Flora and Fauna Assessment Report

Muswellbrook Hospital Redevelopment

Report prepared by Narla Environmental

for Health Infrastructure

October 2022

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Report Certification

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Glossary

Acronym/ Term	Definition
asl	Above sea level
BAM	Biodiversity Assessment Methodology
BC Act	New South Wales Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
DAFF	Department of Agriculture, Fisheries and Forestry
DAWE	Department of Agriculture, Water and the Environment
DEC	Department of Environment and Conservation
DEE	Department of the Environment and Energy
DPE	Department of Planning and Environment (formally DPIE and OEH)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (now known as the DPE)
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning & Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FFA	Flora and Fauna Assessment
ha	Hectares
km	Kilometres
LGA	Local Government Area
m	metres
MDCP	Muswellbrook Development Control Plan 2009
MLEP	Muswellbrook Local Environmental Plan 2009
mm	millimetres
NSW	New South Wales
OEH	Office of Environment and Heritage (now known as the DPE)
SEPP	State Environmental Planning Policy
SRZ	Structural Root Zone
Subject Site	All areas associated with the proposed activity
Subject Property	Lots 300/-/DP865487, 27/-/DP752484 and 29/-/DP752484
TEC	Threatened Ecological Community
Threatened species, populations and ecological communities	Species, populations and ecological communities specified in Schedules 1 and 2 of the BC Act 2016
TPZ	Tree Protection Zone

1. Introduction

1.1 Project Background

Narla Environmental Pty Ltd (Narla) was engaged by Health Infrastructure ('the proponent') to undertake a Flora and Fauna Assessment (FFA) for the proposed Muswellbrook Hospital Redevelopment at Lots 300/-/DP865487, 27/-/DP752484 and 29/-/DP752484, hereafter referred to as the 'Subject Property' (**Figure 1**). The proposed activity involves the following elements (dwp Australia 2022; **Appendix A**):

- A new IPU Maternity Ward;
- Renovated Community Health Centre;
- Hardstand and internal roads upgrades; and
- Landscaping.

All areas associated with the proposed activity will hereafter be collectively referred to as the 'Subject Site' (**Figure 1**).

Narla have produced this report in order to assess any potential impacts associated with the proposed activity on terrestrial ecology (biodiversity), particularly threatened species, populations and ecological communities listed under the Biodiversity Conservation Act 2016 (BC Act). The report will also recommend appropriate measures to mitigate any potential impacts in line with all relevant State Environmental Planning Policies (SEPPs) and local government plans, namely the Muswellbrook Local Environmental Plan 2009 (MLEP) and Muswellbrook Development Control Plan 2009 (MDCP).

1.2 Site Description and Location

1.2.1 Subject Site

The Subject Site is located within the locality of Muswellbrook in the Muswellbrook Shire Council Local Government Area (LGA). The Subject Site occurs within the existing Muswellbrook Hospital grounds, surrounded by a mix of health infrastructure, residential properties and a cemetery, covering an area of approximately 0.5ha. Currently, the Subject Site comprises of, grassed open space, existing buildings, hardstand and a car park (**Figure 1**).

Figure 1. Components of the Subject Property and Subject Site.

1.3 Topography, Geology and Soil

The Subject Site occurs on a gentle slope with an elevation ranging from approximately 187m above sea level (asl) to 192m asl. The Subject Site is situated on the 'Roxburgh' soil landscape, as described in Soil Landscapes of the Singleton 1:250,000 Sheet (Kovac and Lawrie 1991), which is characterised by undulating low hills and undulating hills on Singleton Coal Measures which is derived from Permian sediments including sandstone, shale, mudstone, conglomerate and coal.

1.4 Hydrology

The Subject Site contains one (1) mapped 1st order watercourse and associated riparian buffer. The location has been verified by the site survey (adw Johnson 2022)

1.5 Scope of Assessment

The objectives of this FFA were to:

- Establish the likelihood of occurrence of migratory species, threatened species, endangered populations and threatened ecological communities as listed under the BC Act and/or the EPBC Act;
- Assess any potential impacts to species and/or communities listed under the BC Act and EPBC Act;
- Identify and map the distribution of vegetation communities within the Subject Site;
- Record presence and the extent of any known or potential fauna habitat features such as nests, dreys, caves, crevices, culverts, pools, soaks, flowering trees, fruiting trees or hollow-bearing trees and provide recommendations for on-going management of these habitat features and any fauna present;
- Record presence and the extent of any Priority Weeds or weed infestations and provide recommendations for on-going management; and
- Recommend any controls or additional actions to be taken to protect or improve environmental outcomes of the proposed activity.

1.6 Study Limitations

This study was not intended to provide a complete inventory of all flora and fauna species with potential to occur within the Subject Site. The species list provided for the Subject Site within this report was restricted to what was observed during the site assessment by the Narla Ecologist.

The timing of the survey may not have coincided with emergence times of some species of flora and fauna, such as seasonally flowering herbs, seasonal migratory fauna or nocturnal fauna. To account for those species that could not be identified during the site assessment, detailed habitat assessments were combined with desktop research and local ecological knowledge to establish an accurate prediction of the potential for such species to occur on or adjacent the Subject Site.

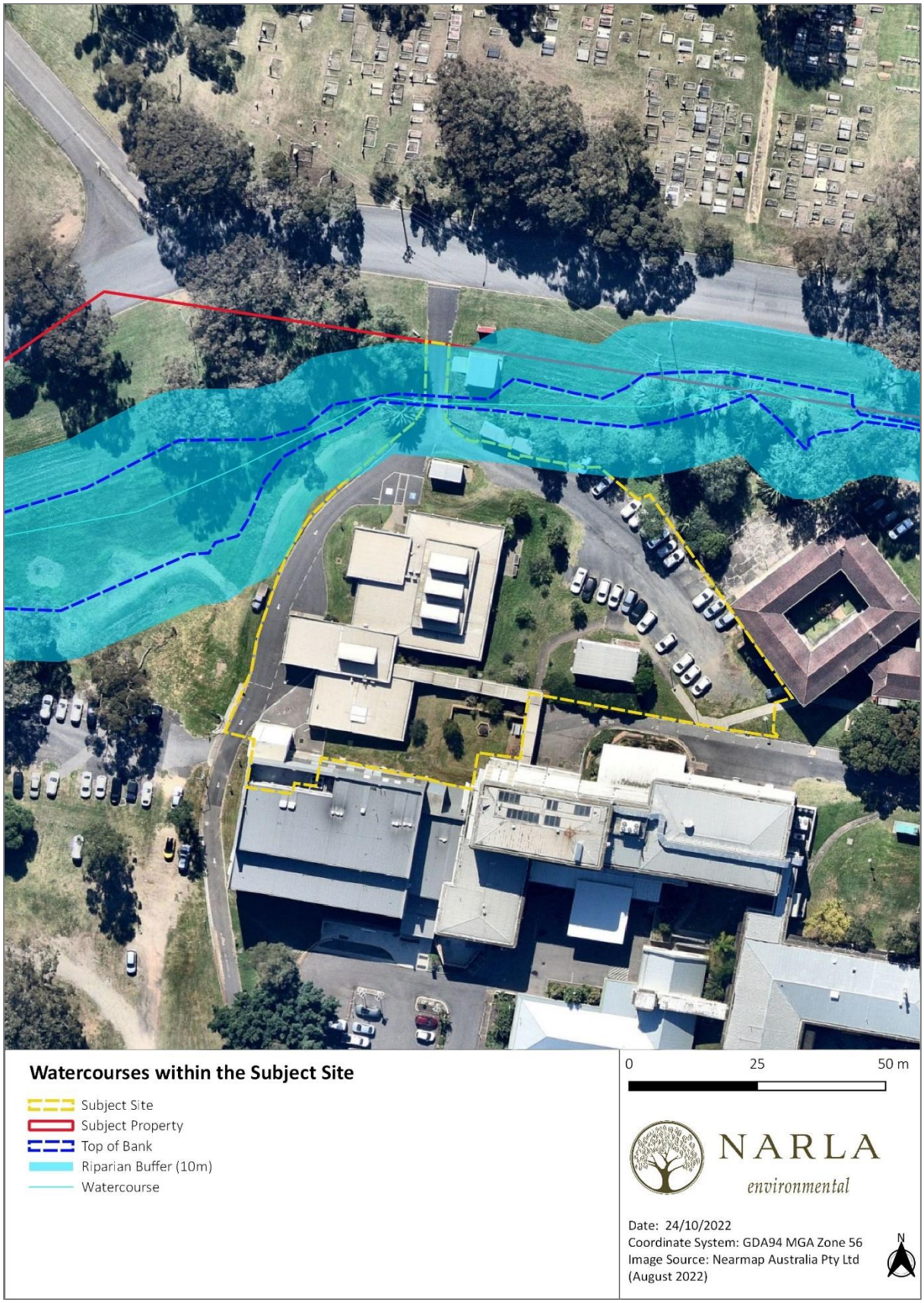

Figure 2. Watercourses and associated riparian within the Subject Site.

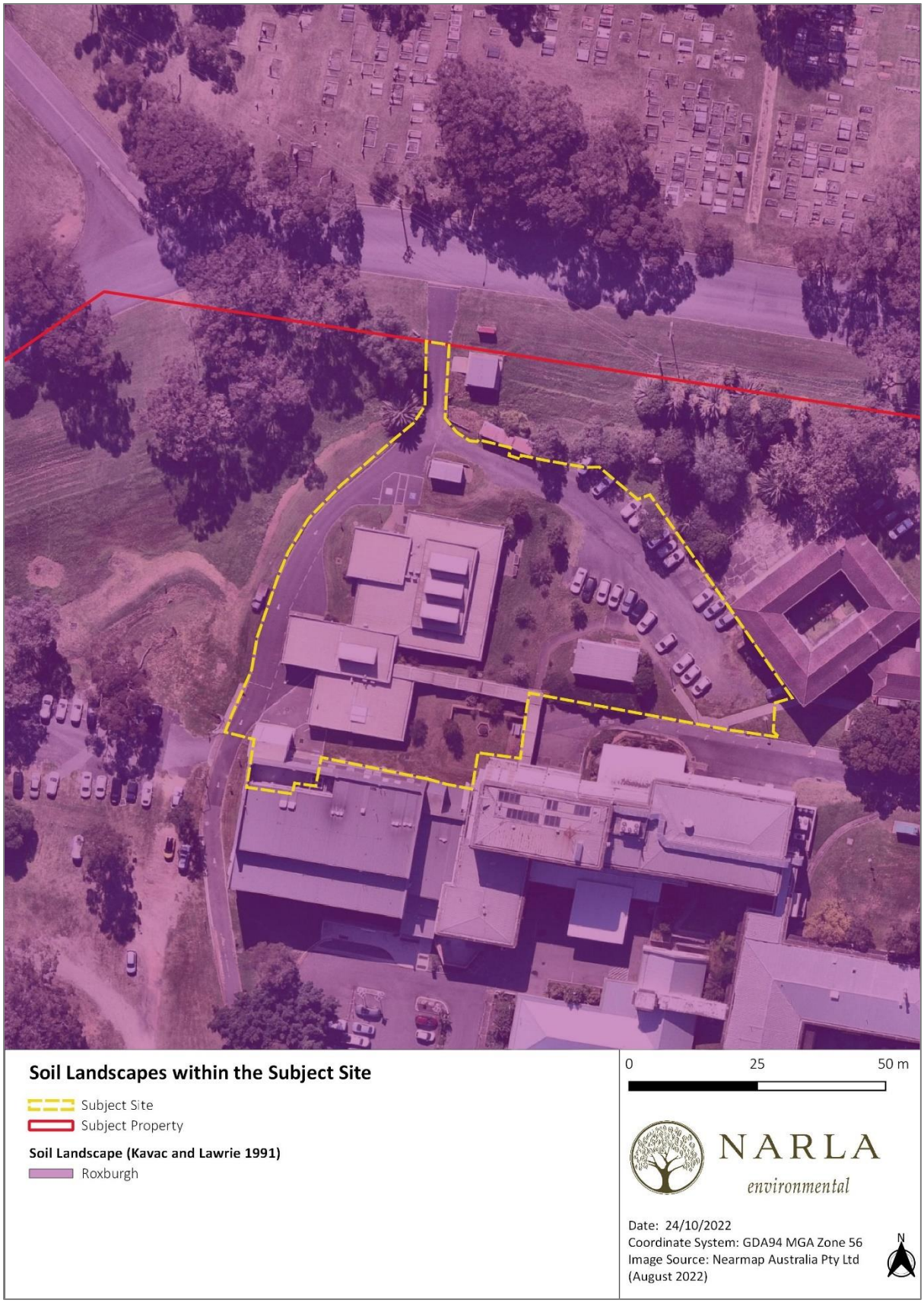

Figure 3. Soil landscapes mapped within the Subject Site.

1.7 Relevant Legislation and Policy

The legislation and policy that are addressed in this report are listed in **Table 1.**

Table 1. Relevant legislation and policy addressed

Legislation/Policy		Relevant Ecological Feature on Site	Triggered	Action Required
Environmental Planning and Assessment Act 1979 (EP&A Act)		All threatened species, populations and ecological communities and their habitat that occur or are likely to occur within the Subject Site during a part of their lifecycle.	Yes	This FFA and all subsequent recommendations relevant to the planning process under Part 5 'Infrastructure and environmental impact assessment'.
Biodiversity Conservation Act (BC Act) (New South Wales)		BC Act threatened species have the potential to occur within the Subject Site. No BC Act listed species were identified within the Subject Site during the site assessment. The BC Act listed Endangered Ecological Community (EEC) Central Hunter Grey Box—Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions was present within the Subject Site.	Yes	This FFA, particularly the likelihood tables for threatened fauna and flora species occurring or potentially occurring within the Subject Site, as well as severity of potential impacts. A Test of Significance (5-part Test) was undertaken in accordance with the BC Act to assess potential impacts from the proposed activity on BC Act listed threatened ecological communities.
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth)		EPBC Act threatened species have the potential to occur within the Subject Site. No EPBC Act listed species or communities were observed within the Subject Site during the site assessment.	Yes	This FFA, particularly the likelihood tables for threatened fauna and flora species occurring or potentially occurring within the Subject Site, as well as severity of potential impacts.
Biosecurity Act 2015 (Bio Act)		Two (2) priority weed for the Hunter area was observed within the Subject Site: ▪ *Olea europaea subsp. cuspidata* (Alligator Weed); ▪ *Asparagus aethiopicus* (Ground Asparagus).	Yes	Listed priority weeds must be managed in accordance with the Biosecurity Act 2015.
State Environmental Planning Policy (Resilience and Hazards) 2021	**Chapter 2- Coastal Management**	The Subject Site does not contain areas mapped as 'Coastal Wetlands', 'Littoral Rainforest' or any other areas on the Coastal Management mapping. As such Chapter 2 – Coastal Management of this	No	None.

Legislation/Policy		Relevant Ecological Feature on Site	Triggered	Action Required
		SEPP does not apply to the Subject Site.		
State Environmental Planning Policy (Biodiversity and Conservation SEPP) 2021	Chapter 4 – Koala habitat protection 2021	Part 5 developments are not subject to this chapter.	No	None.
	Chapter 6— Bushland in Urban Areas	The Subject Site does not occur within a LGA listed in schedule 5.	No	None

1.8 Biodiversity Assessment Pathway

Activities requiring an environmental assessment under Part 5 of the EP&A Act 1979 are to consider biodiversity as part of the environmental assessment process. The test of significance (under s.7.3 of the BC Act) determines whether the proposed activity is likely to significantly affect threatened species, ecological communities or their habitats. If the activity is likely to have a significant impact, or will be carried out in a declared Area of Outstanding Biodiversity Value (AOBV), the proponent can opt in to the Biodiversity Offsets Scheme (BOS) or instead prepare a species impact statement (SIS).

The environmental impact of activities that will not have a significant impact on threatened species will continue to be assessed under Section 5.5 of the Environmental Planning and Assessment Act 1979. The proposed activity is considered unlikely to result in a significant impact to threatened species, ecological communities or their habitats.

1.9 Muswellbrook Local Environmental Plan 2009 (MLEP)

1.9.1 Zoning

The Subject Site is zoned 'SP2: Infrastructure'. The MLEP requires that the proposed activity satisfies the zone objectives which are:

- To provide for infrastructure and related uses.
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.
- To recognise existing railway land and to enable future development for railway and associated purposes.
- To prohibit advertising hoardings on railway land.
- To recognise major roads and to enable future development and expansion of major road networks and associated purposes.
- To recognise existing land and to enable future development for utility undertakings and associated purposes.

The aims of the proposed activity are to improve the facilities of the hospital, improving the local health infrastructure for the Muswellbrook community.

2. Methodology

2.1 Desktop Assessment and Literature Review

A thorough literature review of local information relevant to the Muswellbrook LGA was undertaken. Searches using NSW Wildlife Atlas (BioNet; DPE 2022b) and the Commonwealth Protected Matters Search Tool (DAFF 2022) were conducted to identify all current threatened flora and fauna, as well as migratory fauna records within a 10km x 10km cell search area centred on the Subject Site. These data were used to assist in establishing the presence or likelihood of any ecological values as occurring on or adjacent the Subject Site and helped inform our Ecologist on what to look for during the site assessment.

Soil landscape and geological mapping was examined to gain an understanding of the environment on the Subject Site and assist in determining whether any threatened flora or ecological communities may occur there (Kovac and Lawrie 1991).

2.2 Ecological Site Assessment

2.2.1 General Survey

A site assessment was undertaken by experienced Narla Ecologist, Jonathan Coy and Jayden Maloney, on Tuesday the 20th of September 2022. During the site assessment, the following activities were undertaken:

- Identifying and recording the vegetation communities present within the Subject Site, with focus on identifying any threatened ecological communities;
- Recording a detailed list of flora species encountered within the Subject Site, with a focus on threatened species, species diagnostic of threatened ecological communities and Priority Weeds;
- Recording opportunistic sightings of any fauna species seen or heard on or within the immediate surrounds of the Subject Site;
- Targeted surveys for threatened flora;
- Identifying and recording the locations of notable fauna habitat such as important nesting, roosting or foraging microhabitats;
- Assessing the connectivity and quality of the vegetation within the Subject Site and surrounding area; and
- Targeting the habitat of any threatened and regionally significant fauna including:
    - Tree hollows (habitat for threatened large forest owls, parrots and arboreal mammals);
    - Caves and crevices (habitat for threatened reptiles, small mammals and microbats);
    - Termite mounds (habitat for threatened reptiles);
    - Soaks (habitat for threatened frogs);
    - Wetlands (habitat for threatened fish, frogs and water birds);
    - Drainage lines (habitat for threatened fish and frogs);
    - Fruiting trees (food for threatened frugivorous birds and mammals);
    - Flowering trees (food for threatened nectarivorous birds and mammals);
    - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals); and
    - Any other habitat features that may support fauna (particularly threatened) species.

2.2.2 Weather Conditions

Weather conditions recorded at the nearest weather station (Scone, NSW) prior to and during the site assessment are provided in **Table 2** (BOM 2022). The data revealed moderate-high rainfall and mild temperatures leading up to the survey. These weather conditions were conducive to the emergence of annual herbs.

Table 2. Weather conditions recorded at Scone, NSW (station 061363) preceding and during the site assessment (site assessment date in bold).

Survey date	Day	Minimum Temp. (°C)	Maximum Temp. (°C)	Rainfall (mm)
13/09/2022	Tuesday	4.4	18.7	0
14/09/2022	Wednesday	2.3	19.3	0
15/09/2022	Thursday	9	17.2	2.2
16/09/2022	Friday	11.1	22.3	28
17/09/2022	Saturday	12	21.5	0
18/09/2022	Sunday	12.1	21.5	0
19/09/2022	Monday	8.6	21.3	0
20/09/2022	**Tuesday**	**2.4**	**21.5**	**0**

2.2.3 Mapping and Analysis of Vegetation Communities

Narla examined local satellite imagery, geological mapping, soil landscape mapping and topographic mapping, in addition to existing vegetation mapping (Sivertsen et al 2013) in order to stratify the Subject Site and guide the site assessment survey efforts. The following resources were consulted during the site assessment to assist with the identification of vegetation communities present within the Subject Site:

- eSPADE v2.2 (DPE 2022e);
- Soil Landscapes of the Singleton 1:250,000 Sheet (Kovac and Lawrie 1991); and
- Hunter Native Vegetation Mapping. Geodatabase Guide (Version 4.0) (Sivertsen 2011);

3. Native Vegetation

3.1 Vegetation Community

3.1.1 Historically Mapped Vegetation Communities

One (1) vegetation community has been historically mapped within the Subject Site (Sivertsen et al 2011; **Figure 4**):

- Non-native Vegetation.

The nearest native vegetation community mapped in the locality is MU173: Narrow-leaved Ironbark/ Grey Box grassy woodland of the central and upper Hunter.

3.1.2 Field-validated Vegetation Communities

The field survey conducted by the Narla Ecologist identified the vegetation within the Subject Site best conforms to the following vegetation communities (**Figure 5**):

- Planted Exotic/Native Vegetation.

The vegetation communities identified within the Subject Site are detailed in **Table 3** and displayed in **Figure 5**.

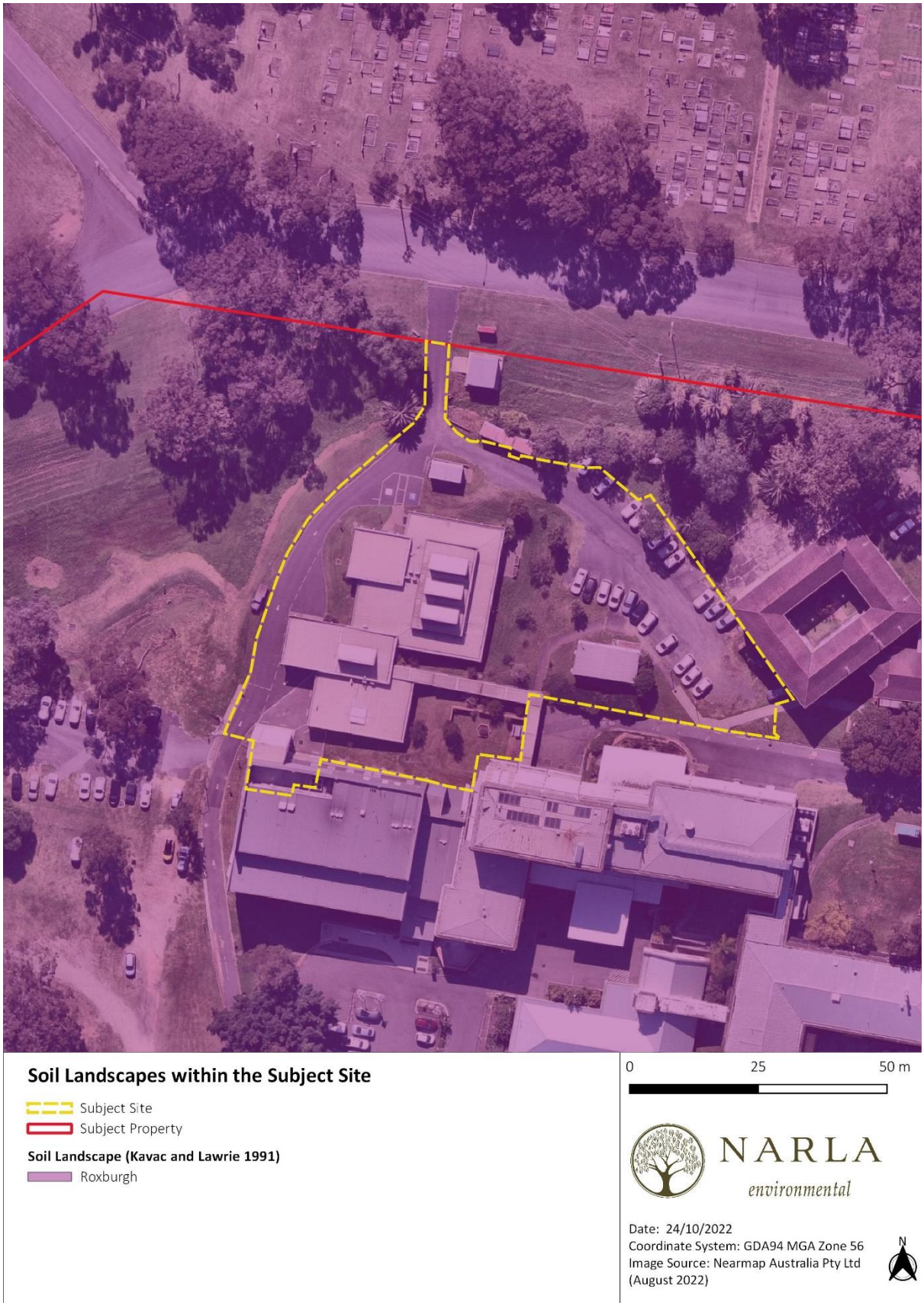

Figure 4. Historically mapped vegetation communities within the Subject Site.

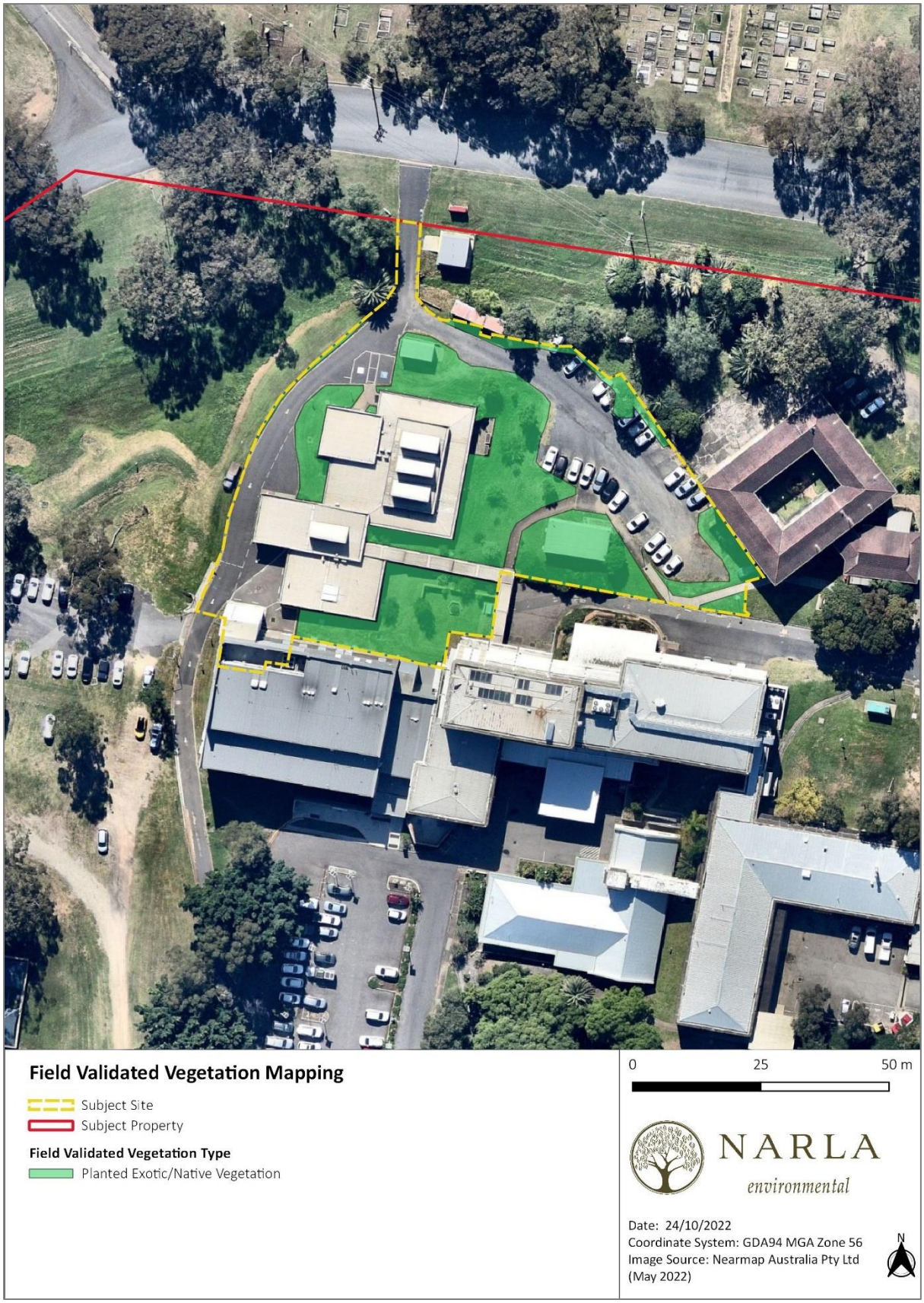

Figure 5. Narla field-validated vegetation communities within the Subject Site.

Table 3. Description of Planted Exotic/Native Vegetation identified within the Subject Site.

Planted Exotic/Native Vegetation	
	
Extent within Subject Site (approximate)	0.16ha
Description of the Vegetation within the Subject Site	
This vegetation was characterised by planted native and exotic species typical of an urban environment. The canopy comprised of a mixture of exotic and planted native species including *Grevillea robusta, Phoenix canariensis, Populus spp., Araucaria bidwillii* and *Lophostemon confertus*. Shrubs within this community were a mix of exotic and planted native species including *Senna artemisioides, Callistemon viminalis, Schefflera arboricola, Grevillea spp. (cultivar), Agonis flexulosa, Pelargonium hortorum, Atriplex halimus* and the priority weed *Olea europaea* subsp. *cuspidata*. The ground layer was a mix of common parkland native and exotic species. Native groundcover species included *Cynodon dactylon* and *Dichondra repens*. Exotic species included *Poa annua, Lotus uliginosus, Hypochaeris radicata, Arctotheca calendula* and *Bidens pilosa*.	
Justification of Vegetation Assignment	The vegetation within this area consisted of planted native and exotic vegetation. As the vegetation could not be assigned to a locally occurring native community it has been classified as Planted Exotic/Native Vegetation
TEC Status	N/A
References	N/A

4. Threatened Entities

4.1 Threatened Ecological Communities

No Threatened Ecological Communities (TECs) are anticipated to be impacted by the proposal activity.

4.2 Threatened Flora

Desktop analysis revealed a range of threatened flora as occurring or having the potential to occur on or within a 10km x 10km cell centred on the Subject Site. Thorough targeted surveys were undertaken throughout the Subject Site for potentially occurring threatened flora (**Figure 6**). No threatened flora were identified at the time of the site assessment.

Owing to the degraded nature of the Subject Site it was deemed unlikely that the proposed activity will have a significant impact on these species. Therefore, no further assessment of impacts pursuant to the BC Act (e.g. Biodiversity Development Assessment Report (BDAR)) and/or EPBC Act Referral to Commonwealth will be required. A comprehensive list of flora species identified within the Subject Site during the site assessment is presented in **Appendix B.**

The following locally occurring species were assessed for their potential to occur within the Subject Site (**Table 4**).

Table 4. Assessment of likely occurrence of threatened flora species within the Subject Site

Species	BC Act	EPBC Act	Likelihood of occurrence within the Subject Site	Further Impact Assessment Required?
Acacia pendula (Weeping Myall)	Endangered Population in the Hunter Catchment	-	Absent. Within the Hunter catchment the species typically occurs on heavy soils, sometimes on the margins of small floodplains, but also in more undulating locations. Due to the degraded nature of the Subject Site it is unlikely to be present and the species was not observed within the Subject Site during the DPE approved survey period (DPE 2022d) in September 2022.	No
Cymbidium canaliculatum (Tiger Orchid)	Endangered Population in the Hunter Valley	-	Absent. Typically grows in the hollows, fissures, trunks and forks of trees in dry sclerophyll forest or woodland, where its host trees typically occur on Permian Sediments of the Hunter Valley floor. Within the Hunter Catchment, this species is most commonly found in *Eucalyptus albens* (White Box) dominated woodlands (including those dominated by the intergrade *E. albens-moluccana*), much of which may constitute the endangered ecological community (EEC) 'White Box Yellow Box Blakely's Red Gum Woodland'. It has been found, less commonly, to grow on E. *dawsonii* (Slaty Box), *E. crebra* (Narrow-leaved Ironbark), *E. moluccana* (Grey Box), *Angophora floribunda* (Rough-barked Apple), *Acacia salicina*	No

Species	BC Act	EPBC Act	Likelihood of occurrence within the Subject Site	Further Impact Assessment Required?
			(Cooba) and on some other species, including dead stags. It is also known to use man-made structures, such as fence posts and wooden bridges as its host. While potential host species are present, due to the degraded nature of the Subject Site it is unlikely to utilise the site. The species was not observed within the Subject Site during the DPE approved survey period (DPE 2022d) in September 2022.	
Diuris tricolor (Pine Donkey Orchid)	V Endangered Population in the Muswellbrook LGA	-	Absent. Found in sclerophyll woodland and derived grassland on flats or small rises, on a range of substrates including sandy or loamy soils. Due to the degraded nature of the Subject Site it is unlikely to be present and the species was not observed within the Subject Site during the DPE approved survey period (DPE 2022d) in September 2022.	No
Eucalyptus camaldulensis (River Red Gum)	Endangered Population in the Hunter Catchment	-	Absent. Found in grassy woodland or forest on deep rich alluvial soils adjacent to large permanent water bodies. May occur with *Eucalyptus tereticornis, Eucalyptus melliodora*, *Casuarina cunninghamiana subsp. cunninghamiana* and *Angophora floribunda.* No such habitat is present within the Subject Site. The species was not observed within the Subject Site during the DPE approved survey period (DPE 2022d) in September 2022.	No
Eucalyptus glaucina (Slaty Red Gum)	V	V	Absent. This species grows in grassy woodland and dry eucalypt forest on deep, moderately fertile and well-watered soils. Due to the degraded nature of the Subject Site it is unlikely to be present and the species was not observed within the Subject Site during the DPE approved survey period (DPE 2022d) in September 2022.	No

V = Vulnerable; E = Endangered; CE = Critically Endangered

Figure 6. Targeted survey effort for threatened species within the Subject Property

4.2 Threatened Fauna

Details of the threatened fauna habitat recorded within the Subject Site are included in **Table 5**. The likelihood of occurrence of threatened fauna species within the Subject Site is presented in **Table 6**.

A small suite of avian native fauna species were identified within and surrounding the Subject Site during the site assessment. All native fauna species encountered are listed as 'protected' under the BC Act. The list of fauna recorded during the site visit was produced opportunistically (**Appendix C**).

Based on unsuitable habitat, geographic distribution and/or the small scale of the proposed activity, it was determined that the proposed works are unlikely to significantly impact upon any potentially occurring BC Act or EPBC Act listed threatened species.

Table 5. Fauna habitat values identified within the Subject Site

Habitat component	Subject Site
Coarse woody debris	Absent.
Rock outcrops and bush rock	Absent.
Caves, crevices and overhangs	Absent.
Culverts, bridges, mine shafts, or abandoned structures	Absent.
Nectar/lerp-bearing Trees	Various native and exotic trees present within the Subject Site produce nectar and lerps. These trees may provide intermittent nectar sources for nectivores such as the Grey-headed Flying-fox.
Nectar-bearing shrubs	Various nectar-bearing shrubs identified within the Subject Site may provide intermittent nectar sources for similar nectivores.
Koala Use Trees	Numerous koala use trees (Eucalypts) were present throughout the Subject Site.
Large stick nests	Absent.
Sap and gum sources	Native sap and gum source trees were recorded within the Subject Site such as *Eucalyptus* spp. These trees may provide intermittent sap and/or lerp sources for various fauna species.
She-oak fruit (Glossy Black Cockatoo feed)	Absent.
Seed-bearing trees and shrubs	Seed-bearing trees such as *Eucalyptus* spp. and *Lophostemon confertus* identified within the Subject Site may provide foraging habitat for Gang-gang Cockatoos.
Soft-fruit-bearing trees/shrubs	Exotic soft-fruit-bearing trees occur throughout the Subject Site. These trees may provide intermittent fruit sources for fructivores such as the Grey-headed Flying-fox.
Dense shrubbery and leaf litter	Absent.
Tree hollows	Small and Medium hollows are present within the Subject Site.
Decorticating bark	Absent.
Wetlands, soaks, and streams	Absent.

Habitat component	Subject Site
Open water bodies	Absent.
Estuarine, beach, mudflats, and rocky foreshores	Absent.

4.3 Migratory Fauna Species

The following EPBC Act listed migratory fauna species were considered to occasionally use habitat within or around the Subject Site for foraging or passage:

- *Apus pacificus* (Fork-tailed Swift);
- *Hirundapus caudacutus* (White-throated Needletail);
- *Monarcha melanopsis* (Black-faced Monarch);
- *Motacilla flava* (Yellow Wagtail);
- *Myiagra cyanoleuca* (Satin Flycatcher); and
- *Rhipidura rufifrons* (Rufous Fantail).

The proposed activity will have low impacts to potential foraging habitat and negligible impacts to potential breeding habitat for these species given their migratory nature. In the unlikely event that these species forage within the Subject Site, the proposed removal of vegetation will have low impacts to foraging habitat given the large areas of suitable foraging habitat in the surrounding area and in their migratory range. No anticipated net loss of breeding habitat is expected as these species do not breed within or in close proximity of the Subject Site. As such, the proposed activity is unlikely to a significant impact on these species; therefore, a Referral to Commonwealth pursuant to the EPBC Act should not be required.

Table 6. Assessment of likely occurrence of threatened fauna species within the Subject Site

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
Anseranas semipalmata (Magpie Goose)	V	-	Low	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. No such foraging habitat is present within the Subject Site.	Nests are formed in trees over deep water. No such habitat is present within the Subject Site.	Negligible. No anticipated impact to foraging or breeding habitat.	No
Anthochaera phrygia (Regent Honeyeater)	CE	CE	Low	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Sub-optimal foraging habitat due to the disturbed nature of the Subject Site.	There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. The Subject Site is not within these regions.	Low anticipated impact to potential foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. Furthermore, the Subject Site is not mapped on the important areas map for the species (DPE 2022f). The site assessment in September 2022 did not detect this species.	No
Artamus cyanopterus cyanopterus (Dusky Woodswallow)	V	-	Low	This species often inhabits dry, open eucalypt forests and woodlands with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. Sub-optimal foraging habitat due to the disturbed nature of the Subject Site.	This species nests in dry open Eucalypt Forest. No nests were identified within the Subject Site.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
Calyptorhynchus lathami (Glossy Black Cockatoo)	V	-	Low	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. No such foraging habitat was present within the Subject Site.	Dependent on large hollow-bearing eucalypts for nest sites. No large hollows were identified within the Subject Site.	Negligible. No anticipated impact to foraging or breeding habitat. The site assessment in September 2022 did not detect this species.	No
Chalinolobus dwyeri (Large-eared Pied Bat)	V	V	Low	This species probably forages for small, flying insects below the forest canopy. Prey items may occur within the Subject Site.	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin. No such habitat occurs within the Subject Site.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. No anticipated impact to breeding habitat.	No
Chthonicola sagittata (Speckled Warbler)	V	-	Low	Lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Sub-optimal foraging habitat due to the disturbed nature of the Subject Site.	The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. No nests were identified within the Subject Site.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
Circus assimilis (Spotted Harrier)	V	-	Low	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. Preys on terrestrial mammals (e.g bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion. Such prey may occur within the Subject Site.	Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. No large stick nests were identified within the Subject Site at the time of the site assessment.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species.	No
Climacteris picumnus victoriae (Brown Treecreeper) – eastern subspecies	V	-	Low	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range. Up to 80% of the diet is comprised of ants; other invertebrates (including spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings) make up the remaining percentage. Such prey may occur within the Subject Site.	Hollows in standing dead or live trees and tree stumps are essential for nesting. Such hollows are present within the Subject Site, however sub-optimal due to the disturbed nature of the Subject Site.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. One (1) hollow-bearing trees will be impacted that may be used by the species. Due to better quality habitat in the greater locality, it is not expected that the removal of one hollow-bearing tree to be significant to this species.	No
Daphoenositta chrysoptera (Varied Sittella)	V	-	Low	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned	Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. No nests	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
				from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. Sub-optimal foraging habitat due to the disturbed nature of the Subject Site.	were identified within the Subject Site.	2022 did not detect this species.	
Dasyurus maculatus (Spotted-tailed Quoll)	V	E	Low	A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl. Potential foraging habitat is present within the Subject Site, however it is suboptimal due to its modified nature.	This species uses hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Hollows were observed within the Subject Site.	Low anticipated impact to suboptimal potential foraging habitat as it is located in a highly disturbed area. One (1) hollow-bearing trees will be impacted that may be used by the species. Due to better quality habitat in the greater locality, it is not expected that the removal of one hollow-bearing tree to be significant to this species.	No
Delma impar (Striped Legless Lizards)	V	V	Low	Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Actively hunts for spiders, crickets, moth larvae and cockroaches. No such habitat is present within the Subject Site.	Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. No such habitat is present within the Subject Site.	Negligible. No anticipated impact to foraging or breeding habitat.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
Ephippiorhynchus asiaticus (Black-necked Stork)	E	-	Low	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. No such habitat is present within the Subject Site.	Black-necked Storks build large nests high in tall trees close to water. No such habitat is present within the Subject Site.	Negligible. No anticipated impact to foraging or breeding habitat.	No
Falco subniger (Black Falcon)	V	-	Low	The Black Falcon inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded (eucalypt- dominated) watercourses; it also uses agricultural land with scattered remnant trees. The Falcon is often associated with streams or wetlands, visiting them in search of prey. Sub-optimal foraging habitat due to the disturbed nature of the Subject Site.	Nest along tree-lined creeks and rivers of inland drainage systems. Eggs are laid in the abandoned stick nests of other birds, usually high in a tree. No stick nests were identified within the Subject Site at the time of the site assessment.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species.	No
Falsistrellus tasmaniensis (Eastern False Pipistrelle)	V	-	Low	This species prefers moist habitats with trees taller than 20m. Feeds on insects. Potential prey items may occur within the Subject Site, however foraging habitat is suboptimal given the Subject Site is highly modified.	Generally, roosts in Eucalypt hollows, but has also been found under loose bark on trees or in buildings nearby foraging habitat. Hollows were observed within the Subject Site.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. One (1) hollow-bearing trees will be impacted that may be used by the species. Due to better quality habitat in the greater locality,	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
						it is not expected that the removal of one hollow-bearing tree to be significant to this species.	
Glossopsitta pusilla (Little Lorikeet)	V	-	Low	The Subject Site contains potential feed trees for this species. Isolated flowering trees (e.g. in urban areas) can help sustain viable populations of this species. Sub-optimal foraging habitat due to the disturbed nature of the Subject Site.	This species favours small hollows in Eucalypts. Small hollows were observed within the Subject Site.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. One (1) hollow-bearing trees will be impacted that may be used by the species. Due to better quality habitat in the greater locality, it is not expected that the removal of one hollow-bearing tree to be significant to this species.	No
Haliaeetus leucogaster (White-bellied Sea-Eagle)	V	-	Low	Foraging habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. No such is present within the Subject Site.	Breeding habitat is live large old trees within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines. No nests were identified within the Subject Site at the time of the site assessment.	Negligible, no anticipated net loss of foraging or breeding habitat. The site assessment in September 2022 did not detect this species.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
Hieraaetus morphnoides (Little Eagle)	V	-	Low	Occupies open eucalypt forest, woodland or open woodland. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion. Potential prey items may occur within the Subject Site however foraging habitat is suboptimal given the Subject Site is disturbed.	This species nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. No stick nests were identified within the Subject Site at the time of the site assessment.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species.	No
Hirundapus caudacutus (White-throated Needletail)	-	V	Low	This species has been recorded eating a wide variety of insects, including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers. Prey items may be present within the Subject Site.	N/A. This species does not breed in Australia.	Low anticipated impact to potential foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species.	No
Micronomus norfolkensis (Eastern Coastal Free-tailed Bat)	V	-	Low	Occur in dry sclerophyll forest, swamp forests and mangrove forests east of the Great Dividing Range, feeding on insects. Potential prey items may occur within the Subject Site.	Roost mainly in tree hollows but will also roost under bark or in man-made structures. Hollows were observed within the Subject Site.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. One (1) hollow-bearing trees will be impacted that may be used by the species. Due to better quality habitat in the greater locality, it is not expected that the removal of one hollow-bearing tree to be significant to this species.	No
Miniopterus australis	V	-	Low	This species forage for small insects beneath the canopy of	Only five nursery sites/maternity colonies are	Low anticipated impact to potential foraging habitat	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
(Little Bent-winged Bat)				densely vegetated habitats. Potential prey items may occur within the Subject Site.	known in Australia. The Subject Site is not located near a known maternity colony; therefore, it is not expected breeding habitat will be impacted.	given the mobility of this species. No anticipated impact to breeding habitat.	
Miniopterus orianae oceanensis (Large Bent-winged Bat)	V	-	Low	Hunt in forested areas, catching moths and other flying insects above the tree tops. Potential prey items may occur within the Subject Site.	This species only breeds in caves. No such habitat was identified within, or in close proximity to, the Subject Site.	Low anticipated impact to potential foraging habitat given the mobility of this species. No anticipated impact to breeding habitat.	No
Myotis macropus (Southern Myotis)	V	-	Low	This species forages over streams and pools catching insects and small fish by raking their feet across the water surface. No such habitat was present within the Subject Site.	Generally, roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. No water bodies that would be used by the species are present.	Negligible, no anticipated net loss of foraging or breeding habitat.	No
Nyctophilus corbeni (Corben's Long-eared Bat)	V	V	Low	Inhabits a variety of vegetation types, including mallee, bulloke and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation. Hunts non-flying prey - especially caterpillars and beetles. Potential prey items	Roosts in tree hollows, crevices, and under loose bark. Hollows were observed within the Subject Site.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. One (1) hollow-bearing trees will be impacted that may be used by the species. Due to better quality habitat in the greater locality, it is not expected that the removal of one hollow-bearing	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
				may occur within the Subject Site.		tree to be significant to this species.	
Petaurus norfolcensis (Squirrel Glider)	V	-	Very Low	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein. Sub-optimal foraging habitat due to the disturbed nature of the Subject Site.	Require abundant tree hollows for refuge and nest sites. While a hollow bearing tree was present within the Subject Site, the area does not contain abundant tree hollows, making it sub-optimal habitat.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. One (1) hollow-bearing trees will be impacted that may be used by the species. Due to better quality habitat in the greater locality, it is not expected that the removal of one hollow-bearing tree to be significant to this species.	No
Phascolarctos cinereus (Koala)	V	V	Low	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Potential foraging habitat was identified within the Subject Site, however this is considered suboptimal given the highly disturbed and urbanised nature of the site.	Potential breeding habitat was identified within the Subject Site, however this is considered suboptimal given the disturbed and urbanised nature of the site.	Low anticipated impact to suboptimal foraging and breeding habitat. The Subject Site is highly urbanised and disturbed, making it unlikely for a koala to utilise the site.	No
Pomatostomus temporalis temporalis	V	-	Low	The species inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open	Build and maintain several conspicuous, dome-shaped stick nests about the size of a	Low anticipated impact to suboptimal foraging habitat given the mobility of this	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
(Grey-crowned Babbler (eastern subspecies)				Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Potential foraging habitat was identified within the Subject Site, however this is considered suboptimal given the highly disturbed and urbanised nature of the site.	football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones. No nests were observed within the Subject Site.	species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species.	
Pteropus poliocephalus (Grey-headed Flying-fox)	V	V	Low	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Potential foraging habitat was identified with the Subject Site.	No breeding camps were identified within or surrounding the Subject Site.	Low anticipated impact to potential foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species.	No
Saccolaimus flaviventris (Yellow-bellied Sheathtail-bat)	V	-	Low	This species feeds on insects, flying high and fast over the forest canopy. Prey items may be present within the Subject Site.	Roosts singly or in groups of up to six, in tree hollows and buildings. One (1) hollow-bearing tree was present within the Subject Site.	Low anticipated impact to suboptimal foraging habitat given the mobility of this species. One (1) hollow-bearing trees will be impacted	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
						that may be used by the species. Due to better quality habitat in the greater locality, it is not expected that the removal of one hollow-bearing tree to be significant to this species.	
Scoteanax rueppellii (Greater Broad-nosed Bat)	V	-	Low	Forages after sunset, flying slowly and directly along creek and river corridors. No such habitat was present within the Subject Site.	This species usually roosts in tree hollows and females congregate at maternity sites located in suitable trees. One (1) hollow-bearing tree was present within the Subject Site.	Negligible anticipated impact to foraging habitat. One (1) hollow-bearing trees will be impacted that may be used by the species. Due to better quality habitat in the greater locality, it is not expected that the removal of one hollow-bearing tree to be significant to this species.	No
Stagonopleura guttata (Diamon Firetail)	V	-	Low	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Woodlands. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Potential foraging habitat was identified within the Subject Site, however this is considered suboptimal given the highly disturbed and urbanised nature of the site.	Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. No nests were identified within the Subject Site at the time of the site assessment.	Low anticipated impact to potential foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species. The site assessment in September 2022 did not detect this species.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Site	Breeding Habitat Present Within the Subject Site	Anticipated Impact	Further Impact Assessment Required?
Stictonetta naevosa (Freckled Duck)	V	-	Very Low	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. No such habitat is present within the Subject Site.	Nests are usually located in dense vegetation at or near water level. No such habitat is present within the Subject Site.	Negligible. No anticipated impact to foraging or breeding habitat. The site assessment in September 2022 did not detect this species.	No
Vespadelus troughtoni (Eastern Cave Bat)	V	-	Low	Little is understood of its feeding or breeding requirements or behaviour. Therefore, potential breeding habitat could be present within the Subject Site.	A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. No such habitat is present within the Subject Site.	Low anticipated impact to potential foraging habitat given the mobility of this species. No anticipated impact to breeding habitat. The site assessment in September 2022 did not detect this species	No

V – Vulnerable; E – Endangered; EP – Endangered Population; CE – Critically Endangered

5. Impact Summary

5.1 Vegetation Loss

The proposed activity will result in the following impacts to the vegetation within the Subject Site:

- The removal of approximately 0.16ha of vegetation identified as Planted Exotic/Native Vegetation.

6. Recommendations

6.1 Impact Mitigation and Minimisation Recommendations

This section of the report details recommended efforts to avoid and minimise impacts on biodiversity values associated with the proposed activity. Measures to be implemented before, during, and post construction are detailed in **Table 7.**

Table 7. Measures to be implemented before, during, and after construction to avoid and minimise the impacts of the proposed activity.

Action	Outcome	Timing	Responsibility
Project Location, Design and Planning	The project has been designed to avoid impacts to native vegetation where possible, however there will be some minor impacts to native vegetation within the Subject Site. The following mitigation measures will also ensure impacts to native vegetation are minimal.	Pre-construction phase	Proponent
Tree Protections	Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970) outlines that a Tree Protection Zone (TPZ) is the principal means of protecting trees on construction sites. It is an area isolated from construction disturbance so that the tree remains viable. Ideally, works should be avoided within the TPZ. A Minor Encroachment is less than 10% of the TPZ and is outside the structural root zone (SRZ). A Minor Encroachment is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ. A Major Encroachment is greater than 10% of the TPZ or inside the SRZ. Major Encroachments generally require root investigations undertaken by non-destructive methods or the use of tree sensitive construction methods. Tree Protection Zones should be erected around all retained trees that occur within close proximity to the proposed works.	Pre-construction phase	Proponent Arborist
Assigning a Project Ecologist	Prior to the implementation of the activity, the proponent should commission the services of a qualified and experienced Ecologist with a minimum tertiary degree in Science, Conservation, Biology, Ecology, Natural Resource Management, Environmental Science or Environmental Management. The Ecologist	Pre-construction phase	Proponent Project Ecologist

Action	Outcome	Timing	Responsibility
	must be licensed with a current Department of Primary Industries Animal Research Authority permit and New South Wales Scientific License issued under the BC Act. The Ecologist will be commissioned to: ▪ Undertake an extensive pre-clearing survey which includes targeted searches for threatened fauna threatened flora and Priority Weeds, and delineating habitat-bearing trees and shrubs; and ▪ Supervise the clearance of any habitat trees or shrubs identified during the pre-clearing survey (native and exotic) in order to capture, treat and/or relocate any displaced fauna.		
Landscaping	Landscaping should be undertaken in accordance with the proposed landscaping plan (Moir Landscape Architects). Where possible, consideration should be given to the planting of native species that conform to the nearby community "Narrow-leaved Ironbark/ Grey Box grassy woodland of the central and upper Hunter" (Sivertsen et al 2011).	Pre-construction phase	Proponent Project Ecologist
Erosion and Sedimentation	Appropriate erosion and sediment control should be erected and maintained at all times during construction in order to avoid the potential of incurring indirect impacts on biodiversity values. As a minimum, such measures should comply with the relevant industry guidelines such as 'the Blue Book' (Landcom 2004).	Construction phase	Proponent Construction Contractor
Storage and Stockpiling (Soil and Materials)	Allocate all storage, stockpile, and laydown sites away from any vegetation that is planned to be retained. Avoid importing any soil from outside the site in order to avoid the potential of incurring indirect impacts on biodiversity values as this can introduce weeds and pathogens to the site. If materials are required to be imported for landscaping works, they are to be sterilised according to industry standards prior to importation to site.	Construction phase	Construction Contractors
Weed Eradication and Continued Suppression	Weeding should be undertaken around areas of planted native vegetation to improve the condition of the Subject Site. Priority weeds should be eradicated across the Subject Site. Two (2) priority weed for the Hunter area was observed within the Subject Site: ▪ *Olea europaea* subsp. *europaea;* ▪ *Asparagus aethiopicus* (Ground Asparagus).	Construction phase Post-construction phase	Proponent

7. Conclusion

This assessment indicates that the relevant provisions of the Environmental Planning and Assessment Act 1979, Biodiversity Conservation Act 2016, the Muswellbrook Local Environmental Plan 2009, and the Muswellbrook Development Control Plan 2009 have been satisfied.

In summary, the proposed activity will require the clearing of:

- The removal of approximately 0.16ha of vegetation identified as Planted Exotic/Native Vegetation.

If the appropriate recommendations in this report are followed, the proposed activity is considered to have a minimal ecological impact.

8. References

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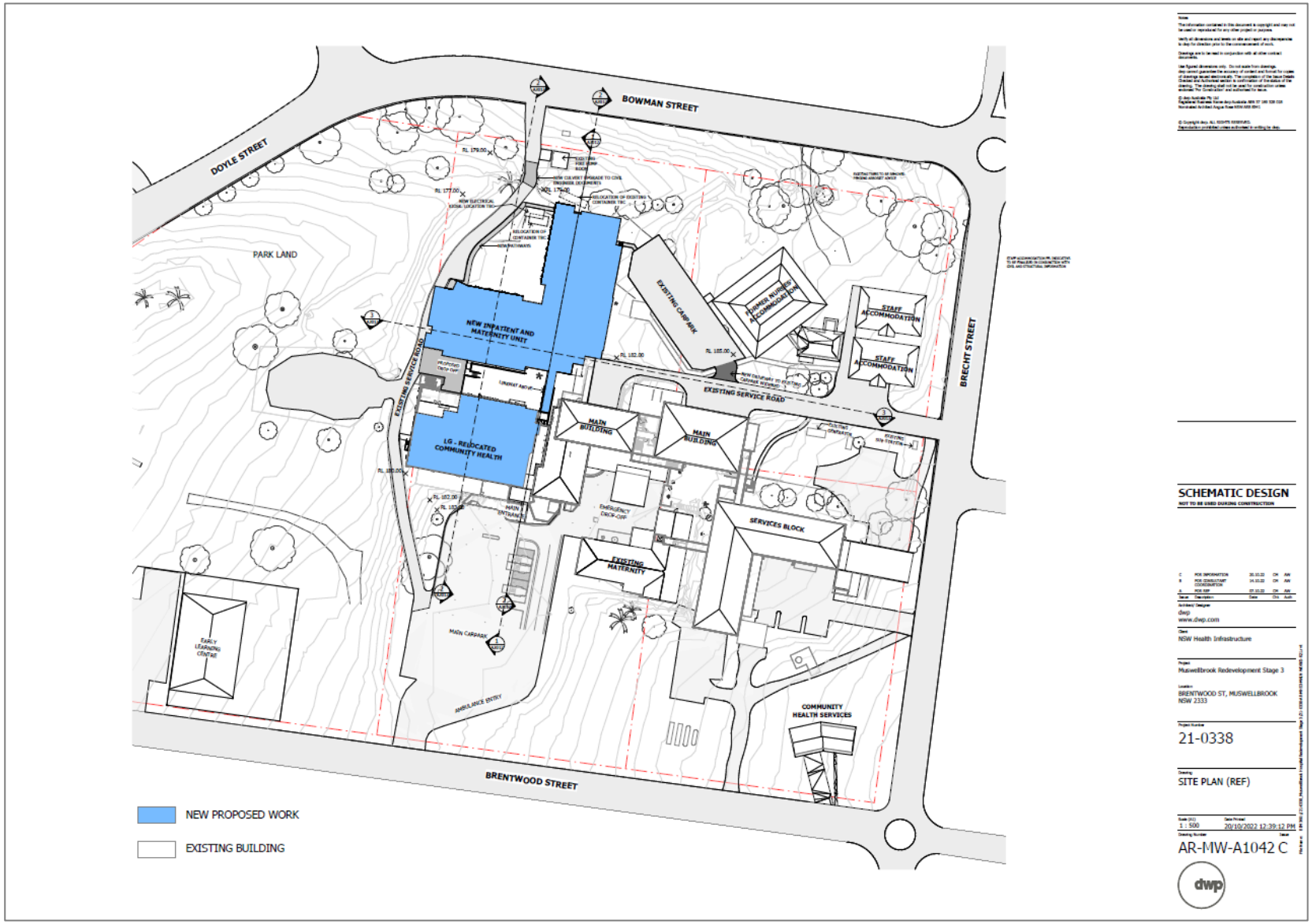
9. Appendices

Appendix A. Site Plan (dwp Australia 2022)
Appendix B. Flora species identified within the Subject Site.
Appendix C. Fauna species identified within and surrounding the Subject Site.

Appendix A. Site Plan (dwp Australia 2022)



Appendix B. Flora species identified within the Subject Site.

Scientific Name	Canopy	Mid-Story	Ground
*Agapanthus spp.**			x
*Agonis flexulosa**		x	
*Araucaria bidwillii**	x		
*Arctotheca calendula**			x
*Asparagus aethiopicus***			x
*Atriplex halimus**		x	
*Bidens pilosa**			x
*Bromus catharticus**			x
Callistemon viminalis		x	
Carpobrotus glaucescens			x
*Cedrela odorata**	x		
*Cenchrus clandestinus**			x
*Chlorophytum comosum**			x
Cynodon dactylon			x
*Cyperus involucratus**			x
Dichondra repens			x
Dodonaea viscosa		x	
Eucalyptus moluccana	x		
*Fraxinus spp.**		x	
*Galium aparine**			x
*Geranium molle**			x
*Grevillea robusta**	x		
Grevillea spp. cultivar		x	
Hakea sericea		x	
*Hypochaeris radicata**			x
Jacaranda mimosifolia	x		
Jacksonia scoparia		x	
Lomandra longifolia			x
Lophostemon brushbox	x		
*Lotus uliginosus**			x
Melaleuca quinquenervia		x	
Melaleuca spp.		x	
*Modiola caroliniana**			x
*Nandina domestica**			x
*Nephrolepis exaltata**			x
*Olea europaea subsp. cuspidata***		x	
*Pelargonium hortorum**		x	
*Phoenix canariensis**		x	
Pittosporum undulatum		x	
*Plantago lanceolata**			x
*Poa annua**			x
*Poplar alba**		x	
*Rumex crispus**			x
*Schefflera arboricola**		x	

Scientific Name	Canopy	Mid-Story	Ground
*Schinus spp.**		x	
Senna artemisioides		x	
*Soliva sessilis**			x
*Sonchus oleraceus**			x
*Trisetum flavescens**			x

** Denotes exotic species*

*** Denotes Priority Weed*

Appendix C. Fauna species identified within and surrounding the Subject Site.

Class	Scientific Name	Common Name	Status
Aves	*Anthochaera carunculata*	Red Wattlebird	Protected
	Columba livia domestica	Feral Pigeon	Pest
	Coracina novaehollandiae	Black-faced Cuckoo Shrike	Protected
	Entomyzon cyanotis	Blue-faced Honeyeater	
	Eolophus roseicapilla	Galah	
	Gymnorhina tibicen	Magpie	
	Manorina melanocephala	Noisy Minor	
	Ocyphaps lophotes	Crested Pigeon	
	Platycercus eximius	Eastern Rosella	
	Trichoglossus moluccanus	Rainbow Lorikeet	
	Zosterops lateralis	Silver Eye	

NARLA

environmental

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