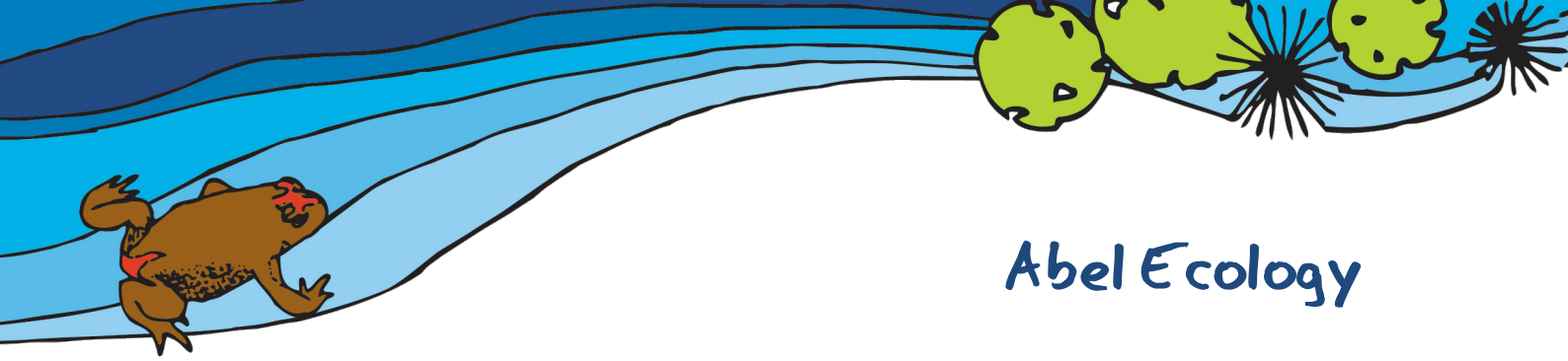


Abel Ecology

Prescribed Ecology Actions Report (PEAR)

for

Pacific Brook Christian School
72-74 Maitland Street, Muswellbrook
Lot 100 DP 1261496

Proposed construction of permanent school buildings for 140 students

Prepared for:	Pacific Brook Christian School Ltd
Report No:	AE20-REP-2144-ISS 8
Prepared by:	Abel Ecology
Date:	11 July 2024

BAM Ecology Pty Ltd (T/A Abel Ecology)
2 Samuel 20:18
ACN 626 221 467 – ABN 37 626 221 467

PO Box 495
Unit 2, 10-11 Ferguson Road
Springwood, NSW, 2777

T (02) 4751 9487
E info@abelecology.com.au
www.abelecology.com.au

Disclaimer

This report has been prepared in accordance with the scope of services described in agreement between Abel Ecology and the Client.

In preparing this report, Abel Ecology has relied upon data, surveys and site inspection results taken at or under the particular time and or conditions specified herein. Abel Ecology has also relied on certain verbal information and documentation provided by the Client and/or third parties, but did not attempt to independently verify the accuracy or completeness of that information. To the extent that the conclusions and recommendations in this report are based in whole or in part on such information, they are contingent on its validity. Abel Ecology assumes no responsibility for any consequences arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Abel Ecology.

The findings contained in this report are the result of discrete/specific methods used in accordance with normal practices and standards. To the best of our knowledge, they represent a reasonable interpretation of the general condition of the site in question. Under no circumstances, however, can it be considered that these findings represent the actual state of the site/sites at all points.

Any representation, statement, opinion or advice, expressed or implied in this publication is made in good faith but on the basis that Abel Ecology, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever, which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement, or advice referred to above. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client.

Furthermore, this report has been prepared solely for use by the Client. Abel Ecology accepts no responsibility for its use by other parties.

Document History

Report	Version	Prepared by	Technical Review by	Proofread by	Submission	
					Method	Date
Report	Draft A	Dr Alison Hewitt		Steven Smith	Dropbox	26 Aug 20
Report	Issue 1	Dr Alison Hewitt		Steven Smith	Dropbox	1 Sept 20
Report	Issue 2	Dr Danny Wotherspoon		Steven Smith	Dropbox	7 Oct 20
Report	Issue 3	Dr Danny Wotherspoon		Steven Smith	Dropbox	9 Nov 20
Report	Issue 4	Dr Danny Wotherspoon Nicholas Tong		Janelle Merry	Dropbox	31 May 24
Report	Issue 5	Dr Danny Wotherspoon Nicholas Tong			Dropbox	7 Jun 24
Report	Issue 6	Dr Danny Wotherspoon Nicholas Tong		Corinna Campbell	Dropbox	27 Jun 24
Report	Issue 7	Dr Danny Wotherspoon Nicholas Tong			Dropbox	28 Jun 24
Report	Issue 8	Callista Harris		Nicholas Tong	Dropbox	10 July 2024

Table of Contents

Table of Figures

Table of Tables

List of Abbreviations

ALS	Actual Lot Size
BAM	Biodiversity Assessment Method
BC Act	Biodiversity Conservation Act 2016
BCR	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
d.b.h.	Diameter at breast height (~1.4 metres)
EEC	Endangered Ecological Community
LEP	Local Environmental Plan
LGA	Local Government Area
MLS	Minimum Lot size

Note regarding maps in this report

The diagrams/site maps used in this report have been supplied by and are used with the permission of NBRS Architecture and the Pacific Brook Christian School.

With regard to maps provided by the Land Information Centre, Topographic maps used with the permission of © Land and Property Information, NSW.

Executive summary

A biodiversity survey was carried out at Lot 100 DP 1261496, Maitland Street, Muswellbrook 'the site' to assess the likely impacts of the proposal on species and ecological communities present on the site, and whether the proposal requires a Biodiversity Development Assessment Report (BDAR) because it is a likely trigger to entry into the Biodiversity Offsets Scheme identified in s. 7.4 of the *Biodiversity Conservation Act 2016*.

This report also describes whether there is likely to be any significant effect on any endangered ecological community, endangered population, threatened species or their habitats, as per the listings in the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999) (Commonwealth legislation).

The areas to be affected are previously disturbed areas.

If any of three thresholds are triggered, then a Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor for the Authority to issue a consent or an approval and a calculation of offsetting required'.

The following three considerations are triggers for entry into the Biodiversity Assessment Method:

1. Threshold 1: The proposal (stage 1) to erect permanent classrooms in mostly a cleared area on site and requires the removal of up to 0.19 ha of native vegetation clearing and non-native vegetation, not including vegetation that is approved for removal under DA 2020-104, and does not exceed the clearing threshold area of 0.25 ha as described in clause 7.2 of the BC Regulation 2017.

2. Threshold 2: The proposal to erect permanent school buildings per the Stage 1 Plan on site does not include undertaking clearing of native vegetation or any prescribed activities (clause 6.1 of the BC Regulation 2017) on land shaded in the Biodiversity Values Land Map.

3. Threshold 3: The proposal for the school buildings and playgrounds per the school Stage 1 Plan proposal as discussed with the architects has been checked to ensure retention of trees identified on site from two threatened populations of species listed as endangered in the Hunter Catchment: Tree 73 (*Eucalyptus camaldulensis)* and Tree 51 (*Acacia pendula)*. Therefore, a significant effect on these threatened populations of the area is unlikely and a Biodiversity Development Assessment Report is not required.

There is no impediment to this proposal in the scope of this report. None of the three thresholds for entry into the Biodiversity Offsets Scheme are triggered by the Stage 1 Plan proposal.

A report prepared using the Biodiversity Assessment Method is **not** recommended for the Stage 1 Plan.

The provisions of the *EPBC Act 1999* do not apply to this proposal and it does not require referral to the Commonwealth.

Recommendations

1. A qualified arborist be engaged prior to any demolition or construction works to erect Australian Standard tree protection fencing to ensure protection and retention of Trees 73 and 51 which are threatened Hunter Catchment populations of *Eucalyptus camaldulensis* and *Acacia pendula.* Tree T169 may be removed.

2. Additional vegetation removal outside the cleared area/approved demolition DA is prohibited without council approval.

3. The *Tamarix aphylla* (Pine Athell) which is a weed of national significance should be removed if it resprouts or seeds on site.

4. Other High Threat Exotic weeds on site (Section 5.3) should be controlled by the site owner.

5. Landscaping appropriate to a school and local area should be installed.

6. Erosion and sediment control structures are to be installed prior to any earthworks commencing.

7. Erosion and sediment control structures are to be cleared after any storm event.

Figure 1. Locality map for Maitland Street, Muswellbrook.

Key

Site location

Figure 2. Aerial photo of the site and local area.

Key

Site location

N

Figure 3. Biodiversity values map of site within broader 1 x 1 kilometre area.

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days
- Site location

Source: https:www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

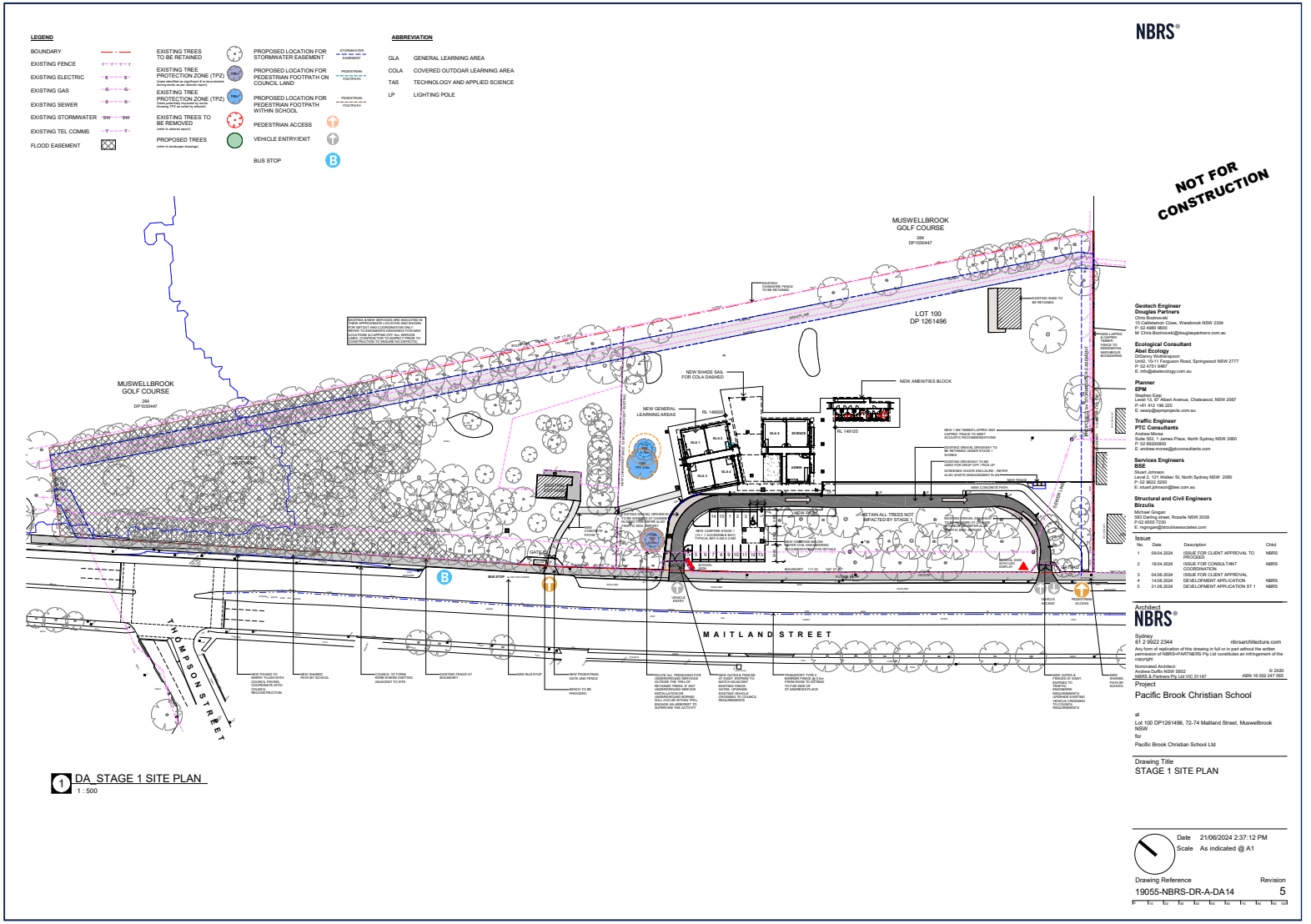


Figure 4. Stage 1 area on site for proposed location of classrooms.

Source: NBRS Architecture drawing 19055-NBRS-DR-A-DA14 Rev 5

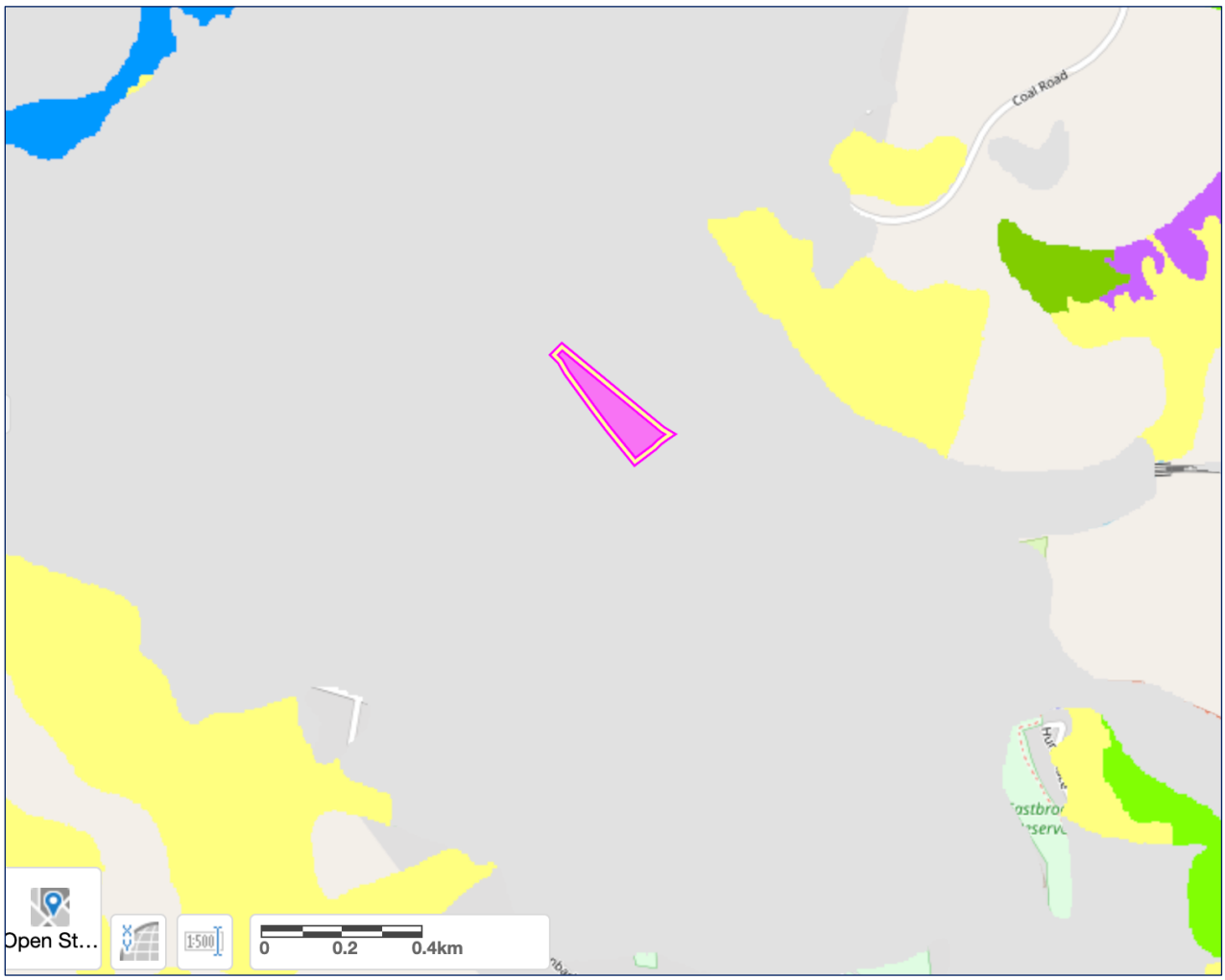
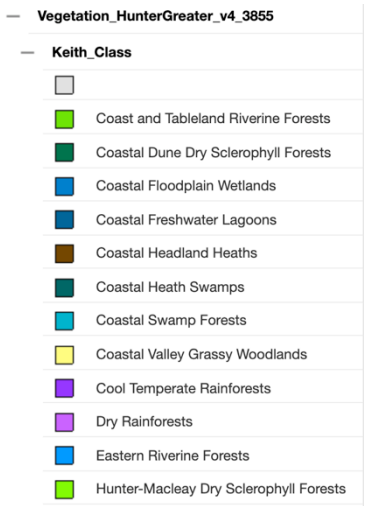


Figure 5. Keith Vegetation classes mapped for the site and surrounding area.



Site location

Source: https://datasets.seed.nsw.gov.au/dataset/hunter-valley-remnant-vegetation-surveys-peake-vis_id-22951f481

Eucalyptus camaldulensis tree tagged 169 planted near to driveway.

Eucalyptus camaldulensis tree tagged 73.

Acacia pendula tree tagged 51 in the arborist report.

Acacia pendula juveniles near to boundary with golf course.

Figure 6. Photographs.

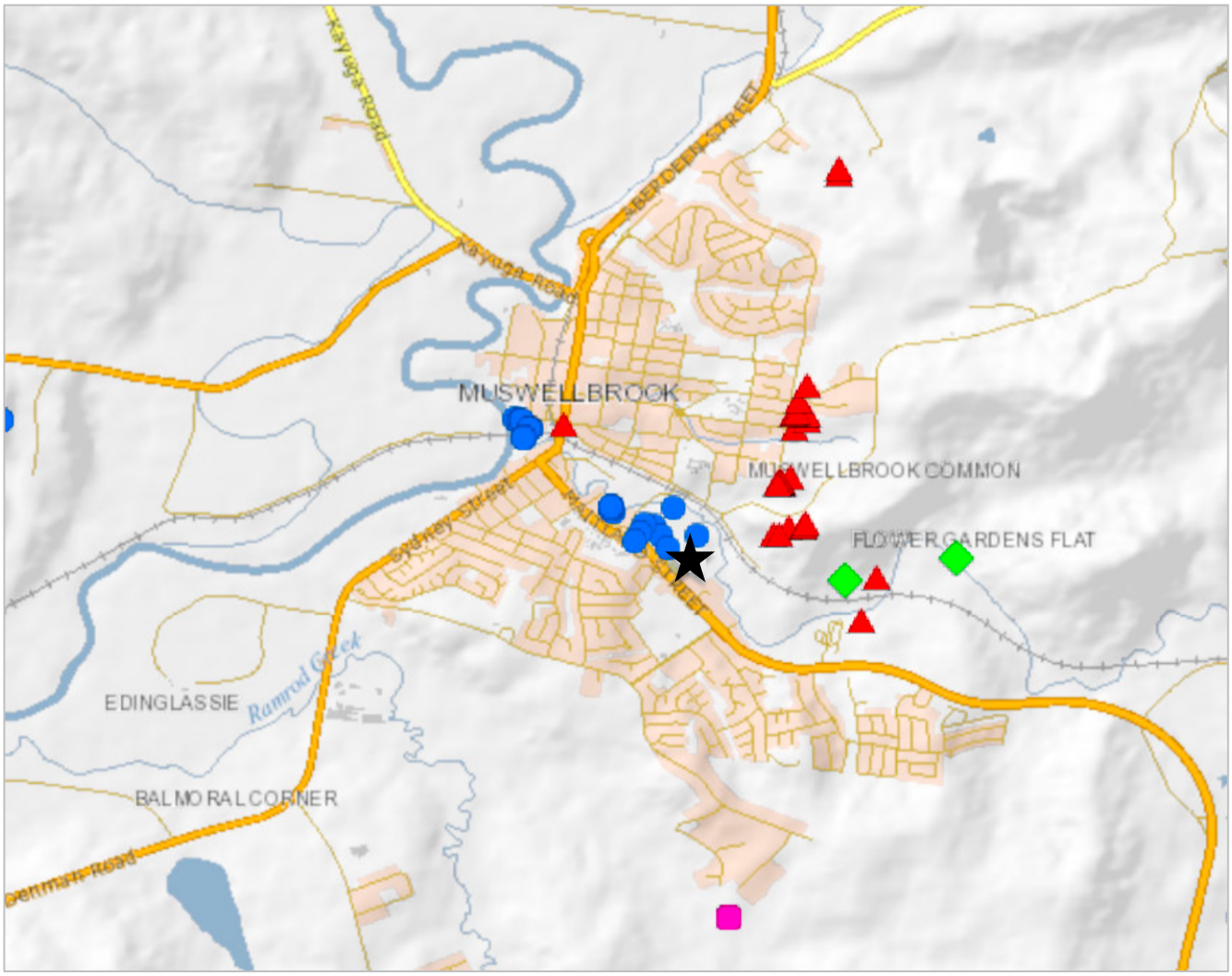


Figure 7. Local records of threatened plants and plant populations.

Key

- Site location
- Acacia pendula population in the Hunter catchment
- Eucalyptus camaldulensis population in the Hunter catchment
- Slaty Red Gum (Eucalyptus glaucina)
- Narrow-leaved Black Peppermint (Eucalyptus nicholii)
- ^Cymbidium canaliculatum population in the Hunter Catchment

Figure 8. Location of threatened plant populations and survey plot on site.

Key

Acacia pendula

Eucalyptus camaldulensis

20 x 20 m Vegetation Plot survey

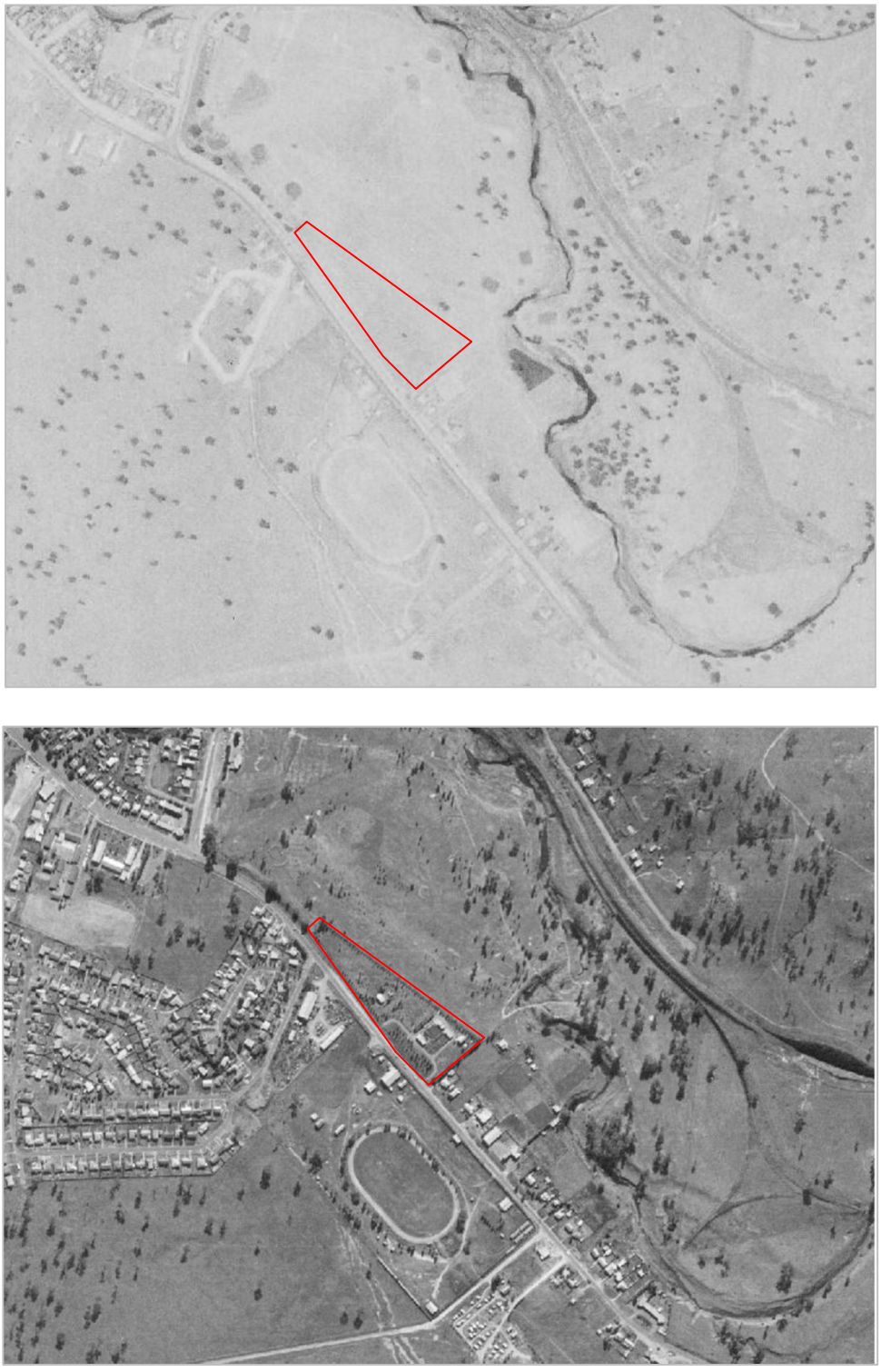


Figure 9. Historical Aerial Imagery from 1958 (above) and 1974 (below).

Source. NSW Government Historical Imagery website:
https://portal.spatial.nsw.gov.au/portal/apps/webappviewer/index.html?id=f7c215b873864d44bccddda8075238cb

1. Introduction

1.1 Legislative context

This Prescribed Ecology Actions Report meets the requirements of the *Biodiversity Conservation Act 2016* to enable a Council or other consent or determining authority to assess a proposed development or activity under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The authority must consider the following three Biodiversity Offset Scheme Development Thresholds.

- Threshold Trigger 1: Exceeding the clearing threshold on an area of native vegetation
- Threshold Trigger 2: Development or a prescribed activity is carried out on land included in the Biodiversity Values Land Map.
- Threshold Trigger 3: A "significant effect" on threatened species or ecological communities.

A biodiversity survey of the proposed development site at Maitland Street Muswellbrook, Lot 100 DP 1261496 ('the site' – Figure 1) was undertaken on 9th to 12th June with a repeat visit 13th August 2020. This Prescribed Ecology Actions Report investigates whether the impacts of proposals to erect demountable buildings in a cleared area and later construction of permanent school buildings on site will trigger any of the three thresholds to entry into the Biodiversity Offsets Scheme, thereby requiring a Biodiversity Development Assessment Report.

This assessment addresses both 'endangered' and 'vulnerable', as required by the *Biodiversity Conservation Act 2016* (BCA 2016). Throughout this report 'threatened' refers to those species and communities listed as 'endangered' or 'vulnerable' in Schedules 1 & 2 of the *BC Act 2016*.

If any of the three thresholds are triggered, then a Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor for the Authority to issue a consent or an approval and a calculation of offsetting required.

1.2 The proposal

The proposed development (Figure 4) is for the establishment of a new K-12 school (Pacific Brook Christian School) on the subject site. The proposed development will comprise site preparation and remediation, tree removal, construction of new school buildings, covered outdoor learning area, covered walkways, car parking, landscaping and associated works. The school will accommodate 140 students and 16 staff. Vegetation removal will be required for the car park area of this activity.

There are seven trees to be removed, being three Callistemons T217, T218 and T219, and four she-oak trees T220, T221, T222 and T224.

This does not include the vegetation removal approved under DA 2020-104.

Table 1. Details of lot size and size of proposed native vegetation clearing.

Component of site	Area m^2	Proportion of the site %
Whole site	23,590	100
Stage 1 Extent of proposed native vegetation clearing	472	1.9

1.3 Sources of information used in this assessment

Literature reviewed in order to assess possible issues relating to this site include:

Air photo (SIX maps)

Survey map (ltsl.com.au / NBRS Architecture)

Vegetation map (SEED)

Schedules to the BC Act 2016

Schedules to the EPBC Act 1999

OEH Atlas of NSW Wildlife

NSW Government Historical Imagery website

2. Biodiversity offsets scheme thresholds 1 and 2

2.1 Threshold One: Biodiversity Conservation Regulation 2017 Development area assessment thresholds

Clearing of native vegetation is declared by clause 7.2(1) to exceed the biodiversity offsets scheme threshold if the area proposed to be cleared is the area set out in Column 2 of the Table to that clause (Table 2 below) opposite the minimum lot size applicable to the land to be cleared in Column 1 of that Table.

Clearing of native vegetation will trigger entry into the offsets scheme if clearing is greater than the assessment threshold. To determine the correct threshold from Table 2 below, the appropriate minimum lot size of land must be selected. The minimum lot size of land can be found on the NSW planning portal https://www.planningportal.nsw.gov.au/find-a-property/property/.

Table 2. Areas section 7.2(4) Biodiversity Conservation Regulation 2017.

	Land to be considered	Assessment threshold
	Minimum lot size of land	Area of clearing
A	Less than 1 hectare	0.25 hectare or more
B	Less than 40 hectares but not less than 1 hectare	0.5 hectare or more
C	Less than 1,000 hectares but not less than 40 hectares	1 hectare or more
D	1,000 hectares or more	2 hectares or more

The size of the lot is approximately 2.3ha. The parcel of land is zoned R1 (General Residential) and the minimum lot size for this lot is 600 m^2. Row A in Table 2 is therefore appropriate for this proposal, and the threshold for clearing of native vegetation is 0.25 ha.

Conclusion

Clearing based on the Stage 1 plan will remove approximately 0.19 hectares of vegetation (native and non-native), but this does not include native and non-native vegetation approved for removal under DA 2020-104. This is under the 0.25 ha clearing area threshold for entry into the Biodiversity Offset Scheme, thus Threshold 1 is not breached and a Biodiversity Development Assessment Report is not required.

2.2 Threshold Two: Clearing or prescribed activities as listed in the Biodiversity Conservation Regulation 2017 on land included on the Biodiversity Values Map

No part of the site is included on the Biodiversity Values Map (Figure 3). Threshold two is not breached.

Conclusion

The threshold two trigger for entry into the Biodiversity offsets scheme is not activated by any part of the proposal. A Biodiversity Development Assessment Report is not required based on this threshold.

3. Landscape features of the site and the locality

3.1 Site description

For the purposes of this report, the site (Figure 1) is defined by the property boundaries of lot 100. It is approximately 2.3 ha. in size and the elevation is approximately 150 m above sea level.

https://www.planningportal.nsw.gov.au/find-a-property/

The adjacent properties (Figure 2) are a mix of commercial, industrial, a golf course and residential land uses.

The site is level with a slight slope to a watercourse at the north west boundary of the site. This watercourse flows northeast into the adjoining golf course and on to Muscle Creek via a series of dams on the golf course. Muscle Creek flows west into the Hunter River which at its closest is 1.3 km north-west of the site. Stormwater management on site is by overland flow.

The vegetation on site is described in detail in Section 5 below and fauna habitat is detailed in Section 5 below.

3.2 History of the site

The site was cleared of vegetation in 1958 (Figure 9) with today's perimeter screen plantings of *Casuarina* trees evident by 1974 (Figure 9) and for many decades has been a NSW State Forests plant nursery and arboretum.

The landform and drainage have been altered for use of the site by NSW State Forests and by road works for the adjacent New England Highway.

3.3 Landscape features

3.3.1 Location and Physical Environment

The site is on Maitland Street close to the Muswellbrook town centre.

Muswellbrook sits within the Sydney Basin Bioregion, in the Hunter Valley IBRA subregion.

The Hunter Valley subregion is at the intersection of a number of bioregions, where ecosystems from the coast, inland and the north and south all meet. It is characterised by rolling hills and wide valleys, with a meandering river system on a wide flood plain.

The geology of the Hunter Valley region's landscape includes Permian shales, sandstones, conglomerates, volcanics and coal measures. These formations are dissected by unconsolidated alluviums associated with the Hunter River. There are a variety of harsh texture contrast (duplex) soils on the slopes; and deep sandy alluvial loam on the valley floors.

The site location indicates it may once have supported Central Hunter Valley eucalypt forest and woodland ecological communities which occur on soils derived from the Permian sedimentary bedrock found on the valley floors and on lower hillslopes and low ridges.

3.3.2 Site landscape features

The following landscape features are present on the site (Table 3).

Table 3. Site landscape features.

Vegetation	The entire site has been cleared or disturbed. There are no remnant local native trees.
Non-native vegetation	The landscape has potential for foraging habitat for threatened species of bats.
Human structures	Buildings to be demolished have very little potential as bat roosts.
Wetlands/dams/watercourse	On the site boundary to the north west is a Strahler first order stream.
Karst, caves, crevices and other geological features of significance	None
Roads	Vehicle traffic and road mortality - No roadkill was observed on the site.

4. Field survey methods

4.1 BioNet Atlas of NSW Wildlife website search

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment.

Search criteria: Licensed Report of all Valid Records of Threatened (listed on *BC Act 2016*) or Commonwealth listed Entities in selected area [North: -32.21 West: 150.84 East: 150.94 South: -32.31] recorded since 01 Jan 2000 until 22 Jun 2020 returned a total of 167 records of 32 species.

These species (Table 4) were considered in designing field survey targets and methods. Unsuitable candidates were eliminated on the basis of habitat requirements (Appendix 5 and Appendix 6).

Table 4. BioNet threatened flora & fauna species records for a 5 km radius of the site since 1 Jan 2000.

Common Name	*Scientific Name*	NSW status	Comm. status
Striped Legless Lizard	*Delma impar*	V	V
Magpie Goose	*Anseranas semipalmata*	V	
White-throated Needletail	*Hirundapus caudacutus*	P	V
Black-necked Stork	*Ephippiorhynchus asiaticus*	E1	
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V	C
Little Eagle	*Hieraaetus morphnoides*	V	
Glossy Black-Cockatoo	*^^Calyptorhynchus lathami*	V	
Little Lorikeet	*Glossopsitta pusilla*	V	
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V	
Speckled Warbler	*Chthonicola sagittata*	V	
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	V	
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E
Brush-tailed Phascogale	*Phascogale tapoatafa*	V	
Koala	*Phascolarctos cinereus*	V	V
Squirrel Glider	*Petaurus norfolcensis*	V	
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V	
Eastern Coastal Free-tailed Bat	*Micronomus norfolkensis*	V	
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V	
Southern Myotis	*Myotis macropus*	V	
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V	
Eastern Cave Bat	*Vespadelus troughtoni*	V	
Little Bent-winged Bat	*Miniopterus australis*	V	
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	V	
Acacia pendula population in the Hunter catchment	*Acacia pendula*	E2	
Eucalyptus camaldulensis population in the Hunter catchment	*Eucalyptus camaldulensis*	E2	
Slaty Red Gum	*Eucalyptus glaucina*	V	V
Cymbidium canaliculatum population in the Hunter Catchment	*^^Cymbidium canaliculatum*	E2	
Pine Donkey Orchid population in the Muswellbrook local government area	*^^Diuris tricolor*	E2	
Pine Donkey Orchid	*^^Diuris tricolor*	V	

Table 5. Threatened species targeted in survey and five part tests.

Common Name	*Scientific Name*	NSW status	Comm. status
Little Eagle	*Hieraaetus morphnoides*	V	
Glossy Black-Cockatoo	*^^Calyptorhynchus lathami*	V	
Little Lorikeet	*Glossopsitta pusilla*	V	
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V	
Eastern Coastal Free-tailed Bat	*Micronomus norfolkensis*	V	
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V	
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V	
Eastern Cave Bat	*Vespadelus troughtoni*	V	
Little Bent-winged Bat	*Miniopterus australis*	V	
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	V	
Acacia pendula population in the Hunter catchment	*Acacia pendula*	E2	
Eucalyptus camaldulensis population in the Hunter catchment	*Eucalyptus camaldulensis*	E2	

Species for which suitable habitat occurs on the site within the range of the species but which did not appear in the Atlas record were added to Appendix 5 and Appendix 6. Targeted surveys were made for relevant threatened species (Table 5).

4.2 Field work effort

Over the four (4) days of fieldwork a total of 55 (fifty five) hours were spent undertaking survey work on the site and surrounding habitat areas.

Table 6. Survey dates and weather conditions.

Date	Time	Temperature (°C)	Task	Hours (hrs x no. people)
9JUN20	1400 – 1700	14 – 19 clear	Vegetation and fauna survey	3 x 2 = 6
10JUN20	0700 – 1030 1130 – 1700	13 – 19 rain	Vegetation and fauna survey	9 x 2 = 18
11JUN20	0630 – 1700	14 – 20 morning rain	Vegetation and fauna survey	10.5 x 2 = 21
12JUN20	0700 – 1200	14 – 19 clear	Vegetation and fauna survey	5 x 2 = 10
13AUG20	0745 – 1400	14 – 21 clear	Vegetation and fauna survey	6 x 1 = 6

Survey effort was concentrated within the site boundaries, although adjacent surrounding vegetation was noted (Figure 2).

4.3 Flora survey method, vegetation community and habitat classification

A flora survey was conducted to compile vegetation descriptions and species lists for the site. Targeted surveys were made for threatened plant species and populations shown in Table 4.

Vegetation quality is assessed as described below (Section 4.4). The plant community on site was classified according to the NSW VIS.

4.4 Simplified vegetation integrity assessment

On-site vegetation may be described according to a simplified vegetation integrity classification for each vegetation zone / habitat type. The simplified vegetation integrity assessment is based upon a modified version of the vegetation integrity assessment described in the NSW Biodiversity Assessment Method (BAM) 2017. This simplified assessment is based upon a qualitative assessment; no quantitative assessment was undertaken and no vegetation integrity score is calculated. The assessment requires the assessor to compare the observed vegetation with the vegetation type presumed to be present prior to 1750 (high quality native vegetation). Vegetation with good or moderate integrity usually provide higher quality habitat for a diverse range of indigenous species.

Four main qualitative classes of vegetation integrity are recognised. There is variation within each class, and in addition the class boundaries are somewhat fluid where one grades into the other.

Good integrity vegetation

Characteristics: Relatively high indigenous species diversity, diversity of flora species growth form (mix of trees, shrubs and groundcovers etc), diversity of tree size, canopy layer regeneration observed, fallen logs present on the ground, dead vegetative litter (leaves, twigs etc) cover present, weed invasion absent or minimal

Moderate integrity vegetation

Characteristics: Remnants and regenerating areas that have experienced disturbance but appear to retain the capability of recovery. Weed invasion may be moderate.

Poor integrity vegetation

Characteristics: The vegetation is highly disturbed. It typically consists of scattered trees/shrubs or clumps of trees and shrubs. Tree size diversity significantly reduced. The groundcover layer is comprised of a mix of indigenous species and exotic species. Fallen logs rare to absent, ground vegetative litter lacking.

Cleared class

Characteristics: Indigenous canopy species are absent and the indigenous understorey (shrubs/climbers/ scramblers/groundcovers) are approximately less than 50%.

Note: some vegetation types naturally lack some of the characteristics. For example, trees are rare to absent in saltmarshes, sedge swamps, alpine herbfields and arid shrublands. However, providing the other characteristics are consistent with a natural undisturbed area of the same vegetation type then these vegetation types are classified as having “good integrity”.

4.5 Fauna survey method

The methods of survey undertaken to detect the various faunal groups or their habitat are outlined below. Locations for specific survey methods are shown in Figure 6. Surveys were made for threatened species based on records of sightings from the BioNet Atlas website, and the Ecologist's knowledge.

Roads and road verges were searched for road-kill fauna. Surveys for mammals, reptiles and frogs are generally run concurrently.

Dates, weather and temperatures of all fieldwork were recorded and are tabulated in Table 6 above.

4.5.1 Diurnal fauna searches

Searching, opportunistic observations and call recording provides an indication of types of species using a site. These methods are used to identify and record live animals, or record indirect evidence of animal presence on the site. On occasions, specific surveys may be conducted for a targeted group or species, such as searching the margins of a dam for frogs.

Generally though, birds, reptiles, frogs and mammals, or evidence of them, may all be present in the same habitat at the time of survey, therefore searching for these faunal groups is generally run concurrently.

This involved:

a) Searching shelter sites, basking sites, opportunistic observation, and assessment of shelter site diversity suitability for reptiles.

b) Searching shelter sites, calling sites, egg deposition sites, spotlighting and triangulation on calling males for frogs.

c) Opportunistic observations and identification of calls of species, and search for indirect evidence such as nests, feathers, scratchings and feeding signs for birds.

d) Searching for indirect evidence, such as diggings, droppings, runways and burrows, and opportunistic observations for mammals.

While rigorous surveys are likely to find more species, high species richness for birds can be recorded in a relatively short amount of time. Bird surveys are used as a simple indicator of other parameters, such as biodiversity and the functioning of the ecosystem.

4.6 Species likely to occur

Species to be listed as 'likely to occur' or 'expected' (see Appendix 4), are common species generally found in the region, which are likely to occur on site if suitable habitat is present.

Native flora may include species local to the area (occurring in local remnants). Structure and species composition will depend upon locally occurring communities.

Expected species are common and, by definition, are not threatened species.

4.7 Limitations of the survey

This survey was conducted in the winter season. This was not suitable for summer migrants or temperature dependent species such as microbats.

The weather conditions were cool to cold, raining to clear, no breeze.

This was not suitable for microbats or many frogs or reptiles, being too cold.

Species that may use the site were not detected during the survey for the following reasons:

a) The species was present during the survey but was not detected due to dormancy, inactivity or cryptic habits.

b) The species use the site at other times of the year but was not present during the survey due to being nomadic or migratory.

4.8 Staff associated with the field work

Table 7. Staff associated with field work and analysis of field work.

Staff Member	Field work	Analysis of field work
Dr Danny Wotherspoon	Fauna and vegetation survey	Dr Danny Wotherspoon Mark Sherring
Alex Mackenzie	Fauna and vegetation survey	Dr Danny Wotherspoon
Dr Alison Hewitt	Fauna and vegetation survey	Dr Alison Hewitt Mark Sherring

5. Survey Results: Vegetation and habitat description

5.1 Site vegetation and habitat

The site contains two vegetation and habitat zones which are described below.

Fifty-three (53) woody species were recorded including thirty-five (35) native species, mostly not locally occurring.

Other dicotyledon herb species comprised twenty-three (23) natives and thirty-eight (38) weed or exotic species.

Monocotyledons comprise thirteen (13) native and eleven (11) weeds or exotic species.

No potential habitat trees were observed on the site.

There is generally a lack of fallen logs and dead wood or coarse woody debris.

Other site habitat characteristics are described below.

Appendix 1 shows the full list of flora found on the site.

5.1.1 Vegetation and habitat zone 1 arboretum

This zone comprises an arboretum collection of various trees and shrub species. These are mostly species that would have been produced and sold by the production nursery and some ornamental and screen plantings. Some possible regeneration of native species from the area is evident. The groundcover comprises sparse native and exotic herbs and grasses.

Trees of the local listed threatened plant population '*Acacia pendula* population in the Hunter catchment' are noted on site (Figure 6). There is one large tree (Tree 51 in the arborist report), two smaller trees and one dozen juvenile trees surrounding these in an area on site shown in Figure 8.

Trees of the local listed threatened plant population '*Eucalyptus camaldulensis* in the Hunter catchment' are noted on site (Figure 6).

There is one large tree (Tree 73, dbh 99 cm in the arborist report) in the northwest of the site and one smaller tree (Tree 169 planted on a landscape mound) near to the driveway as shown in Figure 8.

Important habitat features that have significance for fauna occupation of the site are discussed below (Table 8).

The vegetation community is an arboretum and planted commercial landscape (Figure 9) with some endemic trees planted and some natural regeneration evident. The vegetation within this zone is classified as "cleared" poor integrity vegetation.

5.1.2 Vegetation and habitat zone 2 production nursery and retail sales area

The site is clear of any remnant native vegetation. All vegetation is a planted landscape, comprising various trees and shrub species. Those are mostly ornamental and screen plantings. The groundcover is mown herb layer of exotic grasses and some occasional natives.

The planted shrubs and garden beds surround sales buildings, sheds, glasshouses and hardstand areas from the production nursery and sales area. Important habitat features that have significance for fauna occupation of the site are discussed below (Table 8). These include both site disturbance and natural features.

Table 8. Significant features and observations for the site.

Significant features	Observations
Frequency of large trees (approx. > 80 cm DBH)	Rare, none with fauna hollows.
Tree regeneration and Tree stem-size diversity	Most canopy species are a planted landscape of varying stem size depending on age and response to local habitat and climatic conditions. *Acacia pendula* showed regeneration with smaller trees and juveniles of varied stem size diameters surrounding it. *Casuarina cristata* are also regenerating.
Logs, woody debris and litter cover	Logs and woody debris generally absent due to past cleaning up. A lawn has been maintained in parts. There is little by way of ground level structural fauna habitat.
Food resources	Casuarina, Eucalyptus, Corymbia and Acacia provide food resources of blossoms and seeds.

While it is difficult to tell, original vegetation on site is likely to have been one of the locally occurring Grassy Woodland communities of the Hunter Valley. Appendix 2 shows a comparison of species recorded in a 20 x 20 m vegetation survey plot on site against three locally occurring Grassy Woodland communities and three Commonwealth listed Endangered Ecological Communities in the area. Native species richness is generally too low to align strongly with any of these plant communities.

5.2 Species and Communities of conservation concern

There are no endangered ecological communities or threatened species observed on the site or likely to rely on the site for any part of their life cycle.

Trees of the local listed threatened plant population '*Acacia pendula* population in the Hunter catchment' are noted on site (Figure 6). There is one large tree, two smaller trees and one dozen juvenile trees surrounding these in an area on site indicated in Figure 8. The species shows regeneration on site with smaller trees and juveniles of varied stem size diameters surrounding one larger (~10m high) tree.

Trees of the local listed threatened plant population '*Eucalyptus camaldulensis* in the Hunter catchment' are noted on site (Figure 6). There is one large tree (dbh = 99 cm) in the northwest of the site and one smaller tree (planted on a landscape mound) near to the driveway (Figure 8).

5.3 Weeds

There are two trees which are listed Weeds of National Significance:

- *Tamarix aphylla* (Athel Pine) (T191)
  https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/t-aphylla.pdf
- *Phoenix canariensis* (Canary Island Date Palm)

Other High threat exotic weeds on site include the following grasses:

- *Chloris gayana*
- *Cenchrus clandestinus*
- *Ehrharta erecta*
- *Stenotaphrum secundatum*
- *Paspalum dialatum*

Shrubs:

- *Cestrum parqui* (Green Cestrum)
- *Lycium ferocissimum* (African boxthorn)
- *Ochna serrulata* (Mickey Mouse plant)

Herbs:

- **Galenia pubescens*
- *Bidens pilosa (Cobblers pegs)
- **Senecio madagascariensis* (Fireweed)
- **Bryophyllum delagoense* (Mother of millions)

Climbers:

- *Solanum seaforthianum*
- *Araujia sericifera* (Moth vine)

The *Biosecurity Act 2015* requires each landholder and/or occupier to control biosecurity matter (weeds) on their property. The landholder and/or occupier is to develop an effective control strategy and plan to ensure they meet their General Biosecurity Duty.

The General Biosecurity Duty (GBD) is imposed on any person who deals with biosecurity matter (weeds), and who knows (or ought reasonably to know) of the biosecurity risk posed (or likely to be posed), has a biosecurity duty to ensure that the risk associated with those weeds is prevented, eliminated or minimised - so far as is reasonably practicable. A requirement is that all public and private land owners or managers and all other people who deal with weed species (biosecurity matter) must use the most appropriate approach to prevent, eliminate or minimise the negative impact (biosecurity risk) of those weeds.

Council may issue a Biosecurity Direction when any owner/occupier fails in their biosecurity duty to control weeds on their land. The owner/occupier must comply with this biosecurity direction. A penalty notice or prosecution may follow if the owner/occupier fails to comply with the Biosecurity Direction.

6. Survey Results: Fauna

6.1 Species of conservation concern

No threatened species were observed on the site nor are likely to depend on the site.

6.2 Fauna results

A total of 27 (twenty seven) species were detected, including 24 (twenty four) birds, 2 (two) mammals and 1 (one) frog.

Species listed as 'likely to occur' in the area are presented in Appendix 4. Note that the majority of the 'Expected Species' would not occur on the site due to the lack of habitat, but do occur in the area. All the species listed as 'likely to occur' are common throughout the locality and the region. It is unlikely that protected species will be affected at a local, regional or state-wide scale by the proposal.

The habitats for threatened species that occur in the area are tabulated in Appendix 5.

Table 9. List of fauna detected on the site.

Common Name	*Scientific Name*	Conservation Status	Recorded AE
Frogs			
Common Eastern Froglet	*Crinia signifera*		W
Brown-striped Frog	*Limnodynastes peronii*		
Bleating Tree Frog	*Litoria dentata*		
Eastern Dwarf Tree Frog	*Litoria fallax*		
Broad-palmed Frog	*Litoria latopalmata*		
Peron's Tree Frog	*Litoria peronii*		
Laughing Tree Frog	*Litoria tyleri*		
Verreaux's Tree Frog	*Litoria verreauxii*		
N=	8		1

Common Name	*Scientific Name*	Conservation Status	Recorded AE
Reptiles			
Broad Tailed Gecko	*Phyllurus platurus*		
Scaly-foot Lizard	*Pygopus lepidopodus*		
Red-throated Skink	*Acritoscincus platynota*		
Fence Skink	*Cryptoblepharus virgatus*		
Coppertail Skink	*Ctenotus taeniolatus*		
Eastern Water-skink	*Eulamprus quoyii*		
Dark-flecked Garden Sunskink	*Lampropholis delicata*		
Pale-flecked Garden Sunskink	*Lampropholis guichenoti*		
Weasel Skink	*Saproscincus mustelinus*		
Eastern Blue-tongued Skink	*Tiliqua scincoides*		
Jacky Lizard	*Amphibolurus muricatus*		
Bearded Dragon	*Pogona barbata*		
Red Bellied Black Snake	*Pseudechis porphyriacus*		
N=	13		0

Common Name	*Scientific Name*	Conservation Status	Recorded AE
Birds			
Australian Wood Duck	*Chenonetta jubata*		O
Pacific Black Duck	*Anas superciliosa*		
White-faced Heron	*Egretta novaehollandiae*		O
Australian White Ibis	*Threskiornis molucca*		
Collared Sparrowhawk	*Accipiter cirrocephalus*		
Brown Goshawk	*Accipiter fasciatus*		
Nankeen Kestrel	*Falco cenchroides*		
Black Kite	*Milvus migrans*		O
Purple Swamphen	*Porphyrio porphyrio*		
Dusky Moorhen	*Gallinula tenebrosa*		
Eurasian Coot	*Fulica atra*		
Masked Lapwing	*Vanellus miles*		
Rock Dove*	*Columba livia*		
Spotted Turtle-dove*	*Streptopelia chinensis*		
Crested Pigeon	*Ocyphaps lophotes*		O
Glossy Black-cockatoo	*Calyptorhynchus lathami*		
Yellow-tailed Black-cockatoo	*Calyptorhynchus funereus*		W
Galah	*Eolophus roseicapilla*		O
Long-billed Corella	*Cacatua tenuirostris*		O
Sulphur-crested Cockatoo	*Cacatua galerita*		
Gang-gang Cockatoo	*Callocephalon fimbriatum*		
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*		
Rainbow Lorikeet	*Trichoglossus haematodus*		O
Musk Lorikeet	*Glossopsitta concinna*		O
Australian King-parrot	*Alisterus scapularis*		O
Crimson Rosella	*Platycercus elegans*		
Eastern Rosella	*Platycercus eximius*		O
Asian Koel	*Eudynamys scolopaceus*		
Channel-billed Cuckoo	*Scythrops novaehollandiae*		
Southern Boobook	*Ninox novaeseelandiae*		
Tawny Frogmouth	*Podargus strigoides*		

Common Name	*Scientific Name*	Conservation Status	Recorded AE
Birds			
Laughing Kookaburra	*Dacelo novaeguineae*		
Sacred Kingfisher	*Todiramphus sanctus*		
Dollarbird	*Eurystomus orientalis*		
Satin Bowerbird	*Ptilonorhynchus violaceus*		
Superb Fairy-wren	*Malurus cyaneus*		O
Variegated Fairy-wren	*Malurus lamberti*		
Spotted Pardalote	*Pardalotus punctatus*		
White-browed Scrubwren	*Sericornis frontalis*		
Brown Gerygone	*Gerygone mouki*		
White-throated Gerygone	*Gerygone albogularis*		
White-throated Treecreeper	*Cormobates leucophaea*		
Brown Thornbill	*Acanthiza pusilla*		
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*		O
Striated Thornbill	*Acanthiza lineata*		
Buff-rumped Thornbill	*Acanthiza reguloides*		
Red Wattlebird	*Anthochaera carunculata*		O
Little Wattlebird	*Anthochaera chrysoptera*		
Noisy Friarbird	*Philemon corniculatus*		O
Bell Miner	*Manorina melanophrys*		
Noisy Miner	*Manorina melanocephala*		O
Lewin's Honeyeater	*Meliphaga lewinii*		
Yellow-faced Honeyeater	*Lichenostomus chrysops*		
Blue faced honeyeater	*Entomyzon cyanotis*		O
White-plumed Honeyeater	*Lichenostomus penicillatus*		
White-naped Honeyeater	*Melithreptus lunatus*		
New Holland Honeyeater	*Phylidonyris novaehollandiae*		
Eastern Spinebill	*Acanthorhynchus tenuirostris*		O
Eastern Yellow Robin	*Eopsaltria australis*		
Eastern Whipbird	*Psophodes olivaceus*		
Golden Whistler	*Pachycephala pectoralis*		
Rufous Whistler	*Pachycephala rufiventris*		
Grey Shrike-thrush	*Colluricincla harmonica*		

Common Name	*Scientific Name*	Conservation Status	Recorded AE
Birds			
Magpie-lark	*Grallina cyanoleuca*		O
Rufous Fantail	*Rhipidura rufifrons*		
Grey Fantail	*Rhipidura fuliginosa*		
Willie Wagtail	*Rhipidura leucophrys*		O
Olive-backed Oriole	*Oriolus sagittatus*		
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*		O
Grey Butcherbird	*Cracticus torquatus*		O
Australian Magpie	*Cracticus tibicen*		
Pied Currawong	*Strepera graculina*		O
Australian Raven	*Corvus coronoides*		O
House Sparrow	*Passer domesticus*		
Red-browed Finch	*Neochmia temporalis*		
Welcome Swallow	*Hirundo neoxena*		
Silvereye	*Zosterops lateralis*		
Common Blackbird*	*Turdus merula*		
Common Starling*	*Sturnus vulgaris*		
Common Myna*	*Sturnus tristis*		
N =	0		24

Common Name	*Scientific Name*	Conservation Status	Recorded AE
Mammals			
Brown Antechinus	*Antechinus stuartii*		
Long-nosed Bandicoot	*Perameles nasuta*		
Common Wombat	*Vombatus ursinus*		
Sugar Glider	*Petaurus breviceps*		
Common Ringtail Possum	*Pseudocheirus peregrinus*		
Common Brushtail Possum	*Trichosurus vulpecula*		
Eastern Grey Kangaroo	*Macropus giganteus*		
Swamp Wallaby	*Wallabia bicolor*		
Grey-headed Flying-fox	*Pteropus poliocephalus*		

Common Name	*Scientific Name*	Conservation Status	Recorded AE
Mammals			
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*		
White-striped Freetail-bat	*Austronomus australis*		
Eastern Coastal Free-tail Bat	*Micronomus norfolkensis*		
Large-eared Pied Bat	*Chalinolobus dwyeri*		
Gould's Wattled Bat	*Chalinolobus gouldii*		
Chocolate Wattled Bat	*Chalinolobus morio*		
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*		
Golden-tipped Bat	*Kerivoula papuensis*		
Little Bentwing-bat	*Miniopterus australis*		
Large Bent-winged Bat	*Miniopterus orianae oceanensis*		
Southern Myotis	*Myotis macropus*		
Lesser Long-eared Bat	*Nyctophilus geoffroyi*		
Gould's Long-eared Bat	*Nyctophilus gouldi*		
Greater Broad-nosed Bat	*Scoteanax rueppellii*		
Eastern Broad-nosed Bat	*Scotorepens orion*		
Large Forest Bat	*Vespadelus darlingtoni*		
Eastern Forest Bat	*Vespadelus pumilus*		
Southern Forest Bat	*Vespadelus regulus*		
Large Forest Eptesicus	*Vespadelus darlingtoni*		
Little Forest Eptesicus	*Vespadelus vulturnus*		
Little Forest Bat	*Vespadelus vulturnus*		
Bush Rat	*Rattus fuscipes*		
House Mouse*	*Mus musculus*		
Black Rat*	*Rattus rattus*		
Fox*	*Vulpes vulpes*		Z
Cat*	*Felis catus*		
Rabbit*	*Oryctolagus cuniculus*		Z, S, Scr
N=	36		2

Key

*	=	Introduced fauna	Scr	=	Scratchings
O	=	Observed	W	=	Calls heard
S	=	Scats	Z	=	Animal remain

6.3 Fauna Summary

The number of species from each faunal group, listed as 'likely to occur' can be seen in Appendix 4.

Mammals

Two (2) feral mammal species were detected on the site.

Species not recorded during the survey but likely to occur on the site include common microbats and Brushtail possum.

Reptiles

No reptile species were detected on the site. The lack of woody debris and history of clearing will have significantly reduced potential reptile species on the site.

Species not recorded during the survey but likely to occur on the site include Red-belied Black snake and Eastern Bearded Dragon.

Frogs

One (1) frog species was detected on the site.

Frog species may forage on the site because of past irrigation and use as a plant production nursery. There is no breeding habitat on the site.

Species not recorded during the survey but likely to occur on the site include Peron's tree frog and Reed frog.

Birds

Bird species detected on the site totalled twenty-four (24).

Common urban species were observed indicating a disturbed habitat. Lack of a shrub layer and woody debris most likely accounts for low species diversity.

Species not recorded during the survey but likely to occur on the site include Magpie and Kookaburra.

6.4 Microbats

Foraging Habitat

This site provides potentially suitable foraging habitat for seven of the nine possible threatened species. *Myotis macropus* (syn. *Myotis adversus*) has no suitable foraging habitat in the form of open water bodies. *Kerivoula papuensis* is only likely to forage in areas within a few kilometres of rainforest or rainforest gullies.

Roosting Habitat

This site has no tree hollows that provide suitable roosting habitat for *Falsistrellus tasmaniensis, Micronomus norfolkensis, Scoteanax rueppellii, Myotis macropus, Miniopterus australis* and *Saccolaimus flaviventris*. This site has no caves, culverts, or bridges, but does have buildings and other suitable (often human-made) structures that provide potentially suitable roosting habitat for *Chalinolobus dwyeri, Miniopterus orianae oceanensis, Myotis macropus. Kerivoula papuensis* normally roosts in hanging bird nests or trees in rainforest gullies so is very unlikely to roost in the surveyed site.

6.5 Feral fauna

Rabbits and fox were detected on the site. Domestic cats and dogs are also likely predators on the site.

7. Discussion of results

The site has been largely cleared of native vegetation long ago. It has been used by NSW Forestry Commission (as it was then) for a plant production nursery and arboretum for more than 50 years. There is some natural habitat on the site persisting or regenerating amongst the arboretum plantings and providing some habitat to local bird species.

The adjacent golf course also provides some woodland habitat and remnant native vegetation to act as a fauna habitat reservoir.

Weed indicator species are present, indicating a high disturbance regime on the site. The herb layer is dominated by exotic grasses. Native plant indicator species including chenopod herbs are minimal (<50%) on the site and represent regrowth or possible introduction by birds.

There are some locally native trees of the two threatened plant populations *Acacia pendula* in the Hunter Catchment (T51) and *Eucalyptus camaldulensis* in the Hunter Catchment (T73), which are clear of proposed construction footprint areas but will require protection during works for the current school concept design.

Parrots and other nectarivorous birds were noted using the site. Native faunal indicator species, Noisy Miner and Currawong, are consistent with disturbed habitat. Feral indicator species, Red Fox, indicates that native fauna abundance is likely to be low.

8. Impact on biodiversity: Threshold 3

8.1 Threshold 3: Five-part test summary

Habitat requirements for locally occurring threatened faunal species, and the presence or absence of such habitat on the site, is tabulated in Appendix 5. Threatened plant species, listed in the BC Act and the EPBC Act, are shown in Appendix 6.

Under Section 7.3 of the Biodiversity Conservation Act several factors (listed in Appendix 1) need to be considered in deciding whether there is likely to be a Significant effect on threatened species, populations or ecological communities, or their habitats. If there is likely to be a significant effect on threatened species, the proposal must be accompanied by a Biodiversity Development Assessment Report.

While the overall proposal incorporates mitigating considerations and offsets, these are not taken into account in determining the outcome of the five-part tests.

Table 10. Summary of the five-part tests shown in full in Appendix 1.

Species/Communities	Recorded on site	State listing BC Act '16	C-wealth listing EPBC Act '99	Result
Diurnal raptors				
Little Eagle *Hieraaetus morphnoides*	No	Sch 2, Vul.	-	No significant effect
Forest birds				
Glossy Black-cockatoo *Calyptorhynchus lathami*	No	Sch 2, Vul.	-	No significant effect
Little Lorikeet *Glossopsitta pusilla*		Sch 2, Vul.	-	
Dusky Woodswallow *Artamus cyanopterus cyanopterus*		Sch 2, Vul.	-	
Threatened Plant Populations				
Acacia pendula population in the Hunter Catchment	Yes	Sch. 1, End.	-	No significant effect
Eucalyptus camaldulensis population in the Hunter Catchment	Yes	Sch. 1, End.	-	No significant effect
Arboreal Mammals				
Grey-headed Flying-fox *Pteropus poliocephalus*	No	Sch. 2, Vul.	Vulnerable	No significant effect
Insectivorous bats				
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	No	Sch. 2, Vul.	-	No significant effect
Eastern Coastal Free-tail Bat *Micronomus norfolkensis*		Sch. 2, Vul.	-	
Large-eared Pied Bat *Chalinolobus dwyeri*		Sch. 2, Vul.	Vulnerable	
Eastern False Pipistrelle *Falsistrellus tasmaniensis*		Sch. 2, Vul.	-	
Little Bentwing-bat *Miniopterus australis*		Sch. 2, Vul.	-	
Large Bent-winged Bat *Miniopterus orianae oceanensis*		Sch. 2, Vul.	-	
Greater Broad-nosed Bat *Scoteanax rueppellii*		Sch. 2, Vul.	-	
Eastern Cave Bat *Vespadelus troughtoni*		Sch. 2, Vul.	-	

There is no significant effect, so a Biodiversity Development Assessment Report is not required.

9. Planning Instruments

Additional planning instruments which could apply at this site include:

Local Environmental Plans of Muswellbrook local council (2009);

Development Control Plan Muswellbrook Council (2009);

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017;

State Environmental Planning Policy (Primary production and Rural Development 2019;

State Environmental Planning Policy (Koala Habitat Protection) 2019.

9.1 LEP and DCP Locally significant species or vegetation communities

A review of the Muswellbrook LEP (2009) shows the site is:

Not mapped in the LEP as environmentally sensitive land (map sheet ESL – 023).

Not mapped in the LEP as having terrestrial biodiversity values (map sheet BIO_11)

Not mapped in the LEP as having Heritage values (map sheet HER_24)

A review of the Muswellbrook LEP (2009) states:

1 Objectives of zone

- *To provide for the housing needs of the community.*
- *To provide for a variety of housing types and densities.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*
- *To enable sensitive infill development of other housing types.*
- *To allow people to carry out a reasonable range of activities from their homes, where such activities do not adversely affect the living environment of neighbours.*
- *To promote the principles of ecological sustainable development including energy and water efficient subdivision and housing design.*
- *To minimise the impact of non-residential uses and ensure these are in character and compatible with surrounding development.*
- *To ensure that development is carried out in a way that is compatible with the flood risk of the area.*

2 Permitted without consent

Home occupations

2 Permitted with consent

Attached dwellings; Bed and breakfast accommodation; Boarding houses; Building identification signs;

Business identification signs; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Exhibition homes; Exhibition villages; Flood mitigation works; Group homes; Health consulting rooms; Home-based child care; Home businesses; Home industries; Hostels; Kiosks; Multi dwelling housing; Neighbourhood shops; Oyster aquaculture; Places of public worship; Pond-based aquaculture; Recreation areas; Residential flat buildings; Respite day care centres; Roads; Secondary dwellings; Semi-detached dwellings; Seniors housing; Sewage reticulation systems; Shop top housing; Tank-based aquaculture; Water recycling facilities; Water supply systems

4 Prohibited

Any development not specified in item 2 or 3.

9.2 Environment Protection and Biodiversity Conservation Act 1999

9.2.1 Protected matters

The Protected Matters Search Tool was used to find relevant Matters of National Environmental Significance (MNES) on or near the site. The outputs are shown in Appendix 7 and summarised below.

No World Heritage Properties, National Heritage Places or State and Heritage Reserves are recorded for the area.

One Wetlands of International Importance is recorded for the area being the Hunter estuary wetland some 50-100 km upstream.

Three Listed Threatened Ecological Communities are recorded in the area: 1. Central Hunter Valley eucalypt forest and wetland; 2. Hunter Valley Weeping Myall (*Acacia pendula*) woodland; and 3. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and derived native grassland. These ecological communities are protected under Commonwealth legislation by the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999) and are listed as Critically Endangered.

No Commonwealth Heritage Places, Critical Habitats or Commonwealth Marine or Terrestrial Reserves were reported.

There were no Critically Endangered or Endangered species or ecological communities, or Vulnerable species recorded on the site. The provisions of the EPBC Act do not apply to this proposal.

9.3 Planning for Bushfire Protection

The land is not mapped as bushfire prone land.

10. Conclusion and Recommendations

None of the three thresholds for entry into the NSW Biodiversity Offset Scheme are triggered as follows:

Threshold 1: The proposal Stage 1 Plan to erect permanent classrooms does not exceed the clearing threshold area as described in clause 7.2 of the BC Regulation 2017.

Threshold 2: The proposal to erect permanent school buildings per the Stage 1 Plan on site does not include undertaking clearing of native vegetation or any prescribed activities (clause 6.1 of the BC Regulation 2017) on land shaded in the Biodiversity Values Land Map.

Threshold 3: The proposal for the permanent school buildings and playgrounds per the school Stage 1 Plan proposal as discussed with the architects has been checked to ensure retention of trees identified on site from two threatened populations of species listed as endangered in the Hunter Catchment: Tree 73 (*Eucalyptus camaldulensis)* and Tree 51 (*Acacia pendula)*. Therefore, a significant effect on these threatened populations of the area is unlikely and a Biodiversity Development Assessment Report is not required.

Therefore, a Biodiversity Development Assessment Report (BDAR) is not required for the Stage 1 Plan.

Recommendations

1. A qualified arborist be engaged prior to any demolition or construction works to erect Australian Standard tree protection fencing to ensure protection and retention of Trees 73 and 51 which are threatened Hunter Catchment populations of *Eucalyptus camaldulensis* and *Acacia pendula;* Tree T169 may be removed.
2. Additional vegetation removal outside of the cleared area/ approved demolition DA is prohibited without council approval.
3. The *Tamarix aphylla* (Pine Athell) which is a weed of national significance should be removed if it resprouts or seeds on site.
4. Other High Threat Exotic weeds on site (Section 5.3) should be controlled by the site owner.
5. Landscaping appropriate to a school and local area should be instituted post installation of demountables.
6. Erosion and sediment control structures are to be installed prior to any earthworks commencing.
7. Erosion and sediment control structures are to be cleared after any storm event.

11.References

Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). The New Atlas of Australian Birds. Royal Australasian Ornithologists Union, Victoria.

Benson, D. & McDougall, L. (1991). Rare Bushland Plants of Western Sydney. Royal Botanical Gardens, Sydney.

Benson, D.H. and Howell, J. (1990). Taken for granted: the bushland of Sydney and its suburbs. Kangaroo Press, Kenthurst.

Briggs, J. D., and Leigh, J. H. (1995). Rare or Threatened Australian Plants. CSIRO, Canberra.

Brooker, M. I. H. and Kleinig, D. A. (1990). Field Guide to Eucalypts, Volume 1. South-eastern Australia. Inkata, North Ryde.

Cogger, H. G. (1983). Reptiles and Amphibians of Australia. Reed, Frenchs Forest.

Cropper, S. (1993). Management of Endangered Plants. CSIRO, Melbourne

Ehmann, H. (1992). Encyclopaedia of Australian Animals Reptiles. Angus and Robertson, Pymble.

Ehmann, H. (Ed.) (1997). Overview Chapter, pages 13 - 42 In Threatened Frogs of New South Wales: Habitats, Status and Conservation. Frog and Tadpole Study Group of NSW Inc.

Fairley, A. and Moore, P. (1989). Native Plants of the Sydney District, An Identification Guide. Kangaroo Press, Kenthurst.

McDonald R. C., Isbell, R. F., Speight, J. G., Walker, J., & Hopkins, M. S., (1990). Australian soil and land survey field handbook Second edition. Inkata Press, Melbourne.

McKenzie, N. J., Grundy, M. J., Webster, R. and Ringrose, A. J. (2008). Guidelines for Surveying Soil and Land Resources (Second Edition). CSIRO Publishing, Collingwood, VIC.

NSW Office of Environment and Heritage (2017) Biodiversity Assessment Method (BAM).

NSW Scientific Committee, (1999). Final Determination for Bushrock Removal, Key Threatening Process.

NSW Scientific Committee, (2000). Final Determination for High Frequency Fire, Key Threatening Process.

NSW Scientific Committee, (2001). Final Determination for Clearing of Native Vegetation, Key Threatening Process.

NSW Scientific Committee, (2003). Final Determination for Removal of Dead Wood and Dead Trees, Key Threatening Process.

NSW Scientific Committee, (2007). Final Determination for Loss of Hollow-bearing Trees, Key Threatening Process.

NSW Scientific Committee, (2011). Final Determination for Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands, Key Threatening Process.

Richards, G. C., (2001). Towards defining adequate bat survey methodology: why electronic call detection is essential throughout the night. The Australian Bat Society Newsletter Number 16 March 2001: 24-28

Robinson, M. (1993). A Field Guide to Frogs of Australia. Reed/Australian Museum, Chatswood.

Simpson, K., Day, N. & Trusler, P. (1996). Field Guide to the Birds of Australia. Penguin, Ringwood, Vic.

Specht. R. L. (1970). Vegetation of the Australian Environment. G. W. Leeper (Ed.), 4th Edition, CSIRO, Melbourne.

Strahan, R. (Ed.) (1995). The Mammals of Australia. Reed, Sydney.

Tozer, M.G. Turner, K., Keith, D.A., Tindall, D., Pennay, C., Simpson, C., MacKenzie, B., Beukers, P. and Cox, S. (2010). Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. Cunninghamia, 11(3): 359-406.

Watson, D. M. (2010). Optimizing inventories of diverse sites: insights from Barro Colorado Island birds. Methods in Ecology and Evolution, 1: 280-291.

Appendix 1. Flora List

MAGNOLIOPSIDA
DICOTYLEDONS

AIZOACEAE
* Galenia pubescens HTE

AMARANTHACEAE
Alternanthera nana
Gomphrena celosoides

APIACEAE
* Cyclospermum leptophyllum

APOCYNACEAE
* Araujia sericifera HTE

ASTERACEAE
* Arctotheca calendula
* Bidens pilosa HTE
* Cirsium vulgare
* Conyza bonariensis
* Hypochaeris albiflora
Lactuca serriola
* Senecio madagascariensis HTE
* Silybum marianum
* Sonchus oleraceus
* Taraxacum officinale
Vittadinia cuneata

BIGNONIACEAE
Pandorea pandorana

BRASSICACEAE
* Brassica fruticulosa
* Lepidium africanum

CACTACEAE
* Cylindropuntia sp. HTE

CAMPANULACEAE
Wahlenbergia communis
Wahlenbergia (littoricola)

CASUARINACEAE
Allocasuarina gymnanthera
Allocasuarina leuhmannii
Allocasuarina littoralis
Casuarina cristata
Casuarina cunninghamiana

CHENOPODIACEAE
Atriplex semibaccata
Einadia nutans subsp. linifolia
Einadia polygonoides
Einadia trigonos
Enchylaena tomentosa
Maireana microphylla

CONVOLVULACEAE
Convolvulus erubescens
Dichondra repens

CRASSULACEAE
* Bryophyllum delagoense HTE

EUPHORBIACEAE
* Euphorbia dallachyana
* Euphorbia davidii

FABACEAE
CAESALPINIODEAE
Senna artemisoides subsp. zygophylla

FABACEAE
FABOIDEAE
Glycine tabacina
* Medicago polymorpha

FABACEAE
MIMOSOIDEAE
Acacia baileyana
Acacia iteaphylla
Acacia pendula
Acacia salicina
Acacia williamsonii

GERANIACEAE
Erodium (botrys)
Geranium potentilloides

LAMIACEAE
Lamium amplexicaule
* Stachys arvensis

MALVACEAE
Brachychiton populneus
* Malva parviflora
* Sida rhombifolia

MELIACEAE
Melia azedarach

MYRTACEAE
Callistemon citrinus
Callistemon linearis
Callistemon viminalis
Corymbia citriodora
Corymbia eximia
Eucalyptus albens
Eucalyptus bosistoana
Eucalyptus beyeriana
Eucalyptus camaldulensis
Eucalyptus conspicua
Eucalyptus crebra
Eucalyptus dawsonii
Eucalyptus dealbata
Eucalyptus intertexta
Eucalyptus largiflorens
Eucalyptus melanophloia
Eucalyptus propinqua
Eucalyptus seeana
Eucalyptus sideroxylon
Eucalyptus socialis
Eucalyptus tereticornis
Eucalyptus viridis
Melaleuca bracteata
Melaleuca decussata
Melaleuca halmaturorum
Melaleuca linariifolia
Melaleuca styphelioides

OCHNACEAE
* Ochna serrulata HTE

OLEACEAE
Fraxinus greywoodii
Fraxinus griffithii
* Ligustrum lucidum HTE
Notelaea microcarpa

OXALIDACEAE
* Oxalis latifolia

PAPAVERACEAE
* Fumaria muralis

PASSIFLORACEAE
* Passiflora suberosa

Eremophila gilesii
Camellia japonica

PITTOSPORACEAE
Pittosporum undulatum

PLANTAGINACEAE
* Plantago lanceolata

POLYGONACEAE
Polygonum plebeium
Rumex brownii

PROTEACEAE
Grevillea hookeriana (fanfare)
Grevillea robusta

ROSACEAE
Photinia robusta

RUBIACEAE
* Galium aparine

RUTACEAE
Geijera parviflora
Murraya paniculata

SAPINDACEAE
Cupaniopsis anacradioides

SALICACEAE
Populus deltoides

SCROPHULARIACEAE
Eremophila gilesii

SOLANACEAE
* Cestrum parqui HTE
* Lycium ferocissimum HTE
* Solanum americanum
* Solanum nigrum
* Solanum seaforthianum HTE

TAMARICACEAE
* Tamarix aphylla HTE

ULMACEAE
Ulmus parvifolia

VERBENACEAE
* Verbena bonariensis

MONOCOTYLEDONS

ANTHERICACEAE
Laxmannia gracilis

ARECACEAE
* Phoenix canariensis HTE

CYPERACEAE
Cyperus gracilis

IRIDACEAE
* Romulea rosea HTE

LOMANDRACEAE
Lomandra longifolia

POACEAE
Austrodanthonia sp.
Austrostipa nodosa
Austrostipa ramosissima
Bothriochloa macra
* Cenchrus clandestinus HTE
Chloris divaricata
* Chloris gayana HTE
Dicanthium sericium
Digitaria didactyla
* Ehrharta erecta HTE
Entolasia stricta
Eragrostis parviflora
* Lolium perenne
Paspalidium sp.
* Paspalum dilatatum HTE
* Setaria palmifolia
* Sporobolus creber
* Stenotaphrum secundatum HTE
* Urochloa panicoides

Key
* Weedy
# Planted

Appendix 2. Plant Community Analysis

Table A2.1 Plant Community Type identification using PCTs tabled in the NSW OEH BioNet for the Sydney Basin Bioregion; Hunter subregion and Upper Hunter Valley vegetation mapping.

Species recorded in a 20 x 20m vegetation survey plot on site	618 White box x Grey Box –red gum – Rough-barked Apple grassy woodland on rich soils on hills in the upper Hunter Valley	623 Narrow-leaved Ironbark +/- Grey Box grassy woodland of the upper Hunter Valley, mainly Sydney Basin Bioregion	1767 Rough-barked Apple grassy tall woodlands of the Brigalow Belt South	1691 Narrow - leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter
Eucalyptus albens				
Eucalyptus dawsonii				
Eucalyptus crebra	Yes	Yes		Yes
**Corymbia citriodora*				
Acacia salicina				
Casuarina cristata				
Geijera parviflora				
Brachychiton populneus	Yes	Yes		Yes
Notelaea microcarpa	Yes	Yes		Yes
Wahlenbergia communis	Yes			
Rumex brownii	Yes			
Cyperus gracilis	Yes			
Maireana microphylla		Yes		
Glycine tabacina		Yes		
Sporobolus creber		Yes		
Einadia nutans		Yes	Yes	
Vittadinia cuneata		Yes		
Einadia trigonos		Yes	Yes	
Dichondra repens			Yes	Yes
Dichantheum sericeum			Yes	
Paspalum dilataum			Yes	
Bothriochloa macra	Yes			
Austrostipa nodosa				
Austrostipa ramosissima				
**Araujia sericifera*				
* *Bryophyllum delagoensis*				
* *Romulea rosea*				
Total	**7**	**10**	**5**	**4**

Table A2.2 Plant Community Type identification using locally occurring Endangered Ecological Communities from a Commonwealth Protected Matters Search.

Species recorded in a 20 x 20 m plot on site	Central Hunter Valley eucalypt forest and woodland	Hunter Valley Weeping Myall (Acacia pendula) woodland	White Box-Yellow Box-Blakely's Red Gum Grassy woodland and derived native grassland
Eucalyptus albens	Yes		Yes
Eucalyptus dawsonii	Yes		
Eucalyptus crebra	Yes	Yes	
* *Corymbia citriodora*			
Geijera parvifolia		Yes	
Casuarina cristata			
Brachychiton populneus	Yes		
Acacia salicina	Yes	Yes	
Notelaea microcarpa	Yes	Yes	
Senna artesimoides subsp. zygophylla		Yes	
Rumex brownii			
Glycine tabacina			
Sporobolus creber			
Einadia nutans		Yes	
Vittadinia cuneata			
Paspalum dilatatum			
Austrostipa ramiosissima			
Austrostipa nodosa			
Bothriochloa macra			
Cyperus gracilis			
Dichondra repens	Yes		
Maireana microphylla		Yes	
Enchylaena tomentosa		Yes	
Einadia trigonos			
Wahlenbergia communis			Yes
Dichantheum sericeum			
* *Araujia sericifera*			
* *Romulea rosea*			
* *Bryophyllum delagoensis*			
Total	7	8	2

Appendix 3. Five-part tests

While the overall proposal incorporates mitigating considerations and offsets, these are not taken into account in determining the outcome of the **five-part** tests.

The Assessment of Significance (Office of Environment and Heritage (OEH)) states that "*Proposed measures that mitigate, improve or compensate for the action, development or activity should not be considered in determining the degree of the effect on threatened species, populations or ecological communities, unless the measure has been used successfully for that species in a similar situation.*"

Table 11. Species addressed in five part tests

Common Name	*Scientific Name*	NSW status	Comm. status
Little Lorikeet	*Glossopsitta pusilla*	V,P	
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V,P	
Little Eagle	*Hieraaetus morphnoides*	V,P	
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V,P	
Grey-headed Flying-fox	*Pteropus poliocephalus*	V,P	V
Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	V,P	
Eastern Coastal Free-tail Bat	*Micronomus norfolkensis*	V,P	
Large-eared Pied Bat	*Chalinolobus dwyeri*	V,P	V
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V,P	
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	V,P	
Little Bent-winged Bat	*Miniopterus australis*	V,P	
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V,P	
Eastern Cave Bat	*Vespedelus troughtoni*	V,P	
Weeping Myall in the Hunter River catchment	*Acacia pendula population in the Hunter Catchment*	E,P	-
River Red Gum in the Hunter river catchment	*Eucalyptus camaldulensis population in the Hunter Catchment*	E,P	-

Where applicable threatened populations are considered as threatened species in the following five part tests.

7.2 Development or activity "likely to significantly affect threatened species"

(1) For the purposes of this Part, development or an activity is **"likely to significantly affect threatened species"** if:

(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or

(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or

(c) it is carried out in a declared area of outstanding biodiversity value.

(2) To avoid doubt, subsection (1) (b) does not apply to development that is an activity subject to environmental impact assessment under Part 5 of the *Environmental Planning and Assessment Act 1979*.

7.3 Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Forest Birds

Common name	*Scientific name*	NSW status	Comm. status
Little Lorikeet	*Glossopsitta pusilla*	V	-
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V	-
Little Eagle	*Hieraaetus morphnoides*	V	-
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	-

Key

CE = Critically Endangered

E = Endangered

V = Vulnerable

Little Lorikeet *Glossopsitta pusilla*

http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20111

- Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.
- Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.
- Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards
- Gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries.
- Roosts in treetops, often distant from feeding areas.
- Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like *Allocasuarina*.
- Nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt. However, the survival rate of fledglings is unknown

Glossy Black-Cockatoo *Calyptorhynchus lathami*

https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10140

- 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.
- Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta,* and *A. gymnathera.* Belah is also utilised and may be a critical food source for some populations.

- In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*).
- Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill.
- Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.

Little Eagle *Hieraaetus morphnoides*
https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20131

- Occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used.
- Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.
- Lays two or three eggs during spring, and young fledge in early summer.
- Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.

Dusky Woodswallow *Artamus cyanopterus cyanopterus*
https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20303

- Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.
- Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed.
- Depending on location and local climatic conditions (primarily temperature and rainfall), the dusky woodswallow can be resident year round or migratory. In NSW, after breeding, birds migrate to the north of the state and to southeastern Queensland, while Tasmanian birds migrate to southeastern NSW after breeding. Migrants generally depart between March and May, heading south to breed again in spring. There is some evidence of site fidelity for breeding. Although dusky woodswallows generally breed as solitary pairs or occasionally in small flocks, large flocks may form around abundant food sources in winter. Large flocks may also form before migration, which is often undertaken with other species.
- Nest is an open, cup-shape, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass, rootlets or infrequently horsehair, occasionally unlined. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage.

7.3 Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

No. The space on site is currently clear of vegetation following demolition DA. Birds will continue to forage around the new demountable classrooms on site. Any local viable population of Glossy Black-Cockatoo, Little Eagle, Little Lorikeet or Dusky Woodswallow will use a wide area for foraging. The proposal is unlikely to affect the life cycles of these species such that a viable local population will be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable. This test is for a group of threatened species.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. This test is for a group of threatened species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

No habitat is to be removed with this proposal.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

No. Erection of single level demountable classrooms in a cleared space on site will not isolate or fragment mobile flying species like birds.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

Not applicable. Habitat will not be removed.

Criterion	Comment
Area and quality of habitat within the locality (maps, photos, survey)	The locality is a rural/suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on residential properties.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available on nearby and adjacent properties that have not been cleared. The feeding resource is moderate.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Habitat connectivity is not disrupted by this proposal.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain, and herbaceous species remain suppressed as a lawn around the cleared area for new demountables.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No. No area of outstanding biodiversity value has been specifically declared for this species.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

No.

Conclusion

The Stage 1 proposed activity is unlikely to have a significant effect on Little Eagle, Glossy Black-Cockatoo, Little Lorikeet or Dusky Woodswallow. Therefore, a Biodiversity Development Assessment Report is not recommended.

Grey-headed Flying-fox

Common name	*Scientific name*	NSW status	Comm. status
Grey-headed Flying-fox	*Pteropus poliocephalus*	V,P	V

Key

V = Vulnerable

P = Protected

Habitat and ecology

http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10697

- Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.
- Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.
- Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young.
- Annual mating commences in January and conception occurs in April or May; a single young is born in October or November.
- Site fidelity to camps is high; some camps have been used for over a century.
- Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km.
- Feed on the nectar and pollen of native trees, in particular *Eucalyptus, Melaleuca* and *Banksia*, and fruits of rainforest trees and vines.
- Also forage in cultivated gardens and fruit crops.

7.3 Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

No. The space on site is currently clear of vegetation following demolition DA. Grey-headed Flying-foxes will continue to forage within and around the new demountable classrooms on site. Any local viable population of Flying-fox will use a wide area for foraging. The proposal is unlikely to affect the life cycles of this species such that a viable local population will be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable. This test is for a group of threatened species.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. This test is for a group of threatened species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

No habitat is to be removed with this proposal.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

No. Erection of single level demountable classrooms in a cleared space on site will not isolate or fragment highly mobile flying species like flying fox.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

Not applicable. Habitat will not be removed.

Criterion	Comment
Area and quality of habitat within the locality (maps, photos, survey)	The locality is a rural/suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on residential properties.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available on nearby and adjacent properties that have not been cleared. The feeding resource is moderate.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Habitat connectivity is not disrupted by this proposal.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain, and herbaceous species remain suppressed as a lawn on site around the cleared area for new demountables.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No. No area of outstanding biodiversity value has been specifically declared for this species.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

No.

Conclusion

The Stage 1 proposed activity is unlikely to have a significant effect on Grey-headed Flying-fox. Therefore a Biodiversity Development Assessment Report is not recommended.

Insectivorous bats

Common name	*Scientific name*	NSW status	Comm. status
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V,P	-
Eastern Coastal Free-tail Bat	*Micronomus norfolkensis*	V,P	-
Large-eared Pied Bat	*Chalinolobus dwyeri*	V,P	V
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V,P	-
Little Bentwing-bat	*Miniopterus australis*	V,P	-
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	V,P	-
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V,P	Near Threatened
Eastern Cave Bat	*Vespadelus troughtoni*	V, P	-

Key

V = Vulnerable P = Protected

Yellow-bellied Sheathtail-bat Saccolaimus flaviventris

http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10741

Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.

Eastern Coastal Free-tail Bat Micronomus norfolkensis

http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10544

Eastern Coastal Free-tail Bat occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost maily in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.

Large-eared Pied Bat Chalinolobus dwyeri

http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10157

Large-eared Pied Bat roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open

forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring.

Eastern False Pipistrelle *Falsistrellus tasmaniensis*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10331

Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer.

Little Bentwing-bat *Miniopterus australis*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533

Little Bentwing-bat prefers moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Large Bent-winged Bats (Miniopterus orianae) and appears to depend on the large colony to provide the high temperatures needed to rear its young. Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites /maternity colonies are known in Australia.

Large Bent-winged Bat *Miniopterus orianae oceanensis*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534

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. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.

Greater Broad-nosed Bat *Scoteanax rueppellii*

http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10748

Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. Little is known of its reproductive cycle, however a single young is born in January; prior to birth, females congregate at maternity sites located in suitable trees, where they appear to exclude males during the birth and raising of the single young.

Eastern Cave Bat *Vespadelus troughtoni*

https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10829

Very little is known about the biology of this uncommon species. 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. Occasionally found along cliff-lines in wet eucalypt forest and rainforest. Little is understood of its feeding or breeding requirements or behaviour

7.3 Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

No. The space on site is currently clear of vegetation following demolition DA. Bats will continue to forage within and around the new demountable classrooms on site. Any local viable population of threatened microbats will use a wide area for foraging. The proposal is unlikely to effect the life cycles of these species such that a viable local population will be placed at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable. This test is for a group of threatened species.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. This test is for a group of threatened species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

Approximately 420 m^2 of habitat is to be removed with this proposal.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

No. Erection of single level demountable classrooms in a cleared space on site will not isolate or fragment highly mobile flying species like bats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

Approximately 420m^2 of habitat will be removed.

Criterion	Comment
Area and quality of habitat within the locality (maps, photos, survey)	The locality is a rural/suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on residential properties.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available on nearby and adjacent properties that have not been cleared. The feeding resource is moderate.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Habitat connectivity is not disrupted by this proposal.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain, and herbaceous species remain suppressed as a lawn around the cleared area for new demountables.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No. No area of outstanding biodiversity value has been specifically declared for this species.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

No.

Conclusion

The proposed Stage 1 activity is unlikely to have a significant effect on Yellow-bellied Sheathtail-bat, Eastern Coastal Free-tail Bat, Large-eared Pied Bat, Eastern False Pipistrelle, Little Bentwing-bat, Large Bent-winged Bat, Greater Broad-nosed Bat or Eastern Cave Bat. Therefore, a Biodiversity Development Assessment Report is not recommended.

Endangered plant species populations

Common name	*Scientific name*	NSW status	Comm. status
Weeping Myall in the hunter Catchment	*Acacia pendula population in the Hunter Catchment*	E2	-
River Red Gums in the Hunter River Catchment	*Eucalyptus camaldulensis population in the Hunter Catchment*	E2	-

Key

CE = Critically Endangered

E = Endangered

V = Vulnerable

Acacia pendula endangered population in the Hunter Catchment

https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10967

- The species occurs on the western slopes, western plains and far western plains of NSW, and south into Victoria and north into Queensland.
- This Hunter population is known to occur naturally as far east as Warkworth, and extends northwest to Muswellbrook and to the west of Muswellbrook at Wybong. Only recorded to date at 6 locations: Jerrys Plains, Edderton, Wybong, Appletree Creek, Warkworth and Appletree Flat. These locations occur within the Muswellbrook and Singleton Local Government Areas, with the population potentially also occurring within the Mid-Western Regional and Upper Hunter LGA's.
- The stand at Jerrys Plains is part of the community known as "Weeping Myall - Coobah - Scrub Wilga Shrubland of the Hunter Valley". This is listed under Commonwealth legislation as a "Critically Endangered Ecological Community".
- Within the Hunter catchment the species typically occurs on heavy soils, sometimes on the margins of small floodplains, but also in more undulating locations.
- It is not known to occur within any conservation areas.

Eucalyptus camaldulensis endangered population in the Hunter Catchment
https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10968

- The Hunter population occurs from the west at Bylong, south of Merriwa, to the east at Hinton, on the bank of the Hunter River, in the Port Stephens local government area. It has been recorded in the local government areas of Lithgow, Maitland, Mid-Western Regional, Muswellbrook, Port Stephens, Singleton and Upper Hunter.
- Prior to European settlement, between 10,000 and 20,000 ha of habitat suitable for the River Red Gum occurred in the Hunter catchment. Today only 19 stands are known, occupying at most c. 100 ha, the largest remnant being 15 - 20 ha in extent. Smaller remnants contain only one to several trees. The total number of individuals is estimated to be between 600 - 1000 mature or semi mature trees.
- Most of the occurrences are on private land and there are no known occurrences in conservation reserves.
- Prior to European settlement, it is likely that the species formed extensive stands of woodland and open woodland on the major floodplains of the Hunter and Goulburn rivers, especially in areas where water impoundment occurs after flood. Since settlement, most of the floodplains have been cleared of woody vegetation. Flood mitigation works now prevent most minor floods from inundating floodplains. These flow changes, coupled with the clearing of native vegetation, have greatly reduced the extent of habitat favourable to the River Red Gum in the Hunter catchment.

7.3 Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

Planted specimens on site will be retained outside the planned construction footprint and future recruitment of new individuals remain possible.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Planted specimens of the species will be retained at this site as a member of a population each with less than 1000 individuals within the Hunter Catchment.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. This test is for a group of threatened species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

A planted specimen of the endangered population will be protected with the school concept plan in its current form.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The habitat will not be fragmented but retained on site.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

Important. These populations persist at very low abundance and any loss is significant.

Criterion	Comment
Area and quality of habitat within the locality (maps, photos, survey)	The locality is a rural/suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on residential properties.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Good
Role of habitat to be affected in sustaining habitat connectivity in the locality	Habitat will be retained for these populations with this development proposal.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however some local canopy species remain and herbaceous species remain suppressed as a lawn around the cleared area for new demountables.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No. No area of outstanding biodiversity value has been specifically declared for this species.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

No. Consultation with the project managers and architects NBRS have ensured that the location of the tagged trees T51 and T73 of threatened populations is clear of the proposal footprint and the tree can be protected during building works and retained on site.

Conclusion

The Stage 1 proposed activity is unlikely to have a significant effect on *Acacia pendula* and *Eucalyptus camaldulensis* populations in the Hunter Catchment. Therefore a Biodiversity Development Assessment Report is not recommended.

Appendix 4. Expected fauna species in the Sydney Basin

Mammals

Common name	*Scientific name*
White-striped Freetail-bat	*Austronomus australis*
Gould's Wattled Bat	*Chalinolobus gouldii*
Chocolate Wattled Bat	*Chalinolobus morio*
Lesser Long-eared Bat	*Nyctophilus geoffroyi*
Gould's Long-eared Bat	*Nyctophilus gouldi*
Bush Rat	*Rattus fuscipes*
Swamp Rat	*Rattus lutreolus*
Long-nosed Bandicoot	*Perameles nasuta*
Brown Antechinus	*Antechinus stuartii*
Dusky Antechinus	*Antechinus swainsonii*
Yellow-footed Antechinus	*Antechinus flavipes*
Common Wombat	*Vombatus ursinus*
Common Ringtail Possum	*Pseudocheirus peregrinus*
Sugar Glider	*Petaurus breviceps*
Feathertail Glider	*Acrobates pygmaeus*
Eastern Grey Kangaroo	*Macropus giganteus*
Large Forest Bat	*Vespadelus darlingtoni*
Little Forest Bat	*Vespadelus vulturnus*
Common Wallaroo	*Macropus robustus*
Red-necked Wallaby	*Macropus rufogriseus*
Swamp Wallaby	*Wallabia bicolor*
Common Brushtail Possum	*Trichosurus vulpecula*
Greater Glider	*Petauroides volans*
Short-beaked Echidna	*Tachyglossus aculeatus*
Fox	*Vulpes vulpes*
Black Rat	*Rattus rattus*
Rabbit	*Oryctolagus cuniculus*

Frogs

Common Name	*Scientific Name*
Green Tree Frog	*Litoria caerulea*
Blue Mountains Tree Frog	*Litoria citropa*
Bleating Tree Frog	*Litoria dentata*
Eastern Dwarf Tree Frog	*Litoria fallax*
Jervis Bay Tree Frog	*Litoria jervisiensis*
Broad-palmed Frog	*Litoria latopalmata*
Peron's Tree Frog	*Litoria peronii*
Leaf-green Tree Frog	*Litoria phyllochroa*
Tyler's Tree Frog	*Litoria tyleri*
Verreaux's Frog	*Litoria verreauxii*
Common Eastern Froglet	*Crinia signifera*
Eastern Banjo Frog	*Limnodynastes dumerilii*
Ornate Burrowing Frog	*Limnodynastes ornatus*
Brown-striped Frog	*Limnodynastes peronii*
Spotted Grass Frog	*Limnodynastes tasmaniensis*
Haswell's Froglet	*Paracrinia haswelli*
Smooth Toadlet	*Uperoleia laevigata*
Tyler's Toadlet	*Uperoleia tyleri*

Reptiles

Common Name	Scientific Name
Diamond Python	Morelia spilota spilota
Common Death Adder	Acanthophis antarcticus
Yellow-faced Whip Snake	Demansia psammophis
Common Tree Snake	Dendrelaphis punctulatus
Golden-crowned Snake	Cacophis squamulosus
Eastern Small-eyed Snake	Cryptophis nigrescens
Red-naped Snake	Furina diadema
Black-bellied Swamp Snake	Hemiaspis signata
Tiger Snake	Notechis scutatus
Red-bellied Black Snake	Pseudechis porphyriacus

Common Name	Scientific Name
Eastern Brown Snake	Pseudonaja textilis
Dwyer's Snake	Parasuta dwyeri
Bandy Bandy	Vermicella annulata
Blackish Blind Snake	Ramphotyphlops nigrescens
Wood Gecko	Diplodactylus vittatus
Lesueur's Velvet Gecko	Oedura lesueurii
Broad-tailed Gecko	Phyllurus platurus
Thick-tailed Gecko	Underwoodisaurus milii
Burton's Snake-lizard	Lialis burtonis
Common Scaly-foot	Pygopus lepidopodus
Jacky Lizard	Amphibolurus muricatus
Bearded Dragon	Pogona barbata
Punctate Worm-skink	Anomalopus swansoni
Eastern Blue-tongue	Tiliqua scincoides
Southern Rainbow-skink	Carlia tetradactyla
Cream-striped Shinning-skink	Cryptoblepharus virgatus
Robust Ctenotus	Ctenotus robustus
Copper-tailed Skink	Ctenotus taeniolatus
Mainland She-oak Skink	Cyclodomorphus michaeli
Pink-tongued Skink	Cyclodomorphus gerrardii
Cunningham's Skink	Egernia cunninghami
Black Rock Skink	Egernia saxatilis
White's Skink	Liopholis whitii
Eastern Water-skink	Eulamprus quoyii
Barred-sided Skink	Eulamprus tenuis
Dark-flecked Garden Sunskink	Lampropholis delicata
Pale-flecked Garden Sunskink	Lampropholis guichenoti
Weasel Skink	Saproscincus mustelinus
Red-throated Skink	Acritoscincus platynota
Three-toed Skink	Saiphos equalis
Lace Monitor	Varanus varius
Eastern Snake-necked Turtle	Chelodina longicollis

Birds

Common Name	*Scientific Name*
Brown Quail	*Coturnix ypsilophora*
Black Swan	*Cygnus atratus*
Australian Wood Duck	*Chenonetta jubata*
Mallard	*Anas platyrhynchos*
Pacific Black Duck	*Anas superciliosa*
Grey Teal	*Anas gracilis*
Chestnut Teal	*Anas castanea*
Australasian Grebe	*Tachybaptus novaehollandiae*
Great Crested Grebe	*Podiceps cristatus*
Hoary-headed Grebe	*Poliocephalus poliocephalus*
Little Pied Cormorant	*Microcarbo melanoleucos*
Little Black Cormorant	*Phalacrocorax sulcirostris*
Great Cormorant	*Phalacrocorax carbo*
Australian Pelican	*Pelecanus conspicillatus*
White-faced Heron	*Egretta novaehollandiae*
Little Egret	*Egretta garzetta*
White-necked Heron	*Ardea pacifica*
Great Egret	*Ardea alba*
Cattle Egret	*Ardea ibis*
Intermediate Egret	*Ardea intermedia*
Australian White Ibis	*Threskiornis molucca*
Straw-necked Ibis	*Threskiornis spinicollis*
Royal Spoonbill	*Platalea regia*
Black-shouldered Kite	*Elanus axillaris*
Whistling Kite	*Haliastur sphenurus*
Wedge-tailed Eagle	*Aquila audax*
White-bellied Sea-eagle	*Haliaeetus leucogaster*
Swamp Harrier	*Circus approximans*
Brown Goshawk	*Accipiter fasciatus*
Collared Sparrowhawk	*Accipiter cirrocephalus*
Brown Falcon	*Falco berigora*
Australian Hobby	*Falco longipennis*

Common Name	*Scientific Name*
Nankeen Kestrel	*Falco cenchroides*
Buff-banded Rail	*Gallirallus philippensis*
Purple Swamphen	*Porphyrio porphyrio*
Dusky Moorhen	*Gallinula tenebrosa*
Eurasian Coot	*Fulica atra*
Latham's Snipe	*Gallinago hardwickii*
Black-winged Stilt	*Himantopus himantopus*
Black-fronted Dotterel	*Elseyornis melanops*
Masked Lapwing	*Vanellus miles*
Silver Gull	*Chroicocephalus novaehollandiae*
Rock Dove	*Columba livia*
White-headed Pigeon	*Columba leucomela*
Spotted Turtle-dove	*Streptopelia chinensis*
Brown Cuckoo-dove	*Macropygia amboinensis*
Emerald Dove	*Chalcophaps indica*
Common Bronzewing	*Phaps chalcoptera*
Crested Pigeon	*Ocyphaps lophotes*
Bar-shouldered Dove	*Geopelia humeralis*
Wonga Pigeon	*Leucosarcia picata*
Topknot Pigeon	*Lopholaimus antarcticus*
Yellow-tailed Black-cockatoo	*Calyptorhynchus funereus*
Galah	*Eolophus roseicapilla*
Long-billed Corella	*Cacatua tenuirostris*
Little Corella	*Cacatua sanguinea*
Sulphur-crested Cockatoo	*Cacatua galerita*
Rainbow Lorikeet	*Trichoglossus haematodus*
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*
Musk Lorikeet	*Glossopsitta concinna*
Australian King-parrot	*Alisterus scapularis*
Crimson Rosella	*Platycercus elegans*
Eastern Rosella	*Platycercus eximius*
Fan-tailed Cuckoo	*Cacomantis flabelliformis*
Horsfield's Bronze-cuckoo	*Chalcites basalis*

Common Name	*Scientific Name*
Channel-billed Cuckoo	*Scythrops novaehollandiae*
Asian Koel	*Eudynamys scolopaceus*
Southern Boobook	*Ninox novaeseelandiae*
Barn Owl	*Tyto alba*
Tawny Frogmouth	*Podargus strigoides*
White-throated Nightjar	*Eurostopodus mystacalis*
Australian Owlet-nightjar	*Aegotheles cristatus*
White-throated Needletail	*Hirundapus caudacutus*
Laughing Kookaburra	*Dacelo novaeguineae*
Sacred Kingfisher	*Todiramphus sanctus*
Rainbow Bee-eater	*Merops ornatus*
Dollarbird	*Eurystomus orientalis*
Superb Lyrebird	*Menura novaehollandiae*
Satin Bowerbird	*Ptilonorhynchus violaceus*
Superb Fairy-wren	*Malurus cyaneus*
Variegated Fairy-wren	*Malurus lamberti*
Spotted Pardalote	*Pardalotus punctatus*
White-browed Scrubwren	*Sericornis frontalis*
Large-billed Scrubwren	*Sericornis magnirostra*
Brown Gerygone	*Gerygone mouki*
White-throated Gerygone	*Gerygone albogularis*
White-throated Treecreeper	*Cormobates leucophaea*
Brown Thornbill	*Acanthiza pusilla*
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Yellow Thornbill	*Acanthiza nana*
Striated Thornbill	*Acanthiza lineata*
Buff-rumped Thornbill	*Acanthiza reguloides*
Red Wattlebird	*Anthochaera carunculata*
Little Wattlebird	*Anthochaera chrysoptera*
Noisy Friarbird	*Philemon corniculatus*
Bell Miner	*Manorina melanophrys*
Noisy Miner	*Manorina melanocephala*
Lewin's Honeyeater	*Meliphaga lewinii*

Common Name	*Scientific Name*
Yellow-faced Honeyeater	*Lichenostomus chrysops*
White-plumed Honeyeater	*Lichenostomus penicillatus*
Brown-headed Honeyeater	*Melithreptus brevirostris*
White-naped Honeyeater	*Melithreptus lunatus*
New Holland Honeyeater	*Phylidonyris novaehollandiae*
Eastern Spinebill	*Acanthorhynchus tenuirostris*
Scarlet Honeyeater	*Myzomela sanguinolenta*
Jacky Winter	*Microeca fascinans*
Rose Robin	*Petroica rosea*
Eastern Yellow Robin	*Eopsaltria australis*
Eastern Whipbird	*Psophodes olivaceus*
Crested Shrike-tit	*Falcunculus frontatus*
Golden Whistler	*Pachycephala pectoralis*
Rufous Whistler	*Pachycephala rufiventris*
Grey Shrike-thrush	*Colluricincla harmonica*
Black-faced Monarch	*Monarcha melanopsis*
Leaden Flycatcher	*Myiagra rubecula*
Restless Flycatcher	*Myiagra inquieta*
Magpie-lark	*Grallina cyanoleuca*
Rufous Fantail	*Rhipidura rufifrons*
New Zealand Fantail	*Rhipidura fuliginosa*
Willie Wagtail	*Rhipidura leucophrys*
Spangled Drongo	*Dicrurus bracteatus*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
White-bellied Cuckoo-shrike	*Coracina papuensis*
Olive-backed Oriole	*Oriolus sagittatus*
Dusky Woodswallow	*Artamus cyanopterus*
Grey Butcherbird	*Cracticus torquatus*
Australian Magpie	*Cracticus tibicen*
Pied Currawong	*Strepera graculina*
Australian Raven	*Corvus coronoides*
White-winged Chough	*Corcorax melanorhamphos*
Apostlebird	*Struthidea cinerea*

Common Name	*Scientific Name*
Eurasian Skylark	*Alauda arvensis*
Australasian Pipit	*Anthus novaeseelandiae rogersi*
House Sparrow	*Passer domesticus*
Red-browed Finch	*Neochmia temporalis*
Double-barred Finch	*Taeniopygia bichenovii*
Mistletoebird	*Dicaeum hirundinaceum*
Welcome Swallow	*Hirundo neoxena*
Tree Martin	*Petrochelidon nigricans*
Fairy Martin	*Petrochelidon ariel*
Cicadabird	*Coracina tenuirostris*
Red-whiskered Bulbul	*Pycnonotus jocosus*
Australian Reed-warbler	*Acrocephalus australis*
Little Grassbird	*Megalurus gramineus*
Golden-headed Cisticola	*Cisticola exilis*
Silvereye	*Zosterops lateralis*
Eurasian Blackbird	*Turdus merula*
Common Starling	*Sturnus vulgaris*
Common Myna	*Sturnus tristis*

Appendix 5. Habitat requirements for locally-occurring threatened fauna species

Birds

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Little Eagle *Hieraaetus morphnoides* BC Act Sch. 2, Vul.	Occupies open Eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands are also used. Builds a stick nests in winter in tall living trees within remnant patches.	Suitable foraging habitat occurs on the site.
White-bellied Sea-Eagle *Haliaeetus leucogaster* BC Act Sch. 2, Vul.	• Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. • Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. • Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). • Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.	No suitable natural habitat occurs on the site.
Glossy Black-cockatoo *Calyptorhynchus lathami* BC Act, Sch. 2, Vul.	Found in open forests with Allocasuarina species and hollows for nesting.	Suitable foraging habitat occurs on the site.
Little Lorikeet *Glossopsitta pusilla* BC Act, Sch. 2, Vul.	Inhabits the open forests and dead timber alongside watercourses. Also occurs in eucalypt forest in mountainous regions.	Suitable foraging habitat occurs on the site.
Speckled Warbler *Pyrrholaemus sagittatus* BC Act Sch. 2, Vul.	Inhabits Eucalypt dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy.	No suitable natural habitat occurs on the site.
Dusky Woodswallow	Often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been	Suitable natural habitat occurs on the site.

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Artamus cyanopterus cyanopterus BC Act Sch. 2, Vul.	recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests.	
Magpie Goose *Anseranas semipalmata* BC Act Sch. 2, Vul.	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	No suitable natural habitat occurs on the site.
White-throated Needletail *Hirundapus caudacutus P*	In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground (Coventry 1989; Tarburton 1993; Watson 1955). Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable (Cramp 1985).	No suitable natural habitat occurs on the site.
Black-necked Stork *Ephippiorhynchus asiaticus* E1	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. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly contribute the greatest biomass to their diet, but they feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers, crickets and crayfish). Black-necked Storks build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation (reflecting the floodplain habitat).	No suitable natural habitat occurs on the site.

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae* BC Act Sch. 2, Vul.	Inhabits Eucalypt dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy.	No suitable natural habitat occurs on the site.
Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis* BC Act Sch. 2, Vul.	Inhabits Eucalypt dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy.	No suitable natural habitat occurs on the site.

Mammals

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Spotted-tailed Quoll *Dasyurus maculatus* BC Act, Sch. 2, Vul. EPBC Act, End.	Occurs mostly in sclerophyll forest and woodlands as well as coastal heath lands and rainforests. Requires suitable den sites such as hollows or caves and large areas of intact vegetation.	No suitable natural habitat occurs on the site.
Koala *Phascolarctos cinereus* BC Act, Sch. 2, Vul.	Eucalypt forests rich in Swamp Mahogany (E. robusta), Forest Red Gum (E. tereticornis), and Grey Gum (E. punctata).	No suitable natural habitat occurs on the site.
Squirrel Glider *Petaurus norfolcensis* BC Act, Sch. 2, Vul.	Inhabits dry sclerophyll forest and woodland. Requires abundant hollow-bearing trees and a mix of Eucalypts, acacias and Banksias. At least one floral species should flower heavily in the winter and one or more species of Eucalypts need to be smooth-barked.	No suitable natural habitat occurs on the site.
Grey-headed Flying-fox *Pteropus poliocephalus* BC Act, Sch. 2, Vul. EPBC Act, Vul.	Found in rainforest, wet and dry sclerophyll forest and mangroves. Camps are usually in gullies, close to water and in vegetation with a dense canopy. Feeds on a wide variety of flowering and fruiting plants.	Suitable foraging habitat occurs on the site.

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Eastern Coastal Free-tail Bat *Micronomus norfolkensis* BC Act, Sch. 2, Vul.	Dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures.	Suitable foraging habitat occurs on the site.
Large-eared Pied Bat *Chalinolobus dwyeri* BC Act, Sch. 2, Vul.	Found in well-timbered areas containing gullies.	Suitable foraging habitat occurs on the site.
Eastern False Pipistrelle *Falsistrellus tasmaniensis* BC Act, Sch. 2, Vul.	Little known of habitat. Has been found roosting in stem holes of living Eucalypts	Suitable foraging habitat occurs on the site.
Large Bent-winged Bat *Miniopterus orianae oceanensis* BC Act, Sch. 2, Vul.	Well-timbered valleys. Roosts in caves and storm-water channels and similar structures. Does not roost in tree hollows.	Suitable foraging habitat occurs on the site.
Southern Myotis *Myotis macropus* BC Act, Sch. 2, Vul.	Requires open areas of water over which it hunts. Roosts in caves, under bridges and buildings and sometimes in dense foliage in rainforests. May roost in tree hollows.	No suitable natural habitat occurs on the site.
Greater Broad-nosed Bat *Scoteanax rueppellii* BC Act, Sch. 2, Vul. EPBC Act, Lower risk (near threatened)	Found in woodlands, moist and dry sclerophyll forests and rainforests. Prefers gullies. Roosts in tree hollows only.	Suitable foraging habitat occurs on the site.
Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris* BC Act, Sch. 2, Vul.	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Forages in most habitats.	Suitable foraging habitat occurs on the site.
Eastern Cave Bat *Vespadelus troughtoni* BC Act, Sch. 2, Vul.	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.	Little is understood of this species feeding or breeding requirements or behaviour.

Appendix 6. Habitat requirements for locally-occurring threatened plant species

Botanical name Conservation status	Habitat description	Suitable habitat on site
Acacia asparagoides ROTAP, 2R	Grows in dry sclerophyll forest or occasionally heath on sandstone.	No
Acacia baueri subsp. aspera ROTAP, 2RC – BC Act, Sch. 2, Vul.	Grows in low heath, often on exposed sandstone ridges.	No
Acacia bynoeana ROTAP, 3VC - BC Act, Sch. 1, End. EPBC Act, Vul.	Grows mainly in heath and dry sclerophyll forest, in sandy soils.	No
Acacia clunies-rossiae ROTAP, 2RC - t BC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest, in valleys, on slopes and ridges, and along creeks.	No
Acacia flocktoniae ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest on sandstone.	No
Acacia gordonii ROTAP, 2K BC Act, Sch. 1, End. EPBC Act, End.	Grows in dry sclerophyll forest and heath on sandstone outcrops.	No
Acacia pendula population in the Hunter Catchment BC Act, Sch. 1, End	Within the Hunter catchment the species typically occurs on heavy soils, sometimes on the margins of small floodplains, but also in more undulating locations. Only recorded to date at 6 locations: Jerrys Plains, Edderton, Wybong, Appletree Creek, Warkworth and Appletree Flat. These locations occur within the Muswellbrook and Singleton Local Government Areas, with the population potentially also occurring within the Mid-Western Regional and Upper Hunter LGA's.	Yes
Acacia pubescens ROTAP, 3VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Usually grows in dry sclerophyll forest and woodland in clay soils. Often in roadside and railside bushland remnants.	No
Acacia terminalis subsp. terminalis ROTAP, 2RCi BC Act, Sch. 1, End. EPBC Act, End.	Scattered or locally common in scrub and open eucalypt woodland or forest, usually in sandy soil on creek banks, hillslopes or in shallow soil in rock crevices and sandstone platforms on cliffs.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Acrophyllum australe ROTAP, 2VCi BC Act, – Sch. 2, Vul. EPBC Act, Vul.	Grows in damp crevices in sandstone, usually near waterfalls. Restricted to the Blue Mtns, near Springwood, Linden, Woodford and Lawson.	No
Allocasuarina glareicola ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, End.	Grows in open forest on lateritic soil; restricted to a few small populations in or near Castlereagh S.F., NE of Penrith.	No
Almaleea incurvata ROTAP, 2RC – t	Grows in swamps dominated by sedges and/or shrubs, on sandstone; restricted to the Blue Mtns.	No
Amperea xiphoclada var. papillata ROTAP, 3KC	Grows with other native sedges and rushes in swamps on sandstone at altitudes of greater than 600 m.	No
Ancistrachne maidenii ROTAP, 2KC - BC Act, Sch. 2, Vul.	Grows on sandstone soils; north of Sydney.	No
Angophora crassifolia ROTAP, 2RCa	Locally frequent but restricted to the Ku-ring-gai Plateau region.	No
Asterolasia elegans ROTAP, 2ECa BC Act, Sch. 1, End. EPBC Act, End.	Grows in wet sclerophyll forest on moist hillsides, known from only one locality, north of Maroota.	No
Atkinsonia ligustrina ROTAP, 2RCa	Occurs in woodland and heath in exposed sites, a single plant often parasitic on the roots of many nearby plants; confined to a small area in the Blue Mtns.	No
Banksia conferta var. penicillata BC Act, Sch. 1, End.	Grows in dry sclerophyll forest or woodland, restricted to small populations in the Blue Mtns on sandstone cliffs or steep slopes and around rocky outcrops.	No
Blandfordia cunninghamii ROTAP, 3RCi	Grows in damp shallow sandy and peaty soils, often on sandstone cliff edges; chiefly in the Blue Mtns and Illawarra areas.	No
Blechnum gregsonii ROTAP, 2RCa	Pendent clumps found in cool rainforest, often in damp places near waterfalls, sometimes epiphytic; chiefly in the Blue Mtns and Illawarra coastal ranges.	No
Boronia fraseri ROTAP, 2RCa (UBBS 97 Recommend)	Grows mainly in wet sclerophyll forest and in rainforest in gullies on sandstone, chiefly in the Sydney region.	No
Boronia serrulata ROTAP, 2RC -	Grows in moist heath in sandy situations, chiefly in a coastal band in the Sydney district; record for the SWS in Jacobs & Pickard (1981) not substantiated.	No
Brasenia schreberi	Widespread but rarely common, found in shallow freshwater lagoons or backwaters.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
ROTAP, 3RC- +		
Callistemon linearifolius ROTAP, 2RCi BC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest on the coast and adjacent ranges, chiefly from Georges R. to the Hawkesbury R.	No
Callistemon shiressii ROTAP, 3RC -	Grows on shale ridges, in moist eucalypt forest and rainforest gullies, occasionally along riverbanks; chiefly from Colo R. to Gosford district, also Howes Valley to Bulga district.	No
Carex klaphakei BC Act, Sch. 1, End.	Known only from a few localities on Central Tablelands near Blackheath, Mt Werong and Penrose at 600–1200 m alt.	No
Chamaesyce psammogeton BC Act, Sch. 1, End.	Grows on dunes and sea strandlines.	No
Cryptostylis hunteriana BC Act, Sch. 2, Vul. EPBC Act, Vul.	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland.	No
Cynanchum elegans ROTAP, 3ECi BC Act, Sch. 1, End. EPBC Act, End.	Rare, recorded from rainforest gullies scrub and scree slopes; from the Gloucester district to the Wollongong area and inland to Mt Dangar.	No
Cyphanthera scabrella ROTAP, 2RC -	Grows in dry or wet sclerophyll forest in sandstone-derived soil; restricted to Bilpin-Mt Wilson area in Blue Mtns.	No
Darwinia biflora ROTAP, 2VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on sandstone or in the understorey of woodland on shale-capped ridges; Cheltenham to Hawkesbury R., rare.	No
Darwinia diminuta ROTAP, 2RCi	Grows in heath or dry sclerophyll forest in poorly drained sandy soil; Manly to Ingleside and Loftus to Helensburgh, rare.	No
Darwinia fascicularis subsp. oligantha BC Act, Sch. 1, End. Pop. (Baulkham Hills)	Grows in heath or shallow soils; higher parts of the Blue Mtns.	No
Darwinia grandiflora ROTAP, 2RCi	Grows in dry sclerophyll forest and woodland on poorly drained sandy soil; Woronora Plateau and Illawarra region, rare.	No
Darwinia peduncularis ROTAP, 3RCi BC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest on sandstone hillsides and ridges; Hornsby to Hawkesbury R. and west to Glen Davis, rare.	No
Deyeuxia appressa ROTAP, 2E	Grows on wet ground; in the Hornsby area.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
BC Act, Sch. 1, End. EPBC Act, End.		
Deyeuxia microseta ROTAP, 3KC -	Grows in montane sclerophyll forest, especially wetter areas.	No
Dillwynia tenuifolia ROTAP, 2RCa BC Act, Sch. 2, Vul.	Grows in dry sclerophyll woodland on sandstone, shale or laterite; from Cumberland Plain, Blue Mtns to Howes Valley area.	No
Discaria pubescens ROTAP, 3RCa	In woodland and forest, often in rocky situations; widespread, but considered endangered.	No
Diuris aequalis ROTAP, 3VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows among grass in sclerophyll forest, mainly in the ranges and tablelands; chiefly from Braidwood to Kanangra and Liverpool.	No
Epacris hamiltonii ROTAP, 2ECi BC Act, Sch. 1, End. EPBC Act, End.	Grows in skeletal sandy soils in sheltered damp rock situations on sandstone in the Blackheath area.	No
Epacris muelleri ROTAP, – 3RC -	Grows on skeletal soils on damp rock faces on sandstone in the Blue Mtns and Wollemi N.P.	No
Epacris purpurascens var. purpurascens BC Act, Sch. 2, Vul.	Grows in sclerophyll forest, scrubs and swamps on sandstone from Gosford and Sydney districts.	No
Epacris sparsa ROTAP, 2VCi BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in sandy soil among rocks beside Grose R.	No
Epacris sparsa ROTAP, 2VCi BC Act, Sch. 2, Vul. EPBC Act, Vul.	Rare and localized, in mallee shrubland on skeletal sandy soil on sandstone; sporadic occurrences between Linden and Berrima.	No
Eucalyptus baeuerlenii ROTAP, 3RCa	Locally frequent but restricted, in wet forest or woodland in sheltered often sloping sites; from Wentworth Falls to Budawang Ra.	No
Eucalyptus benthamii ROTAP, 2VCi BC Act, Sch. 2, Vul. EPBC Act, Vul.	Restricted but locally abundant, in wet forest on sandy alluvial soils along valley floors; confined to the lower Nepean R. area.	No
Eucalyptus burgessiana	Locally frequent but restricted, in mallee shrubland on skeletal sand on sandstone; restricted to lower Blue Mtns.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
ROTAP, 2RCa		
Eucalyptus camfieldii ROTAP, 2VCi BC Act, Sch. 2, Vul. EPBC Act, Vul.	Rare and localized, in coastal shrub heath on sandy soils on sandstone, often of restricted drainage; from Gosford to Royal N.P.	No
Eucalyptus camaldulensis population in the Hunter Catchment BC Act, Sch. 1, End	Today only 19 stands are known, occupying at most c. 100 ha, the largest remnant being 15 - 20 ha in extent. Smaller remnants contain only one to several trees. The total number of individuals is estimated to be between 600 - 1000 mature or semi mature trees. Most of the occurrences are on private land and there are no known occurrences in conservation reserves. Prior to European settlement, it is likely that the species formed extensive stands of woodland and open woodland on the major floodplains of the Hunter and Goulburn rivers, especially in areas where water impoundment occurs after flood. Since settlement, most of the floodplains have been cleared of woody vegetation. Flood mitigation works now prevent most minor floods from inundating floodplains. These flow changes, coupled with the clearing of native vegetation, have greatly reduced the extent of habitat favourable to the River Red Gum in the Hunter catchment.	Yes
Eucalyptus cannonii ROTAP, 2VCi BC Act, Sch. 2, Vul.	Locally frequent but restricted, in sclerophyll woodland on shallow soil on rises; Rylstone to upper Wolgan Valley.	No
Eucalyptus copulans ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, End.	Locally frequent but restricted, in sclerophyll woodland on shallow soil on rises; Rylstone to upper Wolgan Valley.	No
Eucalyptus cunninghamii ROTAP, 2RCa	Restricted but locally frequent, in mallee heath skeletal sandy soil on sandstone; confined to central Blue Mtns.	No
Eucalyptus sp. 'Cattai' BC Act, Sch. 1, End.	Grows as isolated trees or small groups of trees in scrub, heath and low woodland, in sandstone-derived soils.	No
Eucalyptus leuhmanniana ROTAP, 2RCa	Locally abundant but restricted, in mallee heath on shallow infertile sandy soils of poor drainage on sandstone; confined to coastal plateau between the Hawkesbury R. and Bulli.	No
Euphrasia bowdeniae ROTAP, 2VCit BC Act Sch. 2, Vul. EPBC Act, Vul.	Grows on sandstone cliffs in shallow soil on ledges or sometimes trailing over rock, in higher parts of Blue Mtns.	No
Genoplesium baueri	Prefers sandy dry Eucalyptus habitats	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
BC Act, Sch. 1, End.		
Grammitis stenophylla BC Act, Sch. 1, End.	Prefers moist shaded gullies, typically grows on rocks near moss.	No
Grevillea caleyi BC Act, Sch. 1, End. EPBC Act, End.	Grows on sandy soil with lateritic influences, typically on ridges.	No
Microtis angusii BC Act, Sch. 1, End. EPBC Act, End.	Difficult to determine, growing among weeds and on a disturbed soil. Possibly prefers sandy soils with lateritic influences.	No
Gonocarpus longifolius ROTAP, 3RC -	Grows in shrub communities on sandstone; mainly on the ranges from Armidale to the Blue Mtns, east of Rylstone.	No
Goodenia rostrivalvis ROTAP, 2RCa	Grows on damp south-facing sandstone cliffs in Blue Mtns, in the Wentworth Falls area, rare.	No
Grevillea juniperina subsp. juniperina BC Act, Sch. 2, Vul.	Grows in open dry sclerophyll (eucalypt-dominated) forest or woodland, at altitudes of less than about 50 m, in sandy to clay-loam soils and red pseudolateritic gravels.	No
Grevillea longifolia ROTAP, 2RC -	Grows in moist areas of sclerophyll forest, often near creeks, on Hawkesbury sandstone; chiefly the southern half of Sydney Basin, and Woronora Plateau; possibly also in Lawson area.	No
Grevillea obtusiflora BC Act, Sch. 1, End. EPBC Act, End.	Grows in sandy loam soils in open low scrub beneath dry sclerophyll forest in the Kandos area.	No
Grevillea parviflora subsp. parviflora BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heathy associations or shrubby woodland, in sandy or light clay soils usually over shale substrates.	No
Gyrostemon thesioides ROTAP, 2KC - BC Act Sch. 1, End.	Grows on hillsides and riverbanks, only from sites near Georges (30 yrs ago) and Nepean Rivers (90 yrs ago). May already be extinct.	No
Hakea constablei ROTAP, 2RCa	In dry sclerophyll forest on rocky outcrops, scattered in the Blue Mtns between 500–1100 m alt., from Bell to Mt Wilson, rare.	No
Haloragodendron lucasii BC Act, Sch. 1, End. EPBC Act, End.	Grows in dry sclerophyll open forest on sheltered slopes near creeks on sandstone; confined to Sydney area, rare.	No
Hibbertia hermanniifolia ROTAP, 3RCa	Open forest on sandstone; confined to Bents Basin (Nepean R), Yarrowitch district and the coastal ranges south from Wadbilliga N.P.; rare.	No
Hibbertia nitida	Widespread on sandstone in the Sydney district.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
ROTAP, 2RC -		
Hibbertia superans BC Act, Sch. 1, End.	Occurs in both open woodland and heathland, and appears to prefer open disturbed areas, such as tracksides.	No
Hymenophyllum lyallii *(was Sphaerocionium lyallii)* ROTAP, 3RC – +	Grows on rocks or trees in moist rainforest in the Blue Mtns and ranges of the south coast.	No
Hymenophyllum pumilum ROTAP, 3RC -	Epiphytic in cooler rainforest of the Blue Mtns and adjacent ranges; uncommon.	No
Isopogon fletcheri ROTAP, 2VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest and heath on sandstone; confined to sheltered moist positions on the escarpment in the Blackheath district of the Blue Mtns, rare.	No
Isotoma sessiliflora (was *Hypsela sessiliflora)* ROTAP, 2X BC Act, Sch. 1, End.	Grows in damp places, on the Cumberland Plain, very rare.	No
Keraudrenia corollata var. denticulata ROTAP, 3RC -	Mostly on sandstone. Rare; recorded from near Grafton and west of Sydney.	No
Kunzea cambagei ROTAP, 2VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath; known mainly from near Mt Werong and Berrima.	No
Kunzea rupestris ROTAP, 2VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on rock platforms; known only from between Lower Portland and Ku-ring-gai Chase N.P.	No
Lasiopetalum joyceae ROTAP, 2RC - BC ACT, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on sandstone; Hornsby Plateau.	No
Leionema lachnaeoides ROTAP, 2ECi BC Act, Sch. 1, End. EPBC Act, End.	Rare, from higher Blue Mtns, on barren rocky situations.	No
Lepidosperma evansianum BC Act, Sch. 2, Vul.	Grows on wet sandstone cliff faces.	No
Lepidosperma evansianum BC Act, Sch. 2, Vul.	Grows in shrubby communities and heath on sandstone cliffs and escarpments.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Leptospermum rupicola ROTAP, -3RC -		
Leucopogon exolasius ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in woodland on sandstone, restricted to the Woronora and Grose Rivers and Stokes Creek, Royal N.P.	No
Leucopogon fletcheri subsp. fletcheri ROTAP, 2RC - BC Act, Sch. 1, End.	Grows in woodland on lateritic soils; rare, in the Springwood area.	No
Lissanthe sapida ROTAP, 3RCa	Grows in open woodland and dry sclerophyll forest, on rocky sandstone ridges and hillsides on sandy soil; occasional, from Bargo to Coloul Ra. and Blackheath.	No
Lomandra brevis ROTAP, 2RC -	Grows in dry sclerophyll forest on sandstone-derived soils in the Sydney region; not common.	No
Lomandra fluviatilis ROTAP, 3RCa	Grows in creek beds on sandy soils; in the Royal N.P. to Colo R	No
Marsdenia viridiflora subsp. viridiflora BC Act, Sch. 1, End. Pop.	Grows in woodland and scrub; north from the Razorback Ra. (Bankstn, Blacktn, Camden, Campbelltn, Fairfield, Holroyd, Liverpool & Penrith LGAs)	No
Melaleuca deanei ROTAP, 3RC- BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in wet heath on sandstone; uncommon, in coastal districts from Berowra to Nowra.	No
Micromyrtus blakelyi ROTAP, 2VCi BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath in depressions on sandstone rock platforms; restricted to areas near the Hawkesbury R.	No
Micromyrtus minutiflora ROTAP, 2V BC Act, Sch. 1, End. EPBC Act, Vul.	Grows in dry sclerophyll forest in western part of the Cumberland Plain; rare.	No
Monotoca ledifolia ROTAP, 3RC - *Notochloe microdon* ROTAP, 2RC -	Grows in exposed sites in dry sclerophyll forest and shrubland on sandstone in the Woronora Plateau and Blue Mtns area.	No
Notochloe microdon ROTAP, 2RC -	Grows in moist shady areas of the Blue Mtns district.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Olearia cordata ROTAP, 2VCi BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest and open shrubland, on sandstone; chiefly from Wisemans Ferry to Wollombi.	No
Olearia quercifolia ROTAP, 3RC -	Grows in swampy or moist terrain; confined to the Blue Mtns.	No
Ozothamnus adnatus ROTAP, 3KC-	Grows in sclerophyll forest and woodland, usually on sandy soil; rare, south from Guyra district.	No
Persoonia acerosa ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath or dry sclerophyll forest on sandstone; central Blue Mtns south to Hill Top.	No
Persoonia bargoensis ROTAP, 2V BC Act, Sch. 1, End. EPBC Act, Vul.	Grows in woodland to dry sclerophyll forest, on sandstone and laterite; restricted to the Bargo area.	No
Persoonia hirsuta/revoluta ROTAP, 3KCi BC Act, Sch. 1, End. EPBC Act, End.	Grows in woodland to dry sclerophyll forest on sandstone; both subspecies occurring as isolated individuals or very small populations.	No
Persoonia laxa BC Act, Sch. 1, Ext. EPBC Act, Ext.	Considered extinct. Probably prefers heath or sclerophyll forest with sandy soils.	No
Persoonia mollis subsp. maxima ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, End.	Grows in dry to wet sclerophyll forest on Hawkesbury sandstone, Cowan–Hornsby area.	No
Persoonia nutans ROTAP, 2ECi BC Act, Sch. 1, End. EPBC Act, End.	Grows in woodland to dry sclerophyll forest on laterite and alluvial sand; confined to the Cumberland Plain.	No
Pherosphaera fitzgeraldii *(was Microstrobos fitzgeraldii)* ROTAP, 2ECi BC Act, Sch. 1, End.	Usually grows on wet rocks within the spray of waterfalls or on ledges or in caves near waterfalls; restricted to southerly aspects on sandstone near waterfalls in the Katoomba to Wentworth Falls area of the Blue Mtns.	No
Philotheca obovalis *(was Eriostemon obovalis)* ROTAP, 3RCa	Grows in heath and dry sclerophyll forest on sandstone; chiefly in the Blue Mountains, also recorded for Kydra Mountain.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Pilularia novae-hollandiae BC Act, Sch. 1, End.	Widespread but not common in seasonally dry depressions and margins of marshes; may grow submerged.	No
Pimelea curviflora var. curviflora BC Act, Sch. 2, Vul. EPBC Act, Vul.	Confined to coastal areas around Sydney on sandstone.	No
Pimelea spicata ROTAP, 3ECi BC Act, Sch. 1, End. EPBC Act, End.	Grows on the coast from Lansdowne to Shellharbour and inland to Penrith; rare.	No
Platysace clelandii ROTAP, 2RCa	Grows among sandstone boulders in dry sclerophyll forest, from Glen Davis to Berowra.	No
Pomaderris brunnea ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	In open forest, confined to the Colo R. and upper Nepean R.	No
Prostanthera cryptandroides BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows chiefly in the Lithgow to Sandy Hollow districts.	No
Prostanthera marifolia BC Act, Sch. 4, Ext A. EPBC Act, CE.	Occurs in sandy soils with clay-loam and ironstone on ridge tops.	No
Pseudanthus divaricatissimus ROTAP, 3RCa	Mostly from Muswellbrook to Bega, with outlying populations near Urbenville and Dubbo (Goonoo State Forest).	No
Pterostylis gibbosa ROTAP, 2E (X-WSyd) BC Act, Sch. 1, End. EPBC Act, End.	Grows among grass in sclerophyll forest; rare, chiefly in the southern parts of the central coast, with a disjunct population in the Hunter Valley.	No
Pterostylis saxicola ROTAP, (2E) BC Act, Sch. 1, End. EPBC Act, End.	Grows in shallow soil over sandstone sheets, often near streams; rare, from Picnic Point to Picton area.	No
Pultenaea sp. 'Genowlan Point' (NSW 417813) BC Act, Sch. 1, Crit. End. EPBC Act, Crit. End.	It is endemic to New South Wales and is only found at Genowlan Point in the Capertee Valley. At Genowlan Point, Pultenaea sp. 'Genowlan Point' (Allen s.n., 29 Nov. 1997) is restricted to well drained stoney soils.	No
Pultenaea glabra EPBC Act, Vul.	Grows in dry sclerophyll forest on sandstone; higher Blue Mtns and Glen Davis area.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Pultenaea parviflora ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, Vul.	Grows in dry sclerophyll forest on Wianamatta Shale, laterite or alluvium, Cumberland Plain.	No
Pultenaea pedunculata BC Act, Sch. 1, End.	Grows in dry sclerophyll forest and disturbed sites on a variety of soils on the South Coast and edge of the Southern Tableland, but with disjunct restricted populations on Wianamatta Shale on the Cumberland Plain in N.S.W.	No
Pultenaea villifera var. villifera ROTAP, 3RC - BC Act, Sch. 1, End. Pop. (Lower Blue Mountains)	Grows in dry sclerophyll forest on sandy soil; lower Blue Mtns to Eden district.	No
Rhizanthella slateri ROTAP, 3KC - BC Act, Sch. 2, Vul. EPBC Act, End.	Grows in sclerophyll forest in shallow to deep loams. Collections tend to be accidental and it is not possible to determine distribution accurately; recorded for the Blue Mtns, also Bulahdelah south to Dharug N.P.	No
Rupicola apiculata ROTAP, 2RCa	Grows in skeletal sandy soils in damp situations on sandstone rock ledges between 700–1100 m alt.; restricted to the Blue Mtns.	No
Rupicola ciliata ROTAP, 2RC – t	Grows in skeletal sandy soils in rock crevices, on rock ledges and beneath cliff overhangs in Kurrajong Heights, Bilpin to lower Yarramun Creek areas in the Blue Mtns.	No
Rupicola sprengelioides ROTAP, 2RC – t	Restricted to skeletal sandy soils on sandstone ledges, cliff faces and rocky ground, in the Burragorang Valley.	No
Sprengelia monticola ROTAP, 2RC – t	Grows on wet rock faces and ledges or cliff bases on sandstone in the Blue Mtns.	No
Syzygium paniculatum BC Act, Sch. 1, End. EPBC Act, Vul.	Rainforest and open forest near riparian zones.	No
Tetratheca glandulosa ROTAP, – 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in sandy or rocky heath or scrub, from Mangrove Mtn to the Blue Mtns and Sydney.	No
Tetratheca neglecta ROTAP, 3RC -	Grows in sandy heath and dry sclerophyll forest; chiefly in the Sydney district, south to Robertson.	No
Thesium australe ROTAP, 3VCi BC Act, -Sch. 2, Vul. EPBC Act, Vul.	Grows in grassland or woodland, often in damp sites; widespread but rare and possibly endangered.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Tylophora woollsii ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, End.	Grows in wet sclerophyll forest and rainforest in the Clouds Creek area near Nymboida and in sclerophyll forest near Parramatta; rare.	No
Velleia perfoliata ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on shallow sandy soil over sandstone; confined to the Hawkesbury district to the upper Hunter Valley.	No
Veronica lithophila (was *Parahebe lithophila)* ROTAP, 2RC -	Grows on cliffs or rock exposures, in pockets of soil over sandstone or quartzite; Blue Mtns-Colong region at 650–870 m alt., uncommon.	No
Wilsonia backhousei BC Act, Sch. 2, Vul.	Grows in coastal saltmarshes; chiefly in the Sydney district, also common at Jervis Bay.	No
Zieria covenyi BC Act, Sch. 1, End. EPBC Act, End.	Grows in eucalypt woodland on sandy soils; known only from Narrow Neck Peninsular in the Blue Mtns N.P.	No
Zieria involucrata ROTAP, 2VCa BC Act, Sch. 1, End. EPBC Act, Vul.	Grows in wet sclerophyll forest, chiefly in the Lower Blue Mtns; rare.	No
Zieria murphyi ROTAP, 2VC-	Grows in dry sclerophyll forest in sandy soils; on the ranges from Mt Tomah to Penrose district.	No
Zieria prostrata BC Act, Sch. 1, End. EPBC Act, End.	Restricted to low coastal heaths, near Coffs Harbour; rare.	No

Key

BC Act 2016:
Sch1 = Schedule 1: Endangered species
Part 1: endangered species
Part 2: endangered populations
Part 3: endangered ecological communities
Part 4: species presumed extinct
Sch2 = Schedule 2: Vulnerable species

EPBC Act 1999:
CE = Critically Endangered
E = Endangered
V = Vulnerable
EP = Endangered Population

ROTAP Codes
1 Known by one collection only
2 Geographic range in Australia < 100Km
3 Geographic range in Australia > 100Km
E Endangered
V Vulnerable
R Rare
X Extinct
K Poorly known
C Reserved
a > or = 1000 plants reserved
i < 1000 plants reserved
t Total known population reserved
- Reserved population size unknown
+ Overseas occurrence

Appendix 7. Matters of National Environmental Significance

The Protected Matters Search Tool was used to find relevant Matters of National Environmental Significance (MNES) on or near the site.

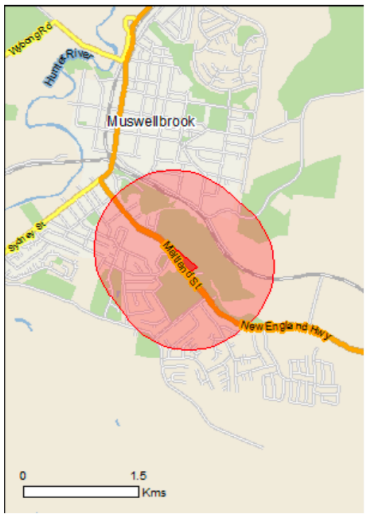
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

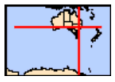
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 19/08/20 16:01:09



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 1.0Km



No World Heritage Properties, National Heritage Places or State and Heritage Reserves are recorded for the area.

One Wetlands of International Importance is recorded for the area being the Hunter estuary wetland some 50-100 km upstream.

Three Listed Threatened Ecological Communities are recorded in the area: 1. Central Hunter Valley eucalypt forest and wetland; 2. Hunter Valley Weeping Myall (*Acacia pendula*) woodland; and 3. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and derived native grassland. These ecological communities are protected under Commonwealth legislation by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) and are listed as Critically Endangered

No Commonwealth Heritage Places, Critical Habitats or Commonwealth Marine or Terrestrial Reserves were reported.

Appendix 8. Company Profile

Abel Ecology has been in the biodiversity consulting business since 1991, starting in the Sydney Region, and progressively more state wide in New South Wales since 1998, and now also in Victoria. During this time extensive expertise has been gained with regard to Master Planning, Environmental Impact assessments including flora and fauna, bushfire reports, Vegetation Management Plans, Management of threatened species, Review of Environmental Factors, Species Impact Statements, Biodiversity Development Assessment Reports and as Expert Witness in the Land and Environment Court. We have done consultancy work for industrial and commercial developments, golf courses, civil engineering projects, tourist developments as well as residential and rural projects. This process has also generated many connections with relevant government departments and city councils in NSW. Our team consists of seven scientists and three administrative staff, plus casual assistants as required.

Licences

NPWS s132C Scientific licence number is SL100780.

NPWS GIS data licence number is CON95034.

NSW Dept of Primary Industries Secretary's Animal Care and Ethics Committee Approval: 18/575.

NSW Dept of Primary Industries Animal Research Authority. Accreditation No: 84207.

The Consultancy Team

Dr Danny Wotherspoon

BSc, DipEd, MA, PhD, Grad Dip Bushfire Protection,
MECA NSW, MEPLA, MNELA, MESA, MEIANZ, White card.

Danny has practised as an ecological and bushfire consultant since 1991. He is a consulting ecologist to private developers, State Government agencies and various City Councils on a regular basis, for development applications, government projects, and as expert witness in the NSW Land and Environment Court.

Danny's PhD researched fragmented vegetation and fauna habitat use. He has special expertise in fauna habitat use. Danny has presented invited papers at international conferences since 2001 in Australia, China, South Africa, Sri Lanka and Israel on his PhD and other research, including golf course habitat management. Danny's scientific papers have been published in both international and Australian academic journals.

Dr Daniel McDonald

B. Ag Sc; M. Agr; PhD (The University of Sydney)
Cert IV – GIS (Riverina TAFE)

Daniel is an accredited Biobanking Assessor (0075) and an accredited BAM assessor (BAAS17056)

Quantified Tree Risk Assessment (QTRA) and Visual Tree Assessment (VTA), White Card

Daniel is an experienced ecologist with expertise in fauna, plant species identification, vegetation assessment, agriculture, arboriculture, conservation genetics and seed collection and preservation. He is accredited both for BAM assessments, BioBanking assessments and Biodiversity Certification. His present research interest is in Eastern Suburbs Banksia Scrub and fragmented endangered ecological communities.

Dr Alison Hewitt

B. Sc. (Hons), PhD.
MESA, MAPS, MASBS, Snr 1st Aid cert, White card.

Alison has researched and published on the reproductive biology and ecology of Australian Melaleuca species, native plant responses to fire and the vegetation of western Sydney. Alison's interests include plant ecology and flora survey methodology, bush regeneration, plant identification and gardening. Alison teaches Botany and Ecology sessionally with Western Sydney University.

Nick Tong

BSc (Biology), MPhil (Ecology), Cert. III CLM
BAM Accredited Assessor (BAAS22012),
MECA NSW, Snr First Aid, White card.

Nicholas is an experienced ecologist with expertise in fauna, plant species identification, vegetation assessment and ecological restoration. In the last six years, he has been a consulting ecologist to private developers and large corporations, for a variety of projecting including State Significant Developments. Nick has extensive field work experience in Sydney, the Blue Mountains and Central West NSW. His Master's project investigated the impacts of exotic predators on herpetofauna in the arid zone. His role at Abel Ecology is to provide expert advice on fauna and the application of the Biodiversity Offset Scheme.