	
Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	
Hieraaetus morphnoides	Little Eagle	Vulnerable	
Lophoictinia isura	Square-tailed Kite	Vulnerable	
Falco subniger	Black Falcon	Vulnerable	
Calidris ferruginea	Curlew Sandpiper	Endangered	Critically Endangered
Limosa limosa	Black-tailed Godwit	Vulnerable	Endangered
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	Vulnerable	Vulnerable
Glossopsitta pusilla	Little Lorikeet	Vulnerable	
Lathamus discolor	Swift Parrot	Endangered	Critically Endangered
Ninox connivens	Barking Owl	Vulnerable	
Ninox strenua	Powerful Owl	Vulnerable	
Tyto novaehollandiae	Masked Owl	Vulnerable	
Chthonicola sagittata	Speckled Warbler	Vulnerable	
Anthochaera phrygia	Regent Honeyeater	Endangered	Critically Endangered
Epthianura albifrons	White-fronted Chat	Vulnerable	
Daphoenositta chrysoptera	Varied Sittella	Vulnerable	
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	
Petroica boodang	Scarlet Robin	Vulnerable	
Petroica phoenicea	Flame Robin	Vulnerable	
Neochmia ruficauda	Star Finch	Vulnerable	Endangered
Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Endangered
Phascolarctos cinereus	Koala	Endangered	Endangered
Petaurus australis	Yellow-bellied Glider	Vulnerable	Vulnerable
Petaurus norfolcensis	Squirrel Glider	Vulnerable	
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Vulnerable

Table 3: Flora – Bionet Atlas results showing vulnerable/endangered species observed within 10km of the site.

SCIENTIFIC NAME	COMMON NAME	STATUS – NSW	STATUS - COMMONWEALTH
Allocasuarina glareicola		Endangered	Endangered
Hibbertia fumana		Endangered	
Hibbertia sp. Bankstown		Endangered	Critically Endangered
Dillwynia tenuifolia		Vulnerable	
Pultenaea parviflora		Endangered	Vulnerable
Acacia bynoeana	Bynoe's Wattle	Endangered	Vulnerable
Acacia flocktoniae	Flockton Wattle	Vulnerable	Vulnerable
Acacia pubescens	Downy Wattle	Vulnerable	Vulnerable
Micromyrtus minutiflora		Endangered	Vulnerable
Syzygium paniculatum	Magenta Lilly Pilly	Endangered	Vulnerable