



Biodiversity Development Assessment Report (BDAR)

10 Lomas Lane, Nulkaba

Prepared for

St Philips Education Foundation c/- Barr Planning

Final V4 / 4th November 2022

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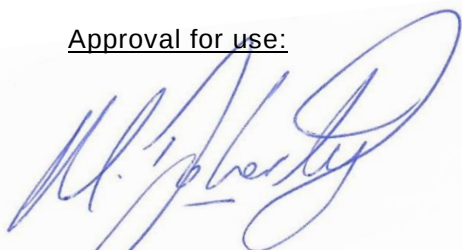
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Approval for use:



Matt Doherty

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November 2022

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EXECUTIVE SUMMARY

MJD Environmental has been engaged by Barr Planning on behalf of St Philips Christian Education Foundation to prepare a Biodiversity Development Assessment Report (BDAR) for a State Significant Development (SSD), being expansion of infrastructure and facilities at St Philips Christian College, being Lots 1 / DP126765, 1 / DP744377, 2 / DP600895 and 518 / DP837571, and a portion of the road corridor of 10 Lomas Lane Nulkaba NSW.

This proposal falls within the major projects approval pathway, as a State Significant Development (SSD), pursuant to Schedule 1, 15(2) of the State Environment Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). The Secretary's Environmental Assessment Requirements (SEARs) for the project have directed the applicant to: *"Assess any biodiversity impacts associated with the development in accordance with the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method 2020, including the preparation of a Biodiversity Development Assessment Report (BDAR), unless a waiver is granted, or the site is on biodiversity certified land"*. As the impacts to biodiversity do not meet the requirements of a BDAR waiver due to the presence of native vegetation and habitat constraints, this BDAR has been prepared to assess residual impacts.

The Biodiversity Assessment Methodology (BAM) 2020 was used as the assessment method, to establish impacts on threatened species and threatened ecological communities in the locality under the *Biodiversity Conservation Act 2016*. In addition, preliminary assessment was also undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Assessment has been considered with regard to the Koala via application of the *State Environmental Planning Policy (Conservation and Biodiversity) 2021*.

The proposed Subject Land is situated over land zoned RU2 – Rural Landscape. Lot 1 DP 126765 is the site of the current educational establishment of St Philip's Christian College, comprising parking, buildings, sports ground and open space. Lot 1 DP 744377 is generally comprised of open space with unsealed access and one building, being the SPCC Dynamic Alternative Learning Environment. Lot 518 DP 837571 comprises of open space, unsealed access, a greenhouse, an irrigation dam and an equestrian centre. Across all lots, substantial managed open space dominates.

Field surveys carried out as part of the BDAR delineated the following Plant Community Type (PCT) within the Subject Land:

- 1594 – Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

No threatened species listed as under the BC Act were recorded within the subject land.

Additionally, the Subject Land is mapped on the Important Areas Map as habitat for *Anthochaera phrygia* (Regent Honeyeater) listed as Critically Endangered under both the BC & EPBC Acts, however no impact to mapped vegetation is proposed.

Impact Avoidance & Mitigation

A package of avoidance and mitigation measures have been described in this BDAR associated with the project.

The Subject Land for development was selected due to the largely cleared or managed lands with low native species diversity as a result of past and present land use. A total of 2.31 ha of native vegetation is to be entirely removed under this proposal within the Study Area.

All measures have been incorporated into the design (avoidance) in the first instance with mitigation measures assessed for the construction phases of the project.

Impact Analysis

The proposal will result in the following impacts and required Biodiversity Offset Liability as calculated using the BAM-C Calculator.

PCT	TEC	Area (ha)	HBT Cr	No HBT Cr	Offset Credits required
Ecosystem Credits					
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.09	2	0	2
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	Not a TEC	2.2	0	0	0

The full Biodiversity Credit Liability is to be retired prior to the commencement of works. Clearing of the Subject Land is anticipated to occur as a single event and so, no staged retirement of credits is listed here.

A market appraisal will be undertaken to determine if some or all of the credit types are available and/or an application will be made to the Biodiversity Conservation Trust (BCT) for payment into Biodiversity Conservation Fund (BCF).

A preliminary assessment under the EPBC Act determined the proposed action is unlikely to have an impact to MNES assessed in this report based on the assessment criteria set out in relevant Commonwealth policies and advice as at the time of this assessment.

Assessment against the SEPP (Biodiversity and Conservation) 2021 criteria determined the proposal is unlikely to impact this species.

CONTENTS

1	Introduction	1
1.1	Description of Proposal	2
1.2	Aims & Objectives	2
1.3	Site Particulars.....	2
1.4	Qualifications & Licencing	3
	Figure 1 Site and Location Map	4
2	Landscape Context.....	5
2.1	Landscape Features.....	5
2.1.1	Interim Biogeographic Regionalisation of Australia (IBRA)	5
2.1.2	Mitchell Landscapes	5
2.1.3	Rivers, Streams, Estuaries and Wetlands	5
2.1.4	Connectivity	6
2.1.5	Areas of Geological significance and soil hazard features.....	6
2.1.6	Areas of Outstanding Biodiversity Value	6
2.2	Site Context	6
2.2.1	Native Vegetation Cover.....	6
2.2.2	Patch Size.....	6
	Figure 2 Native Vegetation Extent.....	7
3	Native Vegetation	8
3.1.1	Preliminary Vegetation Review.....	8
3.2	Methodology: Field Assessment.....	8
3.2.1	Field Survey.....	8
3.2.2	Hollow Bearing Tree Survey	9
3.3	Results	9
3.3.1	Native Vegetation Extent	9
	Figure 3 PCT & BAM Plot Locations	11
4	Vegetation Integrity Assessment	12
4.1	Vegetation Zones	12
4.2	Vegetation Integrity Assessment results	17
5	Threatened Species	18

5.1	Desktop Assessment.....	18
5.2	Ecosystem Credit Species.....	18
5.3	Species Credit Species	23
5.4	Candidate Species Surveys	27
	Figure 4 Targeted Flora Survey	28
5.4.1	Limitations.....	29
	Figure 5 Fauna Survey Locations	30
5.5	Fauna Survey Results	31
5.5.1	Weather Conditions	31
6	Identify Prescribed Additional Biodiversity Impacts.....	32
6.1	Habitat for threatened entities	32
6.2	Habitat Connectivity.....	32
6.3	Water bodies, water quality and hydrological processes that sustain threatened entities	32
6.4	Wind turbine strikes	32
6.5	Vehicle strikes.....	32
7	Matters of National Environmental Significance.....	33
8	SEPP (Biodiversity and Conservation) 2021.....	35
9	Avoid and Minimise Impacts.....	36
9.1	Biodiversity Values	36
9.2	Prescribed Biodiversity Impacts	36
9.2.1	Habitat for Threatened Entities.....	36
9.2.2	Habitat Connectivity.....	37
9.3	Water bodies, Water Quality and Hydrological Processes that Sustain Threatened Entities	37
9.3.1	Wind Turbine Strikes	37
9.3.2	Vehicle Strikes	37
10	Unavoidable Impacts	38
10.1	Direct Impacts.....	38
10.2	Indirect Impacts	38
10.3	Assessment of Prescribed Biodiversity Impacts.....	40
10.3.1	Habitat for Threatened Entities.....	40
10.4	Habitat Connectivity.....	40
10.5	Water bodies, Water Quality and Hydrological Processes that Sustain Threatened Entities	40

10.5.1	Wind Turbine Strikes	41
10.5.2	Vehicle Strikes	41
11	Mitigation and Managing Impacts	42
12	Offset Requirements for Unavoidable Impacts.....	44
12.1	Ecosystem Credits.....	44
12.2	Species Credit	44
12.3	Areas not requiring Offsets.....	44
12.4	Credit Summary.....	45
	Figure 6 Offset Requirements	46
13	Conclusion	47
14	Bibliography	49

LIST OF FIGURES

Figure 1	Site and Location Map	4
Figure 2	Native Vegetation Extent.....	7
Figure 3	PCT & BAM Plot Locations	11
Figure 4	Targeted Flora Survey	28
Figure 5	Fauna Survey Locations	30
Figure 6	Offset Requirements	46

LIST OF TABLES

Plate 1:	Proposed Site Plan – Overall. Refer to Appendix A for plans of the proposal.....	1
Plate 2:	Plot layout (BAM Stage 1 Operation Manual Dec 2020).....	9
Plate 3:	PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	10
Table 1	Vegetation Integrity Results	17
Table 2	Ecosystem Credit Species	18
Table 3	Ecosystem Credit Species assessed as habitat not occurring within the Subject Land.....	19
Table 4	Species Credit Species.....	23
Table 5	Species Credit Species Habitat Assessment.....	24
Table 6	Prevailing Weather Conditions.....	31

Table 7 Direct Impacts on Native Vegetation.....	38
Table 8 Potential Indirect Impacts.....	39
Table 9 Mitigation Measures	42
Table 10 Ecosystem Credits	44
Table 11 Biodiversity Liability Credit Summary.....	45

LIST OF PLATES

Plate 1: Proposed Site Plan – Overall. Refer to Appendix A for plans of the proposal.....	1
Plate 2: Plot layout (BAM Stage 1 Operation Manual Dec 2020).....	9
Plate 3: PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	10

APPENDICES

Appendix A	Plan of Proposal	A-1
Appendix B	BAM Plot Data	B-1
Appendix C	Flora and Fauna Species Tables.....	C-1
Appendix D	EPBC Likelihood of Occurrence Table	D-1
Appendix E	EPBC Assessment	E-1
Appendix F	BAM Credit Report Summary	F-2
Appendix G	Personnel Qualifications	G-1
Appendix H	EPBC Assessment	H-1

GLOSSARY OF TERMS AND ABBREVIATIONS

Term/ Abbreviation	Meaning
BAM	Biodiversity Assessment Method
BDAR	Biodiversity Development Assessment Report
BC Act	Biodiversity Conservation Act 2016
BS Act	Biosecurity Act 2016
Council	City of Cessnock Council
DoEE	Commonwealth Department of the Environment & Energy
DPE	NSW Department of Planning and Environment
DPI Water	NSW Department of Primary Industries – Water
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ha	hectare
HBT	Hollow Bearing Tree
KTP	Key Threatening Process
LGA	Local Government Area
LLS Act	Local Land Services Act
OEH	NSW Office of Environment and Heritage

1 Introduction

MJD Environmental has been engaged by Barr Planning on behalf of St Philips Christian Education Foundation to prepare a Biodiversity Development Assessment Report (BDAR) to support a State Significant Development Application for alterations and additions to an existing school known as St Philip's Christian College Cessnock. The school caters for students from Kindergarten to Year 12 and also incorporates an Early Education Centre and Prep program as well as a special school for students requiring an alternate learning environment.

The school is located on the corner of Lomas Lane and Wine Country Drive, Nulkaba and its land holdings incorporate four large lots described as Lot 1 DP 126765, Lot 1 DP 744377, Lot 2 DP 600895 and Lot 518 DP 837571, hereafter referred to as 'Subject Land'. Refer to **Figure 1**.

The site is irregular in shape and has an overall area of 41.8 hectares. The site's northern boundary has frontage to Lomas Lane of approximately 390 m and its western boundary fronts Wine Country Drive with a length of approximately 1030 m. The site's eastern boundary is defined by Black Creek.

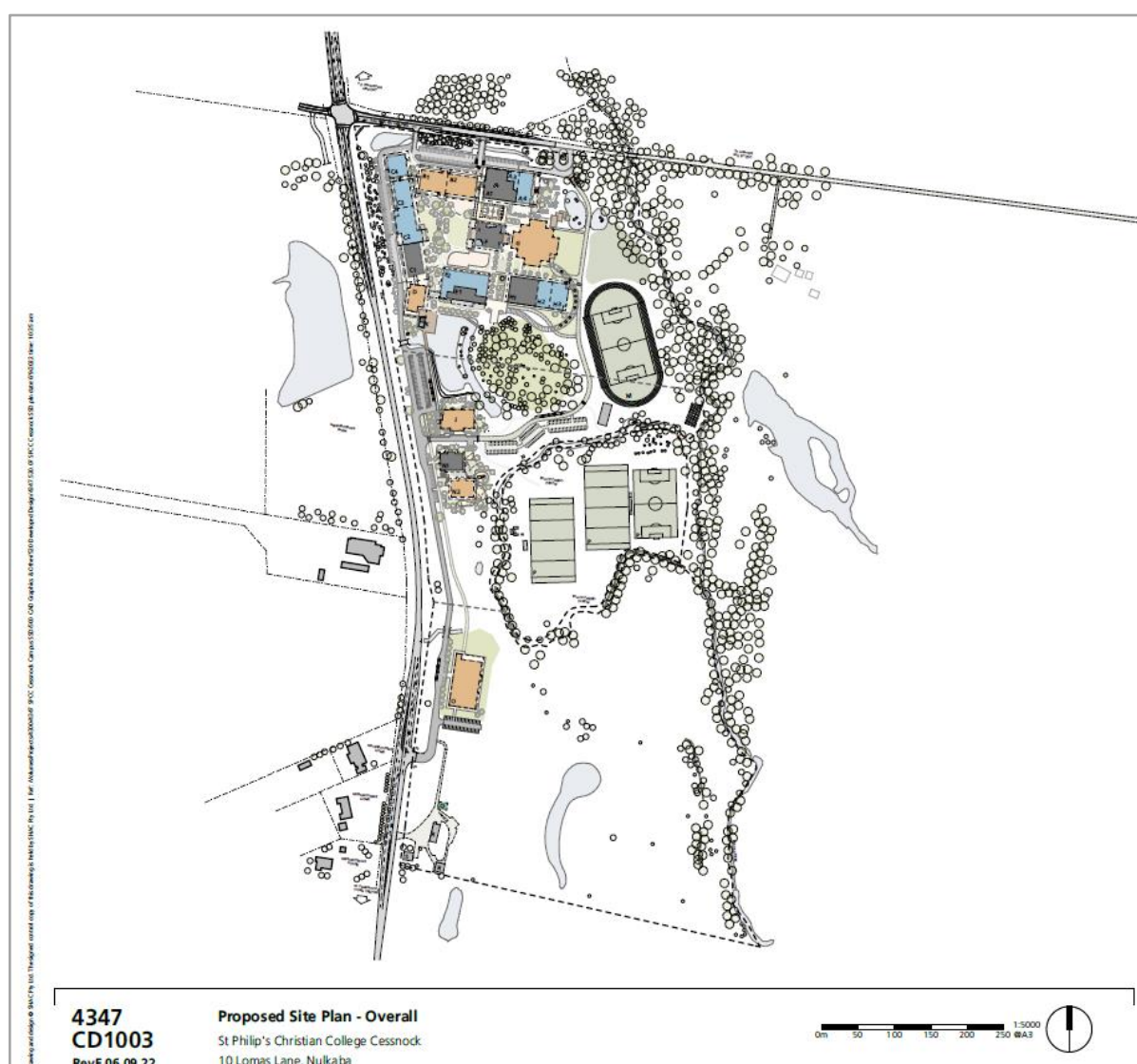


Plate 1: Proposed Site Plan – Overall. Refer to Appendix A for plans of the proposal.

1.1 Description of Proposal

The proposed development, to be constructed in several stages, consists of seven (7) new buildings and additions/alterations to six (6) existing buildings. As part of the development certain existing pre-fabricated buildings will be removed to make way for new permanent buildings.

The proposed development also incorporates infrastructure works external to the site associated with provision of a new intersection on Wine Country Drive providing direct access to the school at the southern end of the campus, and the upgrade of the intersection of Wine Country Drive and Lomas Lane to a roundabout. Widening of Lomas Lane will also be carried out to facilitate the provision of bus bays and a bus layover area.

The school has a current enrolment of approximately 1,270 students in total. This application seeks approval for an increase in student numbers up to 1,732.

1.2 Aims & Objectives

The proposed alterations and additions to SPCC Cessnock are State Significant development (SSD) under Part 4, Division 4.7, of the *Environmental Planning and Assessment Act 1979*.

This Biodiversity Development Assessment Report (BDAR) has been prepared as part of an Environmental Impact Statement (EIS) for the SSD and addresses the anticipated Secretary's Environmental Assessment Requirements (SEARs).

This BDAR is based on an application of the NSW Biodiversity Assessment Methodology 2020 (BAM), which provides a framework for assessing development impact on biodiversity. A two-stage investigation path was performed in accordance with the BAM as listed below:

Stage 1 – Biodiversity Assessment; and

Stage 2 – Impact Assessment.

This report sets out the minimum BAM assessment requirements for the preparation of a BDAR in Appendix K of the BAM (2020).

In addition, preliminary assessment was undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.3 Site Particulars

The following nomenclature has been used in this report (Refer to **Figure 1**):

- Study Area – Refers to the 4 Lots which make up the school's land holdings
- Subject Land – Refers to the impact area.

Locality	The Subject Lands are in Nulkaba, NSW
Land Title	Lot 1 DP 126765, Lot 1 DP 744377, Lot 2 DP 600895, and Lot 518 DP 837571
LGA	Cessnock City Council
Area	Lot (Study Area) – 41.80 ha Subject Land – 6.95 ha
Zoning	RU2 – Rural Landscape

Boundaries	The Study Area is bounded by Wine Country Drive in the west, Lomas Lane in the north, forested riparian zone surrounding Black Creek in the east, and cleared rural lands to the south.
Current Land Use	Lot 1 DP 126765 is the site of the current educational establishment of St Philip's Christian College Cessnock, comprising parking, buildings, sports ground and open space. Lot 1 DP 744377 is generally comprised of open space with unsealed access and one building, being the SPCC Dynamic Alternative Learning Environment. Lot 518 DP 837571 comprises of open space, unsealed access, an irrigation dam and an equestrian centre. Across all lots, substantial managed open space exists.
Topography	The Study Area is generally flat, occurring on elevations of 58-64m AHD with a peak in the extreme southwest corner but no other meaningful gradient over the area.

1.4 Qualifications & Licencing

Qualifications

This BDAR has been prepared by Chris Spraggon [B Sc. (Hons)] and Coral Pearce (BAAS# 21024) and under the guidance of Matt Doherty (BAAS# 17044) accredited BAM Assessor.

Field work for the BDAR was carried out by Coral Pearce, Alexandria Bragg [B. Ani. Sc. (Hons)] and Simone Yasui (PhD) of MJD Environmental (Aust) Pty Ltd.

Refer to **Appendix F** for personnel qualifications.

Licencing

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101684 (Valid 31 January 2023).
- Animal Research Authority (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2023).
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2023).



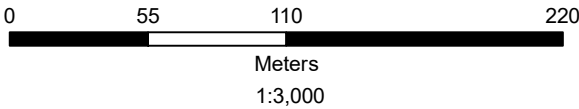
10 LOMAS LANE, NULKABA
FIGURE 1: SITE AND LOCATION

Legend

- Subject Site
- Study Area
- Subject Lots
- Cadastral Boundaries
- Native Vegetation

Watercourse

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 5th Order Stream
- 1st Order Stream (10m Buffer Applied)
- 2nd Order Stream (20m Buffer Applied)
- 3rd Order Stream (30m Buffer Applied)
- 5th Order Stream (50m Buffer Applied)



Aerial: NearMap (2022) | Data: MJD Environmental, Shac (2022), Spatial Services (2021) | Datum/Projection: GDA 1994 MGA Zone 56 | Date: 4/11/2022 | Version 3 | Z:\21035 - SPCC 10 Lomas Lane, Nulkaba\21035_SPCC_CCC_20221018.mxd | This plan should not be relied upon for critical design dimensions.

STAGE 1 BIODIVERSITY ASSESSMENT

2 Landscape Context

2.1 Landscape Features

The following section provides a description of the landscape features within the Study Area and surrounding 1,500 m buffer as outlined in Section 3 of the BAM (2020).

2.1.1 Interim Biogeographic Regionalisation of Australia (IBRA)

Bioregion

The Subject Land occurs wholly within the Sydney Basin Bioregion. The Sydney Basin Bioregion comprises of Mesozoic sandstones and shales; dissected plateaus: forest, woodlands and heaths: The soils are primarily skeletal soils, sands and podzolics (Thackway & Cresswell 1995).

This Bioregion borders NSW North Coast to north: Nandewar and Brigalow Belt south to the north and the South Eastern Highlands in the south.

Subregion

The Study Area occurs wholly within the Hunter subregion.

2.1.2 Mitchell Landscapes

The Study Area occurs wholly within the Sydney Basin Hunter *Central Hunter Foothills*.

Undulating lowlands, rounded to steep hills with rock outcrop on ridges on Permian lithic sandstone, conglomerate, shale and coal, general elevation 40 to 300 m with a few higher peaks, local relief 30 to 120 m. Red-brown to yellow brown harsh texture-contrast soils on slopes, dark coloured clays in valleys and limited accumulations of sand and gravel in streams. Woodlands to open forest of Spotted Gum (*Corymbia maculata*), Forest Red Gum (*Eucalyptus tereticornis*), Narrow-leaved Ironbark (*Eucalyptus crebra*), Red Ironbark (*Eucalyptus sideroxylon*), White Box (*Eucalyptus albens*), Slaty Gum (*Eucalyptus dawsonii*), Rough-barked Apple (*Angophora floribunda*) with Kangaroo Grass (*Themeda triandra*) and Wallaby Grass (*Rytidosperma* sp).

2.1.3 Rivers, Streams, Estuaries and Wetlands

The Study Area is located within the Hunter River catchment in the Hunter region. The Study Area is located west of Black Creek in the township of Nulkaba.

The hydrology of the Subject Land is typified by one 6th [Strahler] order stream being Black Creek, with tributaries extending within the 1,500 m buffer of the subject land; a total of 504 1st order, 128 2nd order, 30 3rd order, eight 4th order and three 5th order tributaries are present (see Figures 1 and 2). Black Creek runs in a meandering north/south orientation generally in the eastern part of the Study Area. Black Creek eventually joins the Hunter River at Elderslie. As per Table 14, Appendix E BAM 2020, relevant riparian buffers have been applied to each stream order.

No mapped wetlands occur within 10 km of the subject land boundary, though numerous mapped reservoirs are present.

2.1.4 Connectivity

The surrounding environment to the site is largely a rural landscape, except for a small residential zoned area to the southwest, being the township of Nulkaba. The vegetation around Black Creek is a significant vegetated riparian corridor in the immediate area, with connectivity in the north and south to Werakata National Park, approximately 1.8 km to the east of the Study Area. Connectivity is limited in all other directions due to past and current land uses, with higher order watercourses represented the majority of retained native vegetation, and these all ultimately join Black Creek at varying points to the north. One isolated patch of native vegetation exists within the Study Area, straddling Lots 1 DP 126765 and 1 DP 744377 south of the established school grounds and east of a wetland lake.

2.1.5 Areas of Geological significance and soil hazard features

No karsts, caves, crevices or cliffs or other areas of geological significance occur in or adjacent to the subject site.

A review of the Acid Sulphate Soils Risk mapping (Naylor et al 1998) records indicate the site has not been assessed for ASS.

2.1.6 Areas of Outstanding Biodiversity Value

There are no Areas of Outstanding Biodiversity Values within the 1,500 m buffer or in the general locality of the Study Area.

2.2 Site Context

The site context was assessed for the Study Area and wider area via desktop assessment of, Aerial Photograph Interpretation (API) using GIS Software and site visit. Site context considerations included native woody cover and patch size in accordance with section 3.2 of the BAM (2020).

2.2.1 Native Vegetation Cover

The native vegetation cover of the Subject Land and 1,500 m buffer was carried out by API of high-quality aerial photography using GIS Software (Map Info), and local vegetation mapping data *Lower Hunter Vegetation Mapping* (Cockerill et al 2013).

Native vegetation cover has been assessed as 30%.

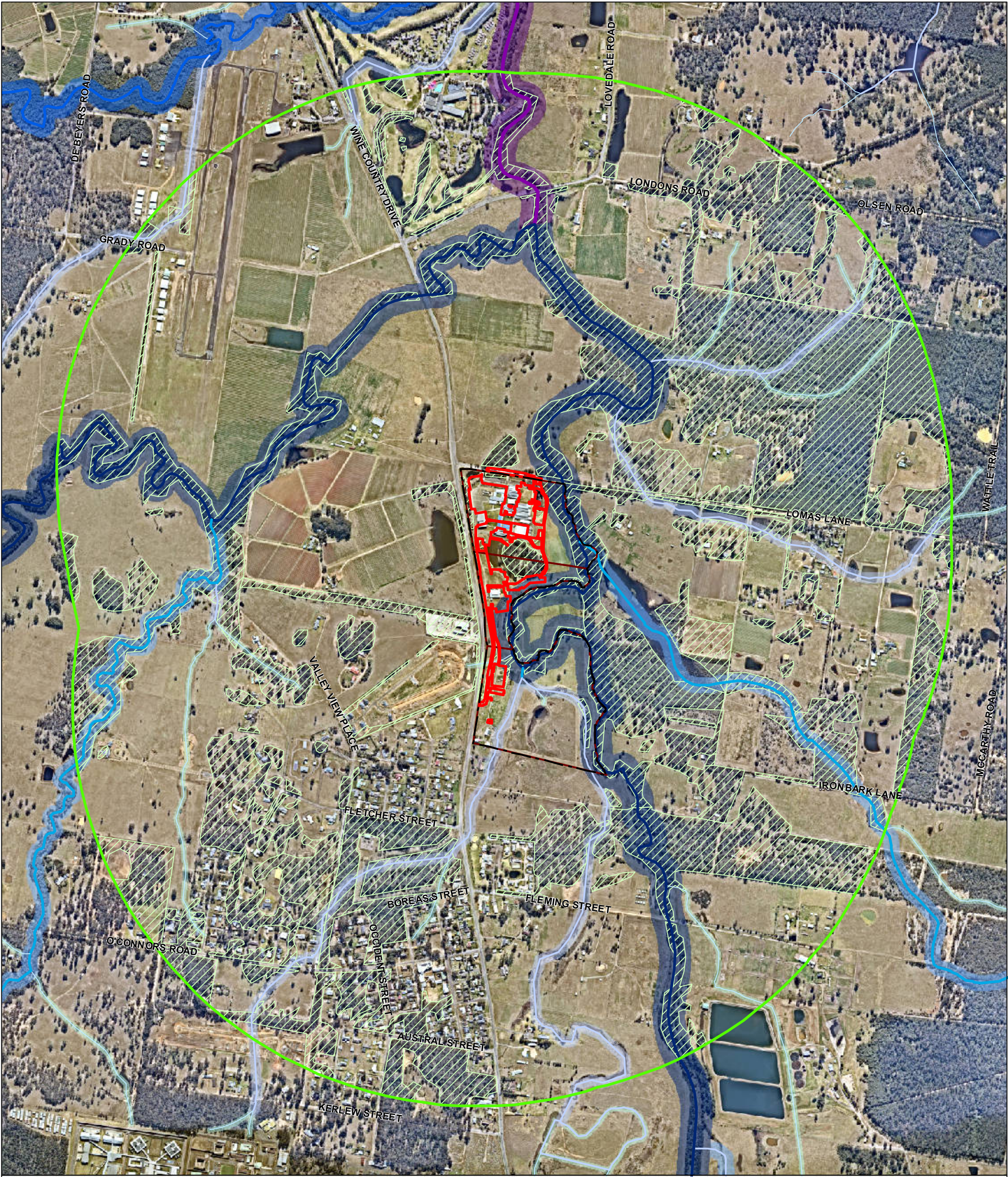
Refer to **Figure 2**.

2.2.2 Patch Size

As per Section 4.3.2 BAM (2020), a patch is defined as:

A patch is an area of native vegetation that occurs on the subject land and includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). A patch may extend onto adjoining land.

Patch size for the subject land has been assessed using the methods outlined; determining that the patch size is greater than 100 ha.



10 LOMAS LANE, NULKABA
FIGURE 2: NATIVE VEGETATION EXTENT

Legend

Subject Site

Study Area

Subject Lots

1500m Buffer from Site

Native Vegetation

Watercourse

1st Order Stream

2nd Order Stream

3rd Order Stream

4th Order Stream

5th Order Stream

6th Order Stream

1st Order Stream (10m Buffer Applied)

2nd Order Stream (20m Buffer Applied)

3rd Order Stream (30m Buffer Applied)

4th Order Stream (40m Buffer Applied)

5th Order Stream (50m Buffer Applied)

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3 Native Vegetation

3.1.1 Preliminary Vegetation Review

A desktop analysis of vegetation within the Study Area and its surrounds were informed by large-scale vegetation mapping projects and aerial photography to determine potential Plant Community Types (PCT) occurring within the Study Area, they include:

- *Lower Hunter Vegetation Mapping* (Cockerill et al 2013);
- GIS analysis including - Aerial Photograph Interpretation (API) and consultation of topographic map (Scale 1:25,000) layers for the Study Area; and
- OEH VIS Classification Database.

3.2 Methodology: Field Assessment

All vegetation survey methods have been carried in accordance with the following documentation and methods:

- *Biodiversity Assessment Methodology (BAM)*: Department of Planning, Industry and Environment (DPIE), October, 2020;
- *Biodiversity Assessment Method 2020 Operational Manual- Stage 1* Department of Planning, Industry & Environment (DPIE), December 2020;
- *Biodiversity Assessment Method Operational Manual- Stage 2* Department of Planning, Industry & Environment (DPIE), September 2019;
- *Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method* Department of Planning, Industry & Environment (DPIE), April 2020; and
- *NSW Survey Guide for Threatened Frogs – A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method* DPIE September 2020.

3.2.1 Field Survey

Initial field assessments of the vegetation were carried out within the Study Area over two days, 22nd October and the 18th November 2021 by Coral Pearce and Alexandria Bragg. Additional field work was completed 6th of October 2022 by Coral Pearce and Simone Yasui. Field surveys were carried out in accordance with Biodiversity Assessment Methodology (BAM 2020) with additional assessment methods to assist in gaining an overview of Subject Land biodiversity values.

The following methods were used to inform the vegetation survey associated with the BDAR:

- Broad vegetation identification, delineation and stratification into vegetation zones carried out by detailed random meander methods (Cropper 1993);
- Collection of eight (8) plots/transect based full floristic data as per Section 4 of the BAM, recording the following;
 - Identification of all flora species to genus where identification attributes were present
 - Composition, Structure attributes within 20x20 plot; and
 - function attributes within the 20X50m plot
- Collection of Subject Land landscape attributes that included, landform, aspect, soil type, detailed descriptions of the vegetation condition, current land use and the current impacts.
- It should be noted that one (1) plot/transect (B01) was conducted following an amended plot design, due to the constraints of the site. The floristic 20 x 20 m plot was conducted, taking up almost the entirety of the patch (the proposed bus turnaround area off of Lomas Lane), while the structural transect is offset, following the road edge north to south, as to not capture the paved road. Therefore two (2) points are included in Figure 3 for B01.

- In addition B08 was conducted using the 10 x 100 m dimensions due to site constraints.

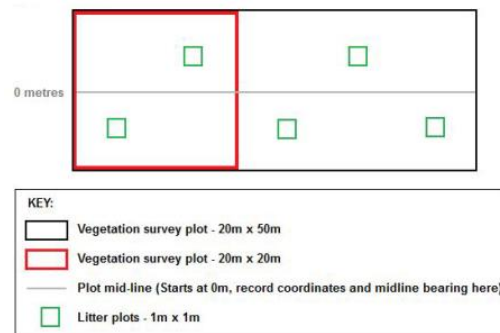


Plate 2: Plot layout (BAM Stage 1 Operation Manual Dec 2020)

3.2.2 Hollow Bearing Tree Survey

A hollow bearing tree survey was undertaken (October/November 2021) across the Subject Land with the following information collected:

- Location (D-GPS);
- Tree species;
- Presences of hollows (including potential hollows) and class;
- Habitat suitability for large Forest Owls; and
- Any observational information.

3.3 Results

3.3.1 Native Vegetation Extent

The study area is 41.8 ha in size which includes cleared and managed land, disturbed native and exotic vegetation. The extent of native vegetation has been interpreted using API and ground truthing during field survey works (Refer to **Figure 3**).

The vegetation within the study area has been mostly cleared, historically for agriculture, with remnant vegetation generally limited to the riparian corridor of Black Creek to the east. Some patches of native canopy persist within the lots away from the creek, chiefly in the northeast and an isolated small forest centrally; these comprise of canopy only with a managed understorey. The former and current land uses have resulted in the modification of the structure of native vegetation within the Subject Land to a point that vegetation representative of the assigned Plant Community Type (PCT) is defined by canopy only. The groundcover throughout the Subject Land is generally cultivated grass species with occasional native grass, graminoid and herbaceous species.

Identification of PCTs within the Subject Land were determined using:

- Occurrence within the Sydney IBRA bio-region;
- Vegetation formation and class;
- landscape position; and
- dominant species noted during field data collected from the full floristic plots/transects established in accordance with the BAM 2020.

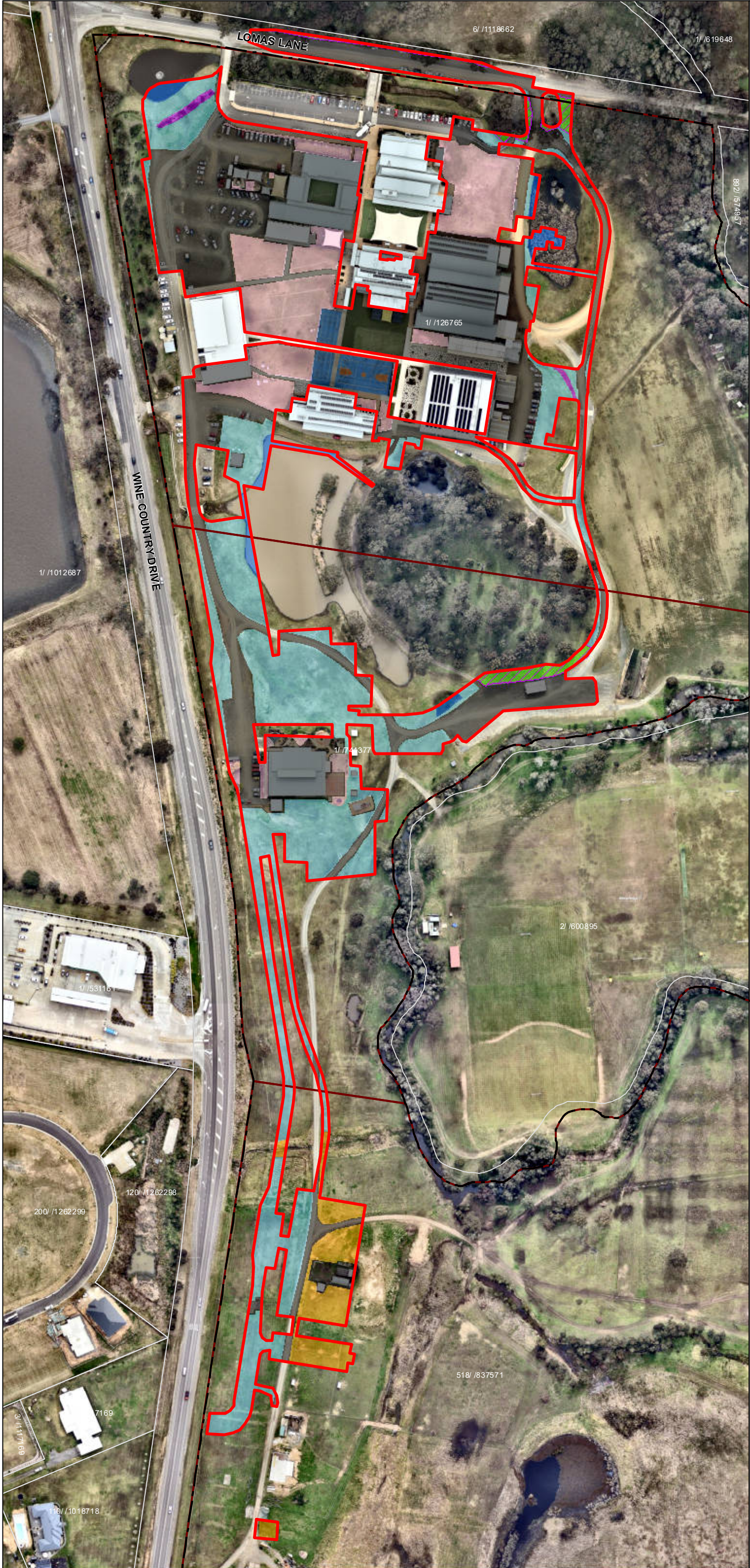
One PCT was identified within the Subject Land.

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

TEC Status: This PCT is partially a subset of BC Act (Endangered) and EPBC Act (Critically Endangered) River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.



Plate 3: PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter



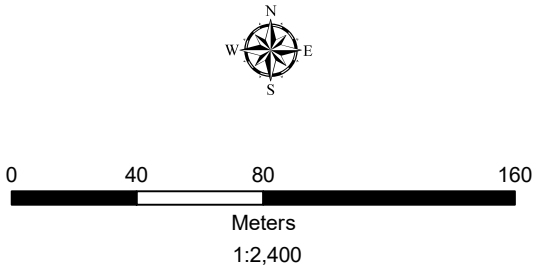
10 LOMAS LANE, NULKABA
**FIGURE 3: PLANT COMMUNITY
TYPES AND BAM PLOT LOCATIONS**

Legend

- Subject Land
- Study Area
- Subject Lots
- Cadastral Boundaries
- Critically Endangered: River-Flat Eucalypt Forest on Coastal Floodplains (EPBC Act); Endangered: River-Flat Eucalypt Forest on Coastal Floodplains

Vegetation Zones

- VZ1 - PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter (Poor Condition)
- VZ2 - PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter (Lawn)
- VZ3 - PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter (Weedy)
- VZ4 - Planted
- Garden/School Yard
- Dam
- Buildings/Infrastructure



Aerial: NearMap (2022) | Data: MJD Environmental, Shac (2022), Spatial Services (2021) | Datum/Projection: GDA 1994 MGA Zone 56 | Date: 24/10/2022 | Version 2 | Z:\21035 - SPCC 10 Lomas Lane, Nulkaba\21035_SPCC_CCC_20221018.mxd | This plan should not be relied upon for critical design dimensions.

4 Vegetation Integrity Assessment

Native vegetation identified on site has been delineated into one PCT, PCT 1594, which was categorised into three vegetation zones. These vegetation zones were delineated based on the general condition of vegetation, differences in current and past management, observation of distinct change or variation in the vegetation based on general attributes such as vegetation age, observable disturbance (past and present), exotic species presences and any structural difference in the stratum present. One non-native vegetation zone was identified.

The Subject Land has been delineated into four vegetation zones:

- VZ 1: 1594_poor
- VZ 2: 1594_lawn
- VZ 3: 1594_weedy
- VZ 4: planted native vegetation

The following table provides a brief description of the vegetation zones justifying the categorisation.

Seven (7) full floristic BAM plots were conducted. The number of plots carried out are in accordance with the minimum required plots per area as outlined in Table 3 of the BAM (2020).

4.1 Vegetation Zones

Vegetation Zone 1

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

Area within Subject Site	0.09
Vegetation Formation	KF_CH9 Forested Wetlands
Vegetation Class	Coastal Floodplain Wetlands
Floristic Description	The canopy is characterised by a young cohort dominated by <i>Eucalyptus moluccana</i> (Grey Box), <i>E. amplifolia</i> (Cabbage Gum) and <i>E. tereticornis</i> (Forest Red Gum) with scattered <i>Angophora floribunda</i> (Rough-barked Apple) across the subject land. As the Subject Land sits within the floodplain of Black Creek to the east. Where the PCT begins to transition toward the watercourse, Melaleuca species, these are as follows; <i>M. styphelioides</i> (Prickly-leaved Tea Tree), <i>M. sieberi</i>, <i>M. nodosa</i> (Prickly-leaved Paperbark) and <i>M. linariifolia</i> (Flax-leaved Paperbark). It should be noted that this transition occurs primarily outside of the subject land/on the subject land border. The mid strum is absent due to current land use and management, with a disturbed/managed ground stratum containing both native and exotic grasses and graminoids. The ground stratum contains a number of native grass and graminoid species such as <i>Panicum simile</i> (Two-coloured Panic), <i>Microlaena stipoides</i> (Weeping grass), <i>Themeda triandra</i> (Kangaroo grass), <i>Aristida calycina</i> (Dark wiregrass), <i>Cyperus gracilis</i> (Slender flat-sedge) as well as the cosmopolitan <i>Cynodon dactylon</i> (Couch). Common forb and herb species were present such as <i>Dianella longifolia</i> (Blue Flax-lily), <i>Euchiton japonicus</i> (Creeping cudweed), <i>Dichondra repens</i> (Kidney weed) and <i>Einadia hastata</i> (Berry saltbush). Exotic species were common in the understory with exotic grass and forb species dominant across the subject land. The following HTE recorded throughout; <i>Senecio madagascariensis</i> (Fireweed), <i>Galenia pubescens</i>, <i>Bidens pilosa</i> (Cobbler's pegs) <i>Heliotropium amplexicaule</i> (Blue Heliotrope), <i>Eragrostis</i>

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

	<i>curvula</i> (African lovegrass), <i>Bryophyllum delagoense</i> (mother-of-millions) and <i>Hyparrhenia hirta</i> (Coolatai grass). See Appendix C for a full floristics list.
Condition	Poor
Structure	Canopy structure is consistent throughout the subject land, with few scattered larger remnant <i>Eucalyptus moluccana</i> (Grey Box) present though infrequent and not impacted by the proposal. Canopy species present occur as a primarily young cohort due to regeneration and supplementary planting. No mid stratum is present within the subject land. The ground stratum is heavily modified by the land management such as mowing of the site and spreading of mulch to suppress exotic grasses. It should be noted that the subject land extends to the road margin along Lomas Lane to the north where the ground cover is not mulched, however is managed by roadside slashing and grazing paddock to the north of the fenceline. Though this area is under different management, it totals 0.01 ha and therefore has not been delineated into its own VZ.
Justification for PCT Selection	This vegetation presents as a Forested Wetland and Coastal Floodplain Wetland Class. It occupies the floodplains of the subject land, occurring within 2 m elevation difference the swale landform to the east. The presence of <i>E. amplifolia</i> (Cabbage Gum) and <i>E. tereticornis</i> (Forest Red Gum) is indicative of this PCT. The presence of <i>E. moluccana</i> (Grey Box) is not associated with this PCT though due to the young cohort of the canopy species, the species presence is likely due to regeneration further conflated by intentional plantings of the species. The absence of a mid-stratum and ground stratum disturbance drives the PCT determination primarily through the Vegetation Formation and Class. During determination PCT were assessed using BioNET VIS, all PCTs were assessed using Mitchell Landscape, IBRA subregion, LGA, Vegetation Class and Formation as a filter. Final determination was based on floristics, landform and knowledge of the area with PCT 1598, 1731 and 1748 considered.
TEC Status	BC Act: Commensurate with Endangered River-Flat Eucalypt Forest (RFEF) on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions Partial subset of Endangered Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion – assessed as not commensurate (outside bioregion) EPBC Act: Commensurate with Critically Endangered River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter



Vegetation Zone 2

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

Area within Subject Site	1.92
Vegetation Formation	KF_CH9 Forested Wetlands
Vegetation Class	Coastal Floodplain Wetlands
Floristic Description	No canopy or mid stratum is present within this VZ. The ground stratum contains both exotic and native species, dominated by <i>Cynodon dactylon</i> (Couch), <i>Panicum simile</i> (Two-coloured Panic), <i>Euchiton japonicus</i> (Creeping Cudweed) and <i>Dichondra repens</i> (Kidney Weed) within occasional <i>Oxalis perennans</i>, and <i>Centella asiatica</i> (Indian Pennywort). In wetter areas species such as <i>Nymphoides montana</i> (Marshwort) and <i>Marsilea hirsute</i> (Nardoo) were also recorded. A number of HTE species were also present such as <i>Cenchrus clandestinus</i> (Kikuyu grass), <i>Paspalum dilatatum</i> (Dallas grass) and <i>Stenotaphrum secundatum</i> (Buffalo grass), indicative of a managed lawn. See Appendix C for a full floristics list.
Condition	Lawn.
Structure	The vegetation within this VZ is heavily modified from past land clearing and ongoing land management practices, as it currently mown. Few scattered trees occur within this VZ, however outside of the Subject Land and therefore were not sampled within the BAM plot. These were primarily planted and regenerating <i>E. tereticornis</i> (Forest Red Gum) and <i>Angophora floribunda</i> (Rough-barked Apple) and a singular exotic <i>Jacaranda mimosifolia</i> (Jacaranda).
Justification for PCT Selection	As per BAM 2020 where a cleared landscape is present with native vegetation the assessor must determine the mostly likely original PCT, therefore this VZ is mostly clearing cleared from the surround PCT 1594.
Status	BC Act: No (Associated [part] with RFEF – ruled out) No (Associated [part] with SCFF – ruled out) EPBC Act: No (Associated [part] with RFEF – ruled out)



Vegetation Zone 3

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

Area within Subject Site	0.27
Vegetation Formation	KF_CH9 Forested Wetlands
Vegetation Class	Coastal Floodplain Wetlands
Floristic Description	As per VZ 2 no canopy or mid stratum is present within this VZ. This VZ has been parsed out of VZ 2 due to the difference in land management, as this area was not managed by mowing and in some areas was undergoing grazing by Ungulates. Few native species were present, limited to <i>Cynodon dactylon</i> (Couch) and <i>Oxalis perennans</i>, though more native grass species were observed outside of the BAM floristics plot. HTE species present were <i>Paspalum dilatatum</i> (Dallas grass) and <i>Senecio madagascariensis</i> (Fireweed) with a number of exotic grass species recorded. See Appendix C for a full floristics list.
Condition	Weedy.
Structure	The vegetation within this VZ is heavily modified from past land clearing and ongoing land management practices, such as grazing. This area also had recent ground disturbance, likely resulting in further weed introduction/proliferation from the seedbank.
Justification for PCT Selection	As per VZ 2 justification.
Status	BC Act: No (Associated [part] with RFEF – ruled out) No (Associated [part] with SCFF – ruled out)
	EPBC Act: No (Associated [part] with RFEF – ruled out)



VZ 4: Planted native vegetation

The vegetation in this zone has been assessed according to Appendix D of the BAM (2020).

The planted native vegetation on the site comprises of a small (0.03 ha) raised, mulched garden bed with a mixture of native and exotic species, with woody species planted in a single, linear row of stems. It is situated in an open context, surrounded by managed fields and adjacent to a carpark and larger amenity planting. The planting was installed for aesthetic purpose within school grounds and does not include individuals of a threatened flora species. On these bases, under the D1 Decision Tree, Sections 4 and 5 of the BAM (2020) are not required to be applied to this vegetation. As per D2 Assessment, the vegetation in this zone does not constitute suitable habitat for threatened species nominated as species credit species by the BAM-C, contains no nests, hollows or secondary indications of fauna use, and does not form a connective corridor between or extending areas of remnant native vegetation. The flowering shrubs may provide forage in the form of nectar for highly mobile, less vulnerable or aggressive bird species typically associated with modified rural and residential landscapes.

The tree species in this planting at time of inspection include immature *Eucalyptus* sp. Shrubs include *Callistemon citrinus*, *Grevillea* cv. and *Banksia oblongifolia*. Graminoids include *Doryanthes excelsa* and the exotic *Agapanthus praecox*. Groundcovers are not present as the raised garden bed is heavily mulched and managed.

4.2 Vegetation Integrity Assessment results

A total of 90 plant species were identified within seven plots comprising 43 native species and 47 exotic species. The results of the plot field data and a flora species list can be found in **Appendix B** and **Appendix C**.

The plot data from the vegetation plot was entered into the BAM-C calculator and the results of the vegetation integrity assessment is summarised in **Table 2**.

Table 1 Vegetation Integrity Results

Vegetation Zone	No. of Plots	Composition condition Score	Structure Condition Score	Function Condition score	Vegetation Integrity Score (V.I)	TEC
VZ 1 – 1594_poor	3	42.5	43.0	63.8	47.7	Yes
VZ 2 – 1594_lawn	3	12.7	53.9	2.6	12.1	No
VZ 3 – 1594_weedy	1	5	63	4.9	11.5	No

- As outlined in section 9.2.1 of the BAM biodiversity offset credits are required for native vegetation where the vegetation integrity score:
 - is ≥ 15 where the PCT is representative of an endangered or critically endangered ecological community; or
 - is ≥ 17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community: or
 - is ≥ 20 where the PCT is not representative of a TEC or associated with threatened species habitat.

5 Threatened Species

5.1 Desktop Assessment

A review of threatened species information was undertaken to provide context and understanding of biodiversity values occurring within the Subject Land. Information reviewed included:

- Online database searches involving a 10-km buffer around the Study Area to provide potentially occurring threatened flora and fauna and migratory species under both the BC Act and EPBC Act:
 - NSW Bionet (accessed initially 8th December 2021 and again 19th October 2022)
 - Commonwealth Protected Matters of National Significance search tool (accessed 8th December 2021)
- BioNet Vegetation Classification – Threatened species associated with known PCTs to occur within the Study Area.

5.2 Ecosystem Credit Species

Ecosystem Credit Species are reliably predicted to occur by vegetation surrogates and landscape features. An assessment of the habitat suitability for each predicted species was undertaken to determine the presences or potential utilisation of the Subject Land as part of their home range. These species are presented in **Table 3**.

Table 2 Ecosystem Credit Species

Scientific Name	Common Name	BC Act	EPBC Act	PCT 1594	Habitat Present (VZ1)	Sensitivity to Gain
<i>Chthonicola sagittata</i>	Speckled Warbler	V	-	X	Yes	High
<i>Climacteris picumnus victorae</i>	Brown Treecreeper (eastern subspecies)	V	-	X	Yes	High
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	X	Yes	Moderate
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	X	Yes	High
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	V	X	Yes	High
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V	-	X	Yes	Moderate
<i>Neophema pulchella</i>	Turquoise Parrot	V	-	X	Yes	High
<i>*Ninox connivens</i>	Barking Owl	V	-	X	Yes	High
<i>Petroica boodang</i>	Scarlet Robin	V	-	X	Yes	Moderate

Key:

V = Vulnerable E = Endangered CE = Critically Endangered

* Dual Credit Species

The vegetation within VZ1 of the Subject Land has been assessed to provide marginal suitable habitat for all species listed above. It is therefore assumed that these species may utilise this portion of Subject Land for foraging opportunities. The remaining VZs are not considered suitable habitat, addressed in **Table 4**.

Table 3 Ecosystem Credit Species assessed as habitat not occurring within the Subject Land

Scientific Name	Common Name	Habitat requirement	Habitat present on development site (VZs 2-4)
Birds			
<i>Chthonicola sagittata</i>	Speckled Warbler	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. The Speckled Warbler lives in a wide range of Eucalyptus 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. Large, relatively undisturbed remnants are required for the species to persist in an area. There are total of 35 records of the species within 10 km of the subject land, recorded between 1999 and 2021. No suitable habitat occurs for the species within VZs 2 – 4 as this area is highly modified and under active management. No large undisturbed remnants persist within the subject land.	Unlikely
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of the species runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. The eastern subspecies lives in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey; also found in mallee and River Red Gum (<i>Eucalyptus camaldulensis</i>) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging. There are total of 128 records of the species within 10 km of the subject land, recorded between 1990 and 2020. No suitable habitat occurs for the species within VZs 2 – 4 as this area is highly modified and under active management. No areas of fallen timber appropriate for foraging are present within the subject land, nor unmanaged woodland.	Unlikely

Scientific Name	Common Name	Habitat requirement	Habitat present on development site (VZs 2-4)
<i>Daphoenositta chrysoptera</i>	Varied Sittella	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. There are total of 79 records of the species within 10 km of the subject land, recorded between 1999 and 2020. No suitable habitat occurs for the species within VZs 2 – 4 as this area is highly modified and under active management.	Unlikely
<i>Hirundapus caudacutus</i>	White-throated Needletail	The White-throated Needletail is widespread in across the coast of eastern and south-eastern Australia, and Tasmania. White-throated Needletails only occur as vagrants in the Northern Territory and in Western Australia. 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. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable (Cramp 1985), but there are, nevertheless, certain preferences exhibited by the species. They are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. There are 15 records of the species within 10 km of the Subject Land recorded between 2005 and 2019. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely
<i>Melanodryas cucullata cucullata</i>	Hooded robin (south-eastern form)	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. There are two historic records of the species within 10 km of the Subject Land recorded 1986 and 1997. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely
<i>Neophema pulchella</i>	Turquoise Parrot	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Unlikely

Scientific Name	Common Name	Habitat requirement	Habitat present on development site (VZs 2-4)
		There are 10 records of the species within 10 km of the Subject Land from 1992 – 2018. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	
<i>Ninox connivens</i>	Barking Owl (Foraging)	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as <i>Acacia</i> and <i>Casuarina</i> species. The site comprises marginal foraging habitat in the form of cleared land within an agricultural landscape. No further survey is required. Two historic records of the species occur within 10 km of the Subject land, from 2005 and 2008 approximately 5.7 km to the east and approximately 10 km to the south respectively. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely
<i>Petroica boodang</i>	Scarlet Robin	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. There are 32 records of the species within 10 km of the subject land, ranging between 1986 – 2019. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely

Scientific Name	Common Name	Habitat requirement	Habitat present on development site (VZs 2-4)
Mammals			
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	The Spotted-tailed Quoll (southeastern mainland population) occurs in eastern Australia from south-eastern Queensland to western Victoria. Populations are now fragmented and isolated and estimates of the decline range from 50–90 percent for the mainland and 25–50 percent for the population in New South Wales since European settlement (DELWP 2016). It has been extirpated from many parts of its former range, most notably including south-eastern South Australia (Woinarski et al. 2014). The Spotted-tailed Quoll is a mainly forest dependent species but occurs in a variety of habitats including closed forests (including temperate and sub-tropical rainforest), tall eucalypt forests, open woodlands, open forests, drier rainshadow woodlands and coastal heathlands (Oakwood et al. 2007). The highest densities of the species have been recorded from both wet and dry forest habitats (Watt 1993; Mansergh 1995; Jones & Rose 1996; Belcher 2000; Dawson 2005; Glen & Dickman 2006b). During the day Spotted-tailed Quolls shelter in fallen logs, boulder piles, burrows, tree hollows and occasionally under dwellings (Woinarski et al. 2014). Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Species is unlikely to utilise the Subject Land due to a lack hollows or logs for denning. No area structures such as windrows were recorded on the site therefore occupation of the site by the species is unlikely. There are a total of six records of the species within 10 km of the Subject land, occurring from 2004 (7.3 km and 9.8 km to the north, 6.7 km to the west of the subject land), 2006 (7.8 km southeast of the subject land) and 2016 (approximately 9.3 km south of the subject land). No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely

5.3 Species Credit Species

Species Credit Species (Candidate Species) are species that cannot be reliably predicted to use an area based on habitat surrogates. Species credit species that have potential to occur within the Subject Land must be surveyed to determine presences/absence or provide an expert report. In the absence of either of these the species will be presumed to be present within the Subject Land.

The conditions of vegetation and habitat within the Subject Land can be assessed by an accredited assessor to have sufficient degradation of key habitat constraints associated with species credits species, therefore is unlikely to utilise the Subject Land and not requiring further assessment. These species are identified in **Table 5** and a habitat assessment for species credit species in **Table 6**.

Table 4 Species Credit Species

Scientific Name	Common Name	BC Act	EPBC Act	Survey Period	Requires further assessment	SAII
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V		Nov-Mar	No (See Table 6 for Reasoning)	No
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	Nov-Mar	No (See Table 6 for Reasoning)	No
<i>Litoria brevipalmata</i>	Green-thighed Frog	V		Oct-Mar	No (See Table 6 for Reasoning)	No
<i>Ninox connivens</i>	Barking Owl	V		May-Dec	No (See Table 6 for Reasoning)	No
<i>Phascolarctos cinerus</i>	Koala	E	E	All year	No (See Table 6 for Reasoning)	No

Key:

V = Vulnerable E = Endangered CE = Critically Endangered EX = Extinct

As no habitat for Candidate Threatened Species was identified within the Subject Land, no further survey for these entities has been undertaken in the assessment of this proposal.

Table 5 Species Credit Species Habitat Assessment

Scientific Name	Common Name	Habitat requirement	Habitat present on development site	Species requires further assessment
Birds				
<i>Ninox connivens</i>	Barking Owl (Breeding)	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as <i>Acacia</i> and <i>Casuarina</i> species. The site comprises marginal foraging habitat in the form of cleared land within an agricultural landscape. No suitable nesting or breeding habitat exists in the form of trees with large hollows (>20cm) that will be impacted by the proposal. No further survey is required. Two historic records of the species occur within 10 km of the Subject land, from 2005 and 2008 approximately 5.7 km to the east and approximately 10 km to the south respectively.	Unlikely	No
Reptiles				
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	The Pale-headed Snake is a highly cryptic species that can spend weeks at a time hidden in tree hollows. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees. The Subject Land comprises no suitable habitat, being largely cleared and with no impacted hollow trees, nor providing connectivity between adjacent riparian habitat and other significant patches of native vegetation. There are no records of the species within 10 km of the Subject Land. No habitat constraints for the species are listed within the TBDC. No further survey is required.	Unlikely	No

Scientific Name	Common Name	Habitat requirement	Habitat present on development site	Species requires further assessment
Amphibians				
<i>Litoria aurea</i>	Green and Golden Bell Frog	Inhabits marshes, dams and stream-sides, particularly those containing bull rushes (<i>Typha</i> spp.) or spike rushes (<i>Eleocharis</i> spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (<i>Gambusia holbrooki</i>), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. Though the subject site contains an unshaded waterbody, surrounded by managed lawns, the predatory fish <i>Gambusia holbrooki</i> was detected during the site visit and the waterbody is physically disconnected from the broader landscape by existing gravel roads which encircle the patch. The land gently slopes from the east of the Subject Land toward swamp forest floodplain dominated by a number of <i>Melaleuca</i> species, <i>E tereticornis</i> and <i>Casuarina glauca</i> at the northeast of the site. Within this swale landform ephemeral pools would likely occur with evidence of regular inundation recorded during site visit. However, this zone is outside of the Subject Land boundary and will not be impacted by the proposal. Furthermore, the majority of the Subject Land is disconnected from this riparian corridor, extending north to south, by managed lawns (school ovals) creating a hostile environment for many fauna species. The waterbody which occurs within the Subject Land will be retained by the proposal, therefore there are no impacts to potential habitat for the species. proposal will retain the waterbody. There are no records of the species within 10 km of the Subject Land.	Unlikely	No
<i>Litoria brevipalmata</i>	Green-thighed Frog	Occurs in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain. It prefers wetter forests in the south of its range but extends into drier forests in northern NSW and southern Queensland. This species is thought to forage in leaf-litter. No suitable habitat occurs on the Subject Land, which is broadly cleared and managed in the understorey (where canopy persists), preventing formation of litter. Forests associated with permanently or ephemerally wet areas occur outside the Subject Land in the Black Creek corridor. No further survey is required. Though it should be noted that there are two recent records of the species within 10 km of the Subject Land, approximately 8.3 and 8.9 km to the south east.	Unlikely	No

Scientific Name	Common Name	Habitat requirement	Habitat present on development site	Species requires further assessment
<i>Phascolarctos cinereus</i>	Koala	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. There are a total of 14 Bionet Koala records within 10 km of the subject land. The majority of the records are historic, dated from 1980 – 2006. Noting that there are three more recent records dated from 2014, 2016 and 2018 all of which were roadkill observations. These records are from approximately 7.24 km, 9.3 km and 3.8 km from the subject land boundary. However, all of which are 'suburb only provided' and from wildlife rehab databases. Therefore, these records are not indicative of a Koala population occurring within the locality. The tree species recorded within the subject land are considered Koala feed tree species under the Koala (<i>Phascolarctos cinereus</i>) BAM Survey Guide (2022), however impacted feed trees are regenerating/planted vegetation, with few remnant individuals retained due to the past and present land use. The trees occur within a highly fragmentated agricultural landscape and are surrounded by hostile barriers such as Wine Country Drive to the east. The 0.09 ha of wooded vegetation removal which will be impacted by the proposal is unlikely to support a koala population within the locality as the Cessnock LGA is unlikely to support a Koala population based on documented populations and records. In addition the area is not identified on the Saving Our Species (SOS) for the entity.	Unlikely	No

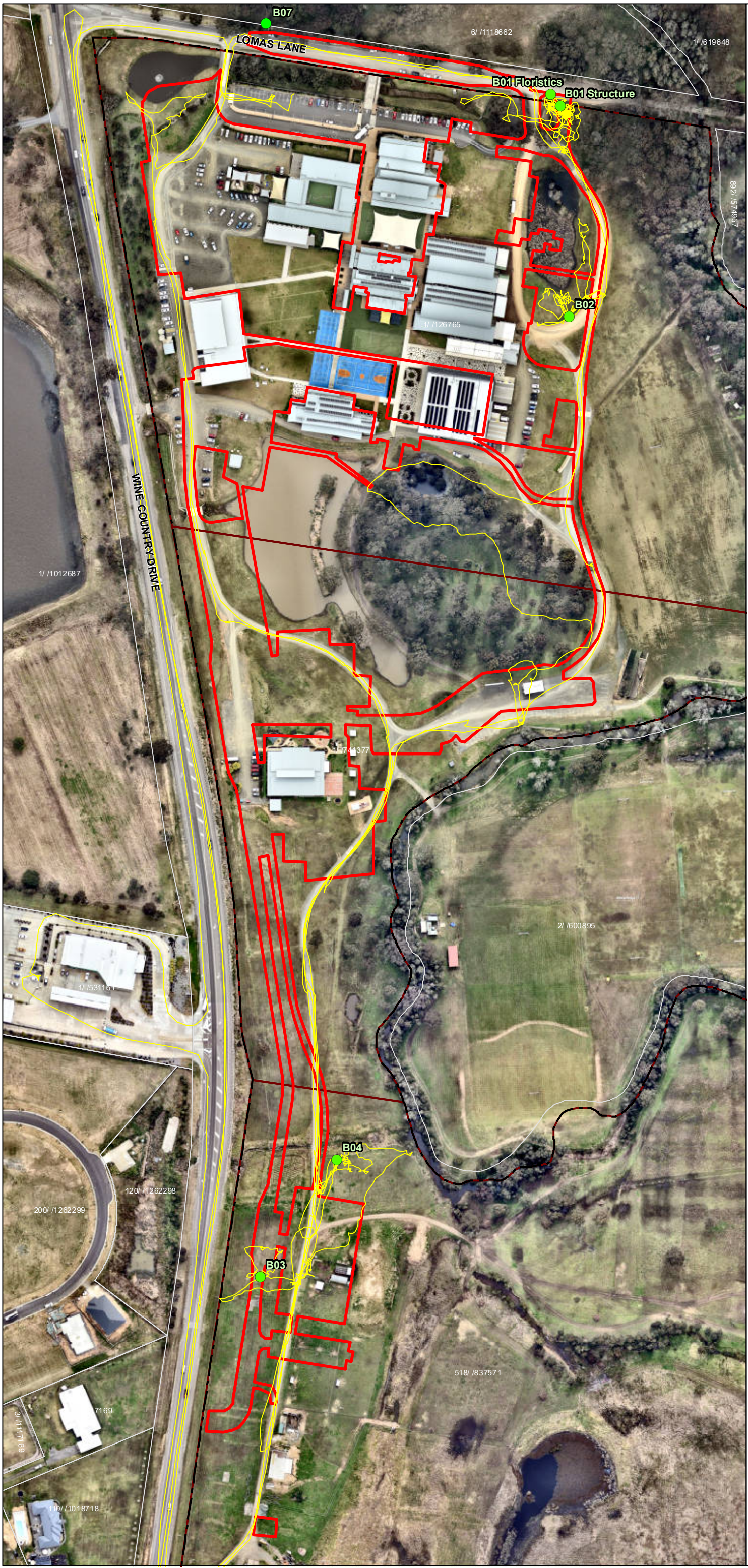
5.4 Candidate Species Surveys

Targeted surveys for flora and fauna candidate species were not conducted at the site due to the lack of suitable habitat observed within the Subject Land. All flora within B01 was recorded as the entirety of the patch fell within the BAM floristics plot, while all other VZ areas are highly modified and currently managed resulting no available habitat for threatened entities associated with the PCT identified.

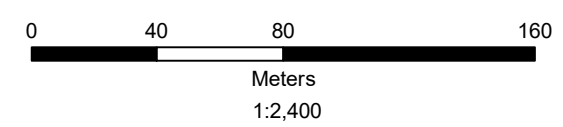
Threatened flora species are unlikely to present within the Subject Land due to current land management practises such as active mulching and mowing in addition to the presence of exotic grass species (a known KTP).

Suitable habitat threatened fauna species was searched for within the Subject Land such as HBTs, searches for logs and areas of leaf litter, existing culverts or derelict structures. Multiple waterbodies occur within the Study Area, as described in Section 2.1.3, with one heavily modified dam being partially altered by the proposal though ultimately retained. See **Table 6** for justification of habitat suitability. No targeted threatened fauna surveys were conducted as a result.

10 LOMAS LANE, NULKABA
**FIGURE 4: FLORA SURVEY
LOCATIONS**



- Legend**
- BAM Plot
 - Flora Survey Transect
 - Subject Land
 - Study Area
 - Subject Lots
 - Cadastral Boundaries



Aerial: NearMap (2022) | Data: MJD Environmental, Shac (2022), Spatial Services (2021) | Datum/Projection: GDA 1994 MGA Zone 56 | Date: 24/10/2022 | Version 2 | Z:\21035 - SPCC 10 Lomas Lane, Nulkaba\21035_SPCC_CCC_20221018.mxd | This plan should not be relied upon for critical design dimensions.

Secondary Indications and Incidental Observations

Opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of resident fauna were noted. Such indicators included:

- Distinctive scats left by mammals;
- Scratch marks made by various types of arboreal animals;
- Nests made by various guilds of birds;
- Feeding scars on Eucalyptus trees made by Gliders;
- Whitewash, regurgitation pellets and prey remains from Owls;
- Aural recognition of bird and frog calls;
- Skeletal material of vertebrate fauna; and
- Searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, and diggings).

5.4.1 Limitations

Limitations associated with this assessment report are presented herewith. The limitations have been taken into account specifically in relation to threatened species assessments, results and conclusions.

In these instances, a precautionary approach has been adopted; whereby 'assumed presence' of known and expected threatened species, populations and ecological communities has been made where relevant and scientifically justified to ensure a holistic assessment.

Seasonality & Conditions

The flowering and fruiting plant species that attract some nomadic or migratory threatened species, often fruit or flower in cycles spanning a number of years. Furthermore, these resources might only be accessed in some areas during years when resources more accessible to threatened species fail. As a consequence, threatened species may be absent from some areas where potential habitat exists for extended periods and this might be the case for nomadic and opportunistic species.

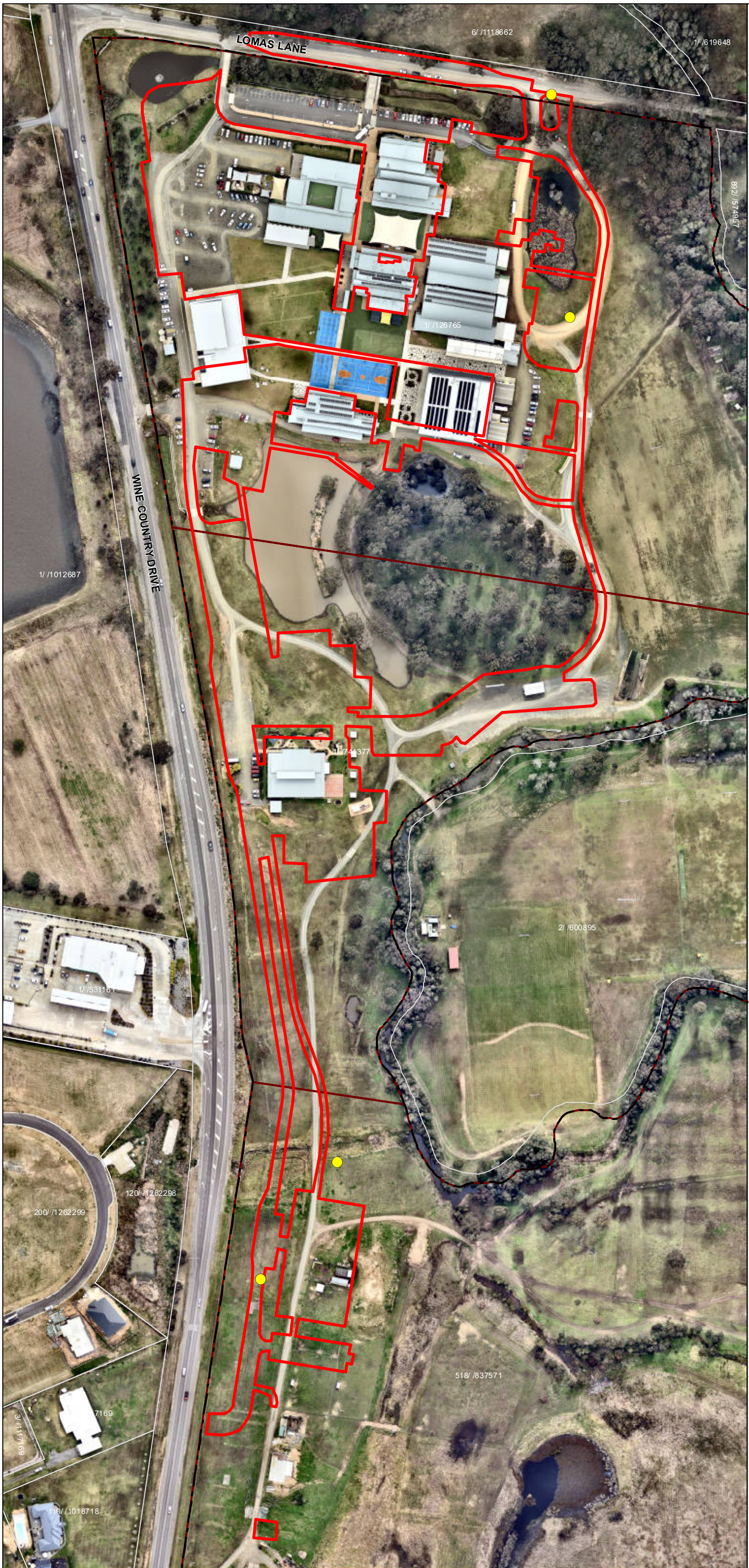
Data Availability & Accuracy

The collated threatened flora and fauna species records provided by NSW Bionet are known to vary in accuracy and reliability. This is usually due to the reliability of information provided to the National Parks and Wildlife Service (NPWS) for collation and/or the need to protect specific threatened species locations. During the review of threatened species records sourced from OEH Atlas of NSW Wildlife, consideration has been given to the date and accuracy of each threatened species record in addition to an assessment of habitat suitability within the subject site.

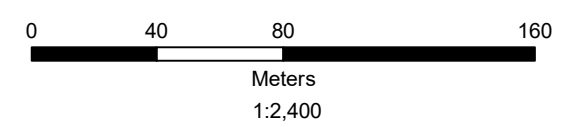
Similarly, EPBC Protected Matters Searches provide a list of threatened species and communities that have been recorded within 10 km of the Study Area, or which have suitable habitat within the wider area, and are subject to the same inherent inaccuracy issues as the State derived databases.

In order to address these limitations in respect to data accuracy, threatened species records have only been used to provide a guide to the types of species that occur within the locality of the Study Area. Consequently, BAM assessment and the results of surveys conducted within the Subject Land and surrounds have been used to assess the likelihood of occurrence of threatened species, populations and ecological communities to occur therein.

10 LOMAS LANE, NULKABA
**FIGURE 5: FAUNA SURVEY
LOCATIONS**



- Legend**
- Bird Census Locations
 - Subject Land
 - Study Area
 - Subject Lots
 - Cadastral Boundaries



Aerial: NearMap (2022) | Data: MJD Environmental, Shac (2022), Spatial Services (2021) | Datum/Projection: GDA 1994 MGA Zone 56 | Date: 24/10/2022 | Version 2 | Z:\21035 - SPCC 10 Lomas Lane, Nulkaba\21035_SPCC_CCC_2022\1018.mxd | This plan should not be relied upon for critical design dimensions.

5.5 Fauna Survey Results

5.5.1 Weather Conditions

Field surveys were undertaken by MJD Environmental on the 22nd October and 18th November 2021. The prevailing weather conditions during the survey are presented in a **Table 6** below.

Table 6 Prevailing Weather Conditions

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Wind (km/h)	Sunrise-Sunset
22 nd October 2021	12.3	24.8	0	ESE 13km/h to E13km/h	0606 - 1912
18 th November 2021	10.2	28.7	0	ENE 2km/h to NNW 15km/h	0543 - 1936
5 th October 2022	11.6	-	0	SSE 6 km/h to ESE 30 km/h	0527 - 1759

Sources: : <http://www.bom.gov.au/climate/dwo/IDCJDW0200.shtml>

<http://www.ga.gov.au/bin/geodesy/run/sunrisenset>

Mammals

Arboreal

No threatened species were observed. No other native or exotic species were observed.

Terrestrial

No threatened species were observed. No other native or exotic species were observed.

Fish

The exotic species *Gambusia holbrooki* (Plague Minnow) was observed in the dams on site.

Avifauna

No threatened species were recorded. A limited number of native bird species were recorded during the survey efforts. A total of sixteen (16) bird species were identified visually or by vocalisation during the surveys. See Appendix C for a full fauna list.

Herpetofauna

No threatened species were observed. A single frog species, *Litoria fallax* (Eastern Dwarf Tree Frog), was detected utilising the subject land based on aural detection.

Microchiropteran Bats

No threatened species were observed. No other native or exotic species were observed.

6 Identify Prescribed Additional Biodiversity Impacts

6.1 Habitat for threatened entities

Karst, caves, crevices, cliffs, rocks, and other geological features of significance

There are no occurrences of karst, caves, crevices, rock outcrops or cliffs within the Subject Land.

Human made structures

Occupied and operational educational buildings exist across the Study Area, across all Lots.

Non-native vegetation

Non-native vegetation exists on the Subject Lands in the form of managed turf and pasture grasses, and areas of unmanaged annual weeds.

6.2 Habitat Connectivity

The surrounding environment to the site is largely a rural landscape, except for a small residential zoned area to the southwest, being the township of Nulkaba. The vegetation around Black Creek is a significant vegetated riparian corridor in the immediate area, with connectivity in the north and south to Werakata National Park, approximately 1.8 km to the east of the Study Area. Connectivity is limited in all other directions due to past and current land uses, with higher order watercourses represented the majority of retained native vegetation, and these all ultimately join Black Creek at varying points to the north. One isolated patch of native vegetation exists within the Study Area, straddling Lots 1 DP 126765 and 1 DP 744377 south of the established school ground and east of a wetland lake.

6.3 Water bodies, water quality and hydrological processes that sustain threatened entities

The Subject Land includes the western bank of Black Creek at 56 m elevation. The site is relatively flat, and includes ephemerally and permanently inundated water bodies, generally draining to the north and east into Black Creek (a tributary to the Hunter River).

The hydrology of the Subject Land is typified by one 4th order stream (Black Creek) in the eastern boundary of the site, as well as a 1st and 2nd order tributaries across the site. This watercourse eventually joins the Hunter River approximately 20km north of the Subject Land.

There are two mapped dams within the Study Area, with an area in the Subject Land of 0.19 ha (**Figure 3**). All dams will be retained under the proposal, with potential minor alterations to the boundary of the dams on Lots 1 / DP744377 and 1 / DP126765 to facilitate the proposal.

6.4 Wind turbine strikes

Not applicable to this proposal.

6.5 Vehicle strikes

There is current vehicle thoroughfare through the Subject Land to facilitate student drop off and collection, staff parking and land management. Under the proposal, thoroughfare through the Subject Land will be increased with the construction of additional sealed and unsealed roads, and new carparks. The increase in student capacity will also cause an increase in vehicle movements over and around the site.

7 Matters of National Environmental Significance

An EPBC Act Protected Matters Search (accessed 19-10-2022) was undertaken to generate a list of those Matters of National Environmental Significance (MNES) from within 10 km of the Study Area. An assessment of those MNES relevant to biodiversity has been undertaken in accordance within EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DoE, 2013). The Matters of National Environmental Significance protected under national environment law include:

- Listed threatened species and communities;
- Listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- World heritage properties;
- National heritage places;
- The Great Barrier Reef Marine Park;
- Nuclear actions; and
- A water resource, in relation to coal seam gas development and large coal mining development.

Listed Threatened Species and Communities:

A total of 66 threatened species and 6 threatened ecological communities listed under the EPBC Act have been recorded on the protected matters search. A likelihood of occurrence assessment for these MNES has been completed in **Appendix D**.

Threatened Species

Ten threatened birds, eight mammals, three frogs, two reptiles, and twenty-three plants were recorded on the protected matters search. None were considered to have the potential to utilise the habitats within the Subject Land.

This assessment concluded that the proposal is unlikely to impact the listed threatened species.

Threatened Ecological Communities

Vegetation Zone 1 was assessed as being commensurate with EPBC Act listed Critically Endangered *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. An assessment of impact has been undertaken in **Appendix G**

Listed Migratory Species:

The protected matters search nominated 16 migratory species or species habitat that may occur with the 10 km Study Area buffer search area. No listed migratory species were observed within the subject site. This assessment concluded that no habitat within the Subject Land or Study Area is critical to their survival. Therefore, it is unlikely that the proposal over the Subject Land will impact migratory species.

Wetlands of International Significance (declared Ramsar wetlands):

The Subject Land is not a wetland of international significance or declared Ramsar wetland. The Subject Land buffer is nominated as being 20-30 km upstream from the Hunter Estuary Wetlands, however in reality over 100 km of waterway separates the site from the wetland and no activities are proposed which are likely to negatively impact local or regional waterways.

Commonwealth Marine Areas:

The Subject Land is not part of a Commonwealth Marine Area and is not in close proximity to any such area.

World Heritage Properties:

The Subject Land is not a World Heritage area and is not in close proximity to any such area.

National Heritage Places:

The Subject Land is not a National Heritage area and is not in close proximity to any such area.

Great Barrier Reef Marine Parks:

The Subject Land is not part of or within close proximity to any Great Barrier Reef Marine Park.

Nuclear Actions:

The proposal over the Subject Land is not and does not form part of a Nuclear action.

Water Resources in relation to Coal Mining and CSG:

The proposal over the Subject Land is related to an Educational Institution and as such is not or does not form part of a coal mining and/or CSG proposal.

Summary - In summary, the proposed action is unlikely to have an impact to MNES assessed in this report based on the assessment criteria set out in relevant Commonwealth policies and advices as at the time of this assessment.

8 SEPP (Biodiversity and Conservation) 2021

The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* commenced on 1 March 2022 and combines 11 separate SEPPs into one consolidated document. SEPP (Biodiversity and Conservation) 2021 replaces and repeals those consolidated SEPPs, which includes amongst others, both the SEPP (Koala Habitat protection) 2020 and SEPP (Koala Habitat protection) 2021. The Biodiversity and Conservation SEPP 2021 provides the existing provisions as separate chapters.

The principles of the Biodiversity and Conservation SEPP 2021 are unchanged from the previous Koala SEPP 2020 and 2021 and aim to:

- Encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.
- Help reverse the decline of koala populations by ensuring koala habitat is properly considered during the development assessment process.
- Provide a process for councils to strategically manage koala habitat through the development of koala plans of management.

The Biodiversity and Conservation SEPP 2021 reflects the policy framework of previous Koala SEPP 2020 (Chapter 3) and 2021 (Chapter 4) for Local Government Areas (LGA) in NSW. At this stage:

- In nine of these LGAs – Metropolitan Sydney (Blue Mountains, Campbelltown, Hawkesbury, Ku-Ring-Gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast LGA – **Chapter 4** of the Biodiversity and Conservation SEPP 2021 applies to **all zones**.
- In all other identified LGAs, **Chapter 3** of the Biodiversity and Conservation SEPP 2021 **applies** to land zoned RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry.

The SEPP applies in accordance with *Part 4.2 Clause 4.9 – Development assessment process – no approved koala plan of management for land*.

(1) *This clause applies to land to which this policy applies if the land –*

- a) *Has an area of at least 1 hectare (including adjoining land within the same ownership), and*

The lot in which the subject land occurs is >1 ha.

- b) *Does not have an approved koala plan of management applying to the land.*

No koala plan of management occurs within the Cessnock Council LGA.

The SEPP (2021) does not apply as the Study Area is zoned RU2 Rural Landscape in a relevant LGA (being Cessnock City Council) – as such the requirements of the SEPP (2020) apply to this development.

No Koala records exist according to DPIE Bionet within 2.5km of the site in the last 18 years. Further, Koala feed trees listed in Schedule 2 comprise less than 15% of the trees in Vegetation Zone 1, which is the only VZ containing native canopy. Significant barriers to Koala movement within the Subject Lands exist, reducing the likelihood that Koalas could utilise the Subject Land for transitory forage or refuge. No secondary indications (scats, fur, scratches consistent with Koala and belly rub trees) were observed during surveys over the site.

On this basis, the Subject Lands are not considered to represent core or potential Koala habitat, nor serve an important ecological function for Koalas, nor to be important for the recovery of the Koala, and further assessment is therefore not required.

STAGE 2 - IMPACT ASSESSMENT

9 Avoid and Minimise Impacts

9.1 Biodiversity Values

Site Selection

The Study Area is a parcel of rural land which has undergone historical clearing and comprises managed pasture and turf with patches of retained vegetation and vegetated riparian corridors. Retained vegetation is generally limited to canopy only with disturbed or managed understorey. Riparian lands within the Study Area have been entirely avoided, with proposed works largely limited to road frontage, cleared land and the established school site. Works on Lomas Lane are proposed for the smallest practical area fit for purpose, avoiding areas of continuous canopy further west of the existing school entrance.

An initial site inspection provided a preliminary assessment of biodiversity values within the Subject Land to assist with site selection and avoidance of higher biodiversity values in the Study Area. subject site.

Project Design

Project design for this proposal has been an iterative process. Consultation between the planners, engineers, bushfire consultant and ecologist has been collaborative. The final development footprint was produced in accordance with BAM requirements including avoiding and minimising biodiversity impacts as much as practicably possible. Avoidance of PCT 1233 associated with the Black Creek riparian corridor has been achieved, and minimal removal of PCT 1594 was avoided where possible. Both are associated with Threatened Ecological Communities (TEC).

Refer to **Figure 1** showing the development footprint as the Subject Land.

9.2 Prescribed Biodiversity Impacts

The avoidance and minimisation of prescribed biodiversity impacts is a critical component of the BAM, as many of these biodiversity values are difficult to quantify, replace or offset.

The BC regulation (clause 6.1) identified actions that are prescribed as impacts to be assessed under the biodiversity offset scheme. Where these items occur, they have been addressed below.

9.2.1 Habitat for Threatened Entities

Karst, caves, crevices, cliffs, rocks, and other geological features of significance

Not applicable to this proposal.

Human-made structures

Occupied buildings exist in the established School adjacent to the Subject Lands, however, do not constitute suitable habitat for threatened species as they are well maintained and regularly occupied or utilised.

Non-native vegetation

Non-native vegetation on the site is limited to managed exotic turf and pasture grasses and areas of unmanaged annual weeds, which do not constitute habitat for threatened species identified as having the potential to occur in the Study Area. Exotic vines in the riparian corridor may provide refuge for threatened species, and these areas have been avoided.

9.2.2 Habitat Connectivity

The proposed development avoids vegetation removal almost entirely, limiting works to the cleared lands west of the Black Creek riparian corridor. Connectivity to adjacent areas of habitat are maintained via this corridor with only a very small fringing area to be disturbed for a bus turnaround, in vegetation that is limited to canopy only with a managed and mulched understorey. All other works occur on the frontage of Lomas Lane and Wine Country Drive where no current connectivity exists.

9.3 Water bodies, Water Quality and Hydrological Processes that Sustain Threatened Entities

Proposed works will avoid all mapped watercourses and will largely avoid existing dams on the Subject Land.

9.3.1 Wind Turbine Strikes

Not applicable to this proposal.

9.3.2 Vehicle Strikes

The proposed development will have a moderate increase in vehicle movements within the Subject Land, due to the proposed increase in student capacity, and increasing vehicle movements through the subject land. Access to the Subject Land will continue from Lomas Lane, with proposed new access from Wine Country Drive.

The new access has been located on the southernmost lot, removed from areas of retained native vegetation and unlikely to form a connection between areas of habitat, between which fauna movements might increase vehicle strike. The upgraded existing access from Lomas Lane has been set aside for mass transport, with a bus turnaround bay. This accessway is adjacent to retained vegetation but logistically will operate as a slow-in, slow-out, pick-up and drop-off area.

Vehicle velocity through the site at peak times will also be moderated by school zone speed limits.

10 Unavoidable Impacts

The following section outlines potential direct and indirect impacts on biodiversity values and prescribed impacts associated with the proposal.

10.1 Direct Impacts

The proposed construction of school buildings and infrastructure at Lomas Lane, Nulkaba, NSW will result in the following direct impacts:

Removal of Native Vegetation & TEC

A total of 2.31 ha of native vegetation is to be entirely removed. **Table 7** provides an overview of the area to be cleared and the current and future vegetation integrity score (V.I), noting that 0.03 ha of this total native vegetation value (2.31 ha) is comprised by planted native vegetation not assigned to a PCT, as per Section 4.2 VZ 4 description.

Of this 0.09 ha of PCT 1594 is to be removed which is commensurate with BC Act Endangered and EPBC Act Critically Endangered Ecological Community *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*.

Removal of Threatened Species (Candidate Species Credit Species)

No Candidate Threatened Species we identified as potentially utilising habitat on the Subject Lands.

Table 7 Direct Impacts on Native Vegetation

Vegetation Zone	Condition	Threatened Ecological Community	Area (ha)	Current V.I Score	Future V.I Score
1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter					
VZ 1	1594_poor	Yes	0.09	48.9	0
VZ 2	1594_lawn	No	1.92	12.1	0
VZ 3	1594_weedy	No	0.27	11.5	0

Candidate Species Credit Species and SAI

As part of the biodiversity assessment, it has been determined the proposal will:

- Not impact any threatened ecological communities which are listed as a candidate Serious and Irreversible Impact entity in accordance with *Guidance to assist a decision-maker to determine a serious and irreversible impact* (BAM 2020)

10.2 Indirect Impacts

The proposed construction of school buildings and infrastructure at Lomas Lane, Nulkaba, NSW will result in the following indirect impacts described in **Table 8**.

Table 8 Potential Indirect Impacts

Impact	Extent	Frequency/likelihood	Duration	Threatened species or TEC likely to be affected	Consequence of the impact on bioregional persistence of the threatened species, TEC and/or habitat
Inadvertent impacts on adjacent habitat or vegetation	Immediate surrounds	Likely – Ongoing	During & post construction	- Hollow bearing trees used by threatened species such as birds, forest owls, microbats and arboreal mammals (potential to occur). - Threatened flora and fauna - Adjacent TEC – (PCT 1233) – River Flat Eucalypt Forest east of the Subject Land	- Risk of disturbance of genetic exchange between flora species - Risk of disturbance to retained vegetation - Risk of loss/disturbance to fauna habitat (nests, foraging habitat) - Minor risk of injury or mortality of fauna during clearing within the Subject Land - Risk of disturbance to riparian zone (Black Creek)
Reduced viability of adjacent habitat due to noise, dust or light spill	Immediate surrounds	Likely - On-going	On-going during construction and post development	- Forest Owls (foraging) - Microbats (foraging) - All potential threatened fauna that may forage in the adjacent habitat - Threatened flora - Adjacent TEC – (PCT 1233) – River Flat Eucalypt Forest east of the subject land	- Alter fauna behaviour (breeding, roosting and movement) in the immediate locality - Dust cover may impact function of flora species in immediately adjacent vegetation - Increased light in the locality impacting on nocturnal fauna movements.
Erosion and sediment impacts to adjacent vegetation	Unknown	Infrequent pending mitigation measures	Construction and Operational	- Threatened flora and fauna - Adjacent TEC – (PCT 1233) – River Flat Eucalypt Forest east of the subject land	- Erosion and sedimentation impact on potential adjacent native vegetation - Erosion and sedimentation impact on potential adjacent disturbed swamp forest/creeklines

10.3 Assessment of Prescribed Biodiversity Impacts

10.3.1 Habitat for Threatened Entities

Karst, caves, crevices, cliffs, rocks, and other geological features of significance

Not applicable to this proposal.

Human-made structures

Occupied buildings exist in the established School adjacent to the Subject Lands, however do not constitute suitable habitat for threatened species as they are well mainlined and regularly occupied or utilised.

Non-native vegetation

Non-native vegetation on the site is limited to managed exotic turf and pasture grasses and areas of unmanaged annual weeds, which do not constitute habitat for threatened species identified as having the potential to occur in the Study Area. Exotic vines in the riparian corridor may provide refuge for threatened species, and these areas have been avoided.

10.4 Habitat Connectivity

The proposal will result in the removal or disturbance of up to 0.09 ha of native vegetation (with a V.I score above the relevant threshold) within a broadly cleared rural landscape, on a highly and frequently trafficked site. The proposed works will have a negligible effect on the habitat connectivity for threatened species locally and within the wider region, as existing connectivity is heavily biased to the riparian corridor east of the Subject Lands, which will be entirely retained. The proposed infrastructure is to be installed within an established educational facility, an on the frontage of an arterial road, both of which constitute significant existing barriers to fauna movement.

The site in its current form is connected to surrounding vegetation only in the east, where the riparian corridor of Black Creek connects to the north and east, ultimately linking with the Hunter River in the north, and connecting to the east to Werakata National Park. These connections are fragmented in places by rural land management. No connection exists to the west, and while connection exists to the south following a riparian corridor, this connection is highly disturbed and terminates at the township of Cessnock.

The proposal will not significantly influence habitat connectivity or existing fragmentation patterns within nearby corridors. The removal or modification of vegetation from the site that represents habitat exists in a disturbed condition due to land management patterns across the site. Specifically, the proposal is located on actively managed school grounds which have been historically cleared and disturbed to an extent where native fauna habitat is limited except for isolated patches of canopy which may constitute foraging habitat or refuge for highly mobile fauna species, and which will be almost entirely retained.

The removal or disturbance of a small patch of native vegetation (0.16 ha) will, on balance, retain existing connectivity and minimise fragmentation of habitat for biodiversity in the locality as a result of development within the Subject Land.

10.5 Water bodies, Water Quality and Hydrological Processes that Sustain Threatened Entities

Proposed works will avoid all mapped watercourses and dams on the Subject Land. There is potential for works to temporarily increase the risk of sedimentation into adjacent watercourses, however mitigation measures (**Section 11**) should ameliorate this risk.

10.5.1 Wind Turbine Strikes

Not applicable to this proposal.

10.5.2 Vehicle Strikes

The proposed development will potentially increase vehicle strike at a minor level for threatened diurnal fauna that may use adjacent vegetation as a place to forage and roost during peak vehicle movements through the Study Area.

11 Mitigation and Managing Impacts

The following section outlines general mitigation measures required to manage impacts associated with the development proposal. All mitigation measures propose to manage impacts that include techniques, timing, frequency and responsibility for implementing each measure.

Table 9 Mitigation Measures

Mitigation Measures	Responsibility	KPI	Timing	Corrective Action
Direct Impacts				
Vegetation Clearing				
Vegetation removal works are to occur outside core breeding periods for species known to use habitat within the Subject Land wherever possible.	Project ecologist in consultation with project manager	Works plan indicates tree clearing areas during optimal months	Spring to Summer where possible	Cease site works, revert to KPI
Pre-clearance survey of tree to be removed	Project Ecologist	Tree pre-clearance survey completed maximum one week prior to removal No breeding fauna observed at time of clearing	Prior to commencement of works for each stage	Cease site works, revert to KPI
Indirect Impacts				
Weeds, disease and edge effects				
Equipment and vehicles entering the Subject Land are cleaned of foreign soil and seed prior to entering the Study Area	Contractors	Best practice hygiene protocols followed, No visible foreign material, certification available upon request	Prior to machinery arriving to the Subject Land	Non-compliance due to foreign material present, Refer to KPI
Retained Vegetation				
Establish No go zones at the Subject Land and Study Area interface.	Contractor in consultation with project ecologist	Fencing to include high vis bunting and star pickets or similar	Prior to construction	Cease site works and refer to KPI
Develop a weed management protocol to be included in Construction Environment Management Plan (CEMP) for constructions period to limit degradation of interface of development and retained vegetation	Contractor with Ecologist input	Approved CEMP (Inc. weed management protocols) prior to construction of each stage	Prior to construction of each stage adjacent to retained vegetation	Increases in weed presences, will require amendments to weed management protocols
Noise and light Impacts				
Limit construction works to daylight hours to reduce impacts from light and noise	Construction contractor	No construction works to occur from dusk till dawn.	During construction works	Cease site works and refer to KPI
All machinery is correctly maintained and operator as per operation manual	Construction contractor	No excessive noise of machinery due to poor maintenance or faulty parts	During construction works	Cease site works and refer to KPI

Mitigation Measures	Responsibility	KPI	Timing	Corrective Action
Dust Impacts				
Vehicles/machinery to observe 10km/h speed limit on Subject Land	Contractors	No excessive dust	For the duration of Subject Land works until impervious surfaces established.	Reassess KPI and control measures if excessive dust continues
Prescribed Biodiversity Impacts				
Erosion and sediment controls enacted in accordance with construction environment management plan (CEMP) to limit impacts on retained vegetation or riparian zones	Construction Contractor	CEMP followed & modified as needed	Prior to commencement of works, for duration of Subject Land works	Cease site works, Refer to KPI
Establish Speed limits during construction and operation of the proposed development	Project Manager	Low speed limits set to minimise vehicle strikes	Prior to construction and during operation	Refer to KPI

12 Offset Requirements for Unavoidable Impacts

A summary of offset liabilities for the proposed development with respect to native vegetation are provided below (Refer to **Table 10**) as per 9.2.1 BAM 2020:

An offset is required for all impacts of development on PCTs that are associated with:

- a vegetation zone that has a vegetation integrity score ≥ 15 where the PCT is representative of an endangered or critically endangered ecological community, or
- a vegetation zone that has a vegetation integrity score of ≥ 17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community, or
- a vegetation zone that has a vegetation integrity score ≥ 20 where the PCT is not representative of a TEC or associated with threatened species habitat.

12.1 Ecosystem Credits

Table 10 Ecosystem Credits

Vegetation Zone	PCT ID	Area (ha)	Vegetation Integrity Score (V.I) loss	Ecosystem Credits Required	SAII
VZ1_1594_Poor	1594	0.09	48.9	2	No
VZ2_1594_Lawn	1594	1.97	12.1	0	
VZ3_1594_Weedy	1594	0.27	11.5	0	
			Total	2	

12.2 Species Credit

As no habitat for Candidate Threatened Species was identified within the Subject Land, no offset liabilities are generated for Species Credit species.

12.3 Areas not requiring Offsets

There is a total of 0.9 ha of non-native and planted native vegetation which does not require offsetting. This vegetation does not align with the native vegetation indigenous to the area and occurs within highly modified garden beds within the school and therefore does not require further assessment. Additionally, VZ 2 & 3 will not require offsets as both VZ's accrued 0 credits.

12.4 Credit Summary

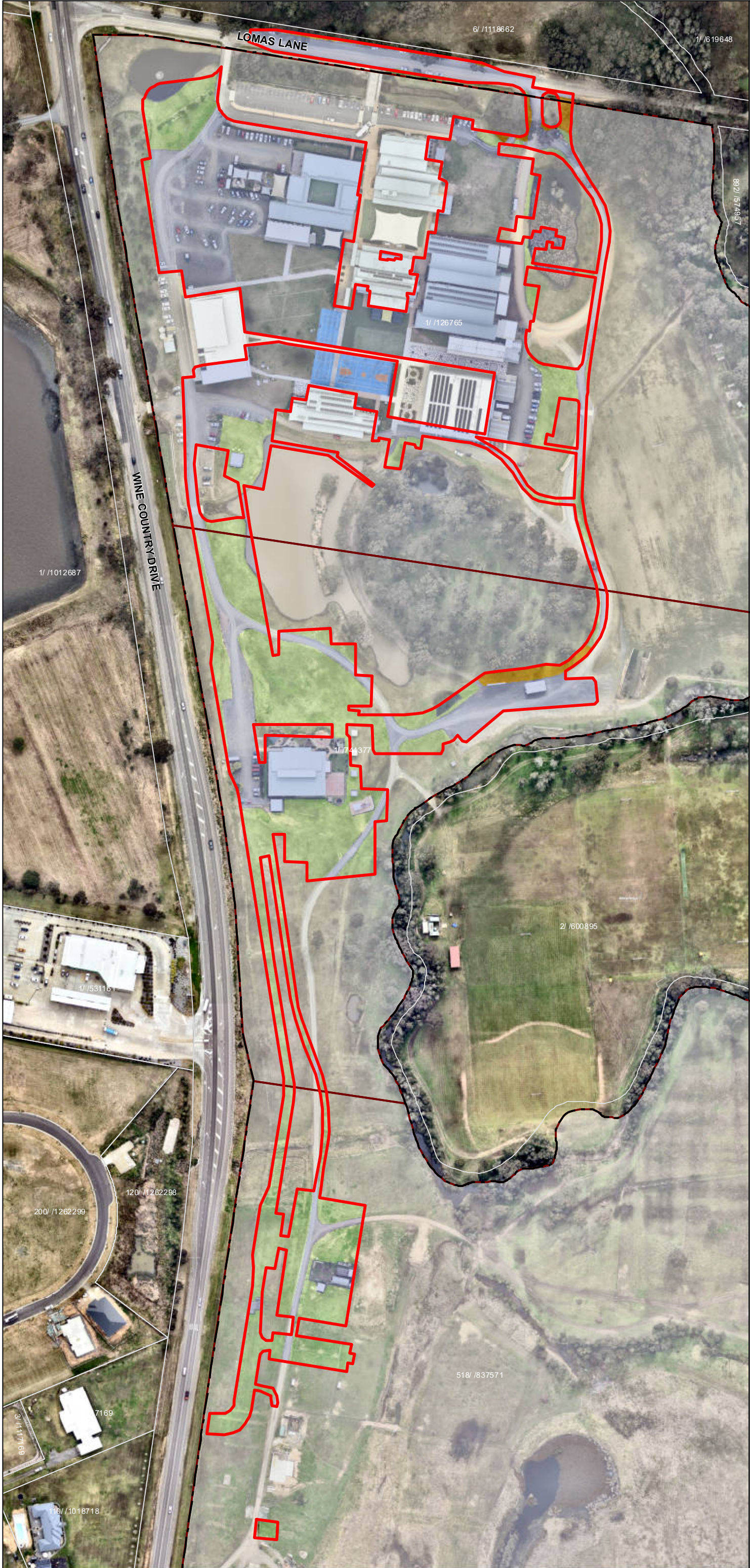
The following **Table 11** displays the required Biodiversity Offset Liability based on the BAM-C and **Figure 7** depicts areas that require offset. Refer to **Appendix E** for the BAM Credit Report.

Table 11 Biodiversity Liability Credit Summary

PCT	TEC	Area (ha)	HBT Cr	No HBT Cr	Offset Credits required
Ecosystem Credits					
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.09	2	0	2
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	Not a TEC	2.27	0	0	0

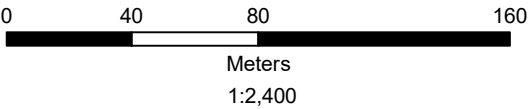
The full Biodiversity Credit Liability is to be retired prior to the commencement of works.

A market appraisal will be undertaken to determine if some or all of the credit types are available and/or an application will be made to the Biodiversity Conservation Trust for payment into Biodiversity Conservation Fund.



10 LOMAS LANE, NULKABA
FIGURE 6: OFFSET REQUIREMENTS

- Legend**
- Subject Land
 - Study Area
 - Subject Lots
 - Cadastral Boundaries
 - Impacts Requiring Offsets
 - Impacts Not Requiring Offsets
 - Areas Not Requiring Assessment
 - Areas Not Impact



13 Conclusion

MJD Environmental has been engaged by Barr Planning on behalf of St Philips Christian Education Foundation to prepare a Biodiversity Development Assessment Report (BDAR) for a State Significant Development (SSD), being expansion of infrastructure and facilities at St Philips Christian College, being Lots 1 / DP126765, 1 / DP744377, 2 / DP600895 and 518 / DP837571, and a portion of the road corridor of 10 Lomas Lane Nulkaba NSW.

This proposal falls within the major projects approval pathway, as a State Significant Development (SSD), pursuant to Schedule 1, 15(2) of the of the State Environment Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). The Secretary's Environmental Assessment Requirements (SEARs) for the project have directed the applicant to: "Assess any biodiversity impacts associated with the development in accordance with the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method 2020, including the preparation of a Biodiversity Development Assessment Report (BDAR), unless a waiver is granted, or the site is on biodiversity certified land". As the impacts to biodiversity do not meet the requirements of a BDAR waiver due to the presence of native vegetation and habitat constraints, this BDAR has been prepared to assess residual impacts.

The Biodiversity Assessment Methodology (BAM) 2020 was used as the assessment method, to establish impacts on threatened species and threatened ecological communities in the locality under the *Biodiversity Conservation Act 2016*. In addition, preliminary assessment was also undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Assessment has been considered with regard to the Koala via application of the *State Environmental Planning Policy (Conservation and Biodiversity) 2021*.

The proposed Subject Land is situated over land zoned RU2 – Rural Landscape. Lot 1 DP 126765 is the site of the current educational establishment of St Philip's Christian College, comprising parking, buildings, sports ground and open space. Lot 1 DP 744377 is generally comprised of open space with unsealed access and one building, being the SPCC Dynamic Alternative Learning Environment. Lot 518 DP 837571 comprises of open space, unsealed access, a greenhouse, an irrigation dam and an equestrian centre. Across all lots, substantial managed open space dominates.

Field surveys carried out as part of the BDAR delineated the following Plant Community Type (PCT) within the Subject Land:

- 1594 – Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

No threatened species listed as under the BC Act were recorded within the subject land.

Additionally, the Subject Land is mapped on the Important Areas Map as habitat for *Anthochaera phrygia* (Regent Honeyeater) listed as Critically Endangered under both the BC & EPBC Acts, however no impact to mapped vegetation is proposed.

Impact Avoidance & Mitigation

A package of avoidance and mitigation measures have been described in this BDAR associated with the project.

The Subject Land for development was selected due to the largely cleared or managed lands with low native species diversity as a result of past and present land use. A total of 2.31 ha of native vegetation is to be entirely removed under this proposal within the Study Area.

All measures have been incorporated into the design (avoidance) in the first instance with mitigation measures assessed for the construction phases of the project.

Impact Analysis

The proposal will result in the following impacts and required Biodiversity Offset Liability as calculated using the BAM-C Calculator.

PCT	TEC	Area (ha)	HBT Cr	No HBT Cr	Offset Credits required
Ecosystem Credits					
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.09	2	0	2
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	Not a TEC	2.2	0	0	0

The full Biodiversity Credit Liability is to be retired prior to the commencement of works. Clearing of the Subject Land is anticipated to occur as a single event and so, no staged retirement of credits is listed here.

A market appraisal will be undertaken to determine if some or all of the credit types are available and/or an application will be made to the Biodiversity Conservation Trust for payment into Biodiversity Conservation Fund.

A preliminary assessment under the EPBC Act determined the proposed action is unlikely to have an impact to MNES assessed in this report based on the assessment criteria set out in relevant Commonwealth policies and advices as at the time of this assessment.

Assessment against the SEPP (Biodiversity and Conservation) 2021 criteria determined the proposal is unlikely to impact this species.

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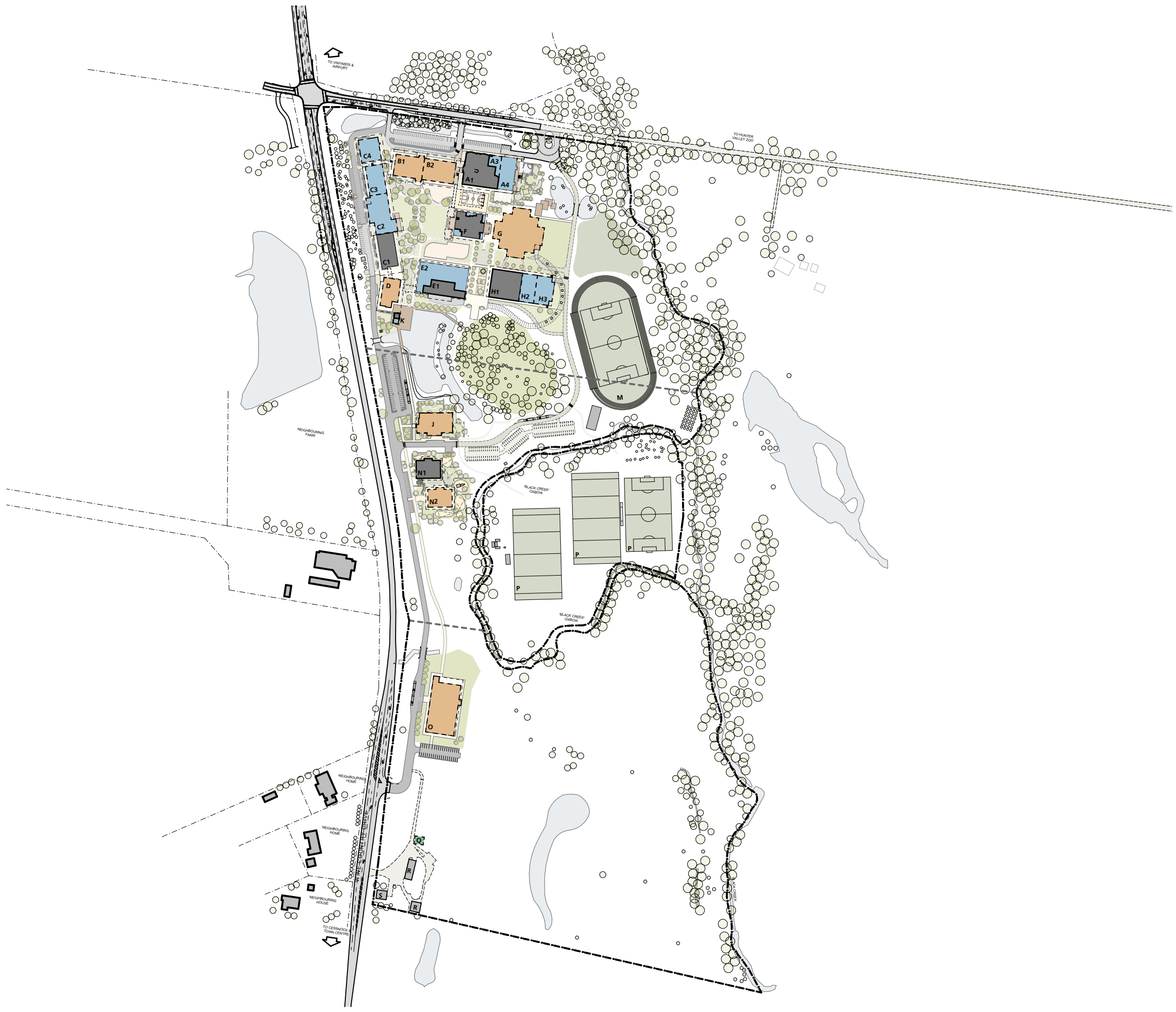
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Appendix A Plan of Proposal

Drawing and design © SHAC Pty Ltd. The signed control copy of this drawing is held by SHAC Pty Ltd. | Ref: Volume/Projects/4304347 SPCC Cessnock Campus SSD/500 CAD Graphics & Other/520 Developed Design/4347 520.07 SPCC Cessnock SSD.pln date:6/9/2022 time: 10:35 am



SSD APPLICATION

1. Dimensions are in millimetres unless otherwise shown.
2. Work to given dimensions. Do not scale from drawing.
3. Check all dimensions on site prior to construction and fabrication.
4. Bring any discrepancies to the attention of the proprietor & architect.

LEGEND

	EXISTING BUILDINGS		EXISTING WATER BODY
	SITE BOUNDARY		EXISTING ROAD NETWORK & PARKING
	LOT BOUNDARY		GRAVEL ROAD / OVERFLOW CAR PARKING
	EXISTING TREES		FOOTPATHS / BUSH TRACKS
	PROPOSED NEW BUILDING		PROPOSED ALTERATIONS & ADDITIONS TO EXISTING BUILDINGS
	PROPOSED ROAD NETWORK & PARKING		PROPOSED PATHWAYS
	PROPOSED NEW AREA		

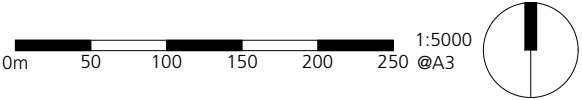
EXISTING BUILDING KEY

- A1 - EXISTING JUNIOR SCHOOL
- C1 - EXISTING SENIOR SCHOOL
- E1 - EXISTING TRADE TRAINING CENTRE
- F - EXISTING CANTEEN/CAFE HUB
- H1 - EXISTING SPORTS HALL
- K - EXISTING SWITCH ROOM
- N1 - EXISTING DALE SPECIAL SCHOOL
- P - EXISTING SPORTS FIELDS
- R - EXISTING SHEDS
- S - EXISTING HOUSE

PROPOSED PROJECT SCOPE

THE FOLLOWING PROJECT STAGES ARE WITHIN THE STATE SIGNIFICANT DEVELOPMENT (SSD) APPLICATION:

- A3 - JUNIOR SCHOOL ALTERATIONS & ADDITIONS
- A4 - JUNIOR SCHOOL ALTERATIONS & ADDITIONS
- B1 - MIDDLE SCHOOL
- B2 - MIDDLE SCHOOL
- C2 - SENIOR SCHOOL ADDITION
- C3 - SENIOR SCHOOL ADDITION
- C4 - LIBRARY / CHAPEL ADDITION
- D - ADMIN & WELCOME CENTRE
- E2 - TRADE TRAINING CENTRE ALTERATIONS & ADDITIONS
- F - CANTEEN / CAFE HUB ALTERATIONS & ADDITIONS
- G - PERFORMING ARTS CENTRE
- H2 - SPORTS HALL ADDITION
- H3 - SPORTS HALL ADDITION
- J - NARNIA EARLY LEARNING CENTRE
- K - WELCOME CENTRE
- N2 - DALE SPECIAL SCHOOL
- O - AQUATIC CENTRE
- Q - WASTE MANAGEMENT DEPOT



Appendix B BAM Plot Data

Plot Info							Composition						Structure (%)						Function										
Plot	PCT	Condition Class	Vegetation Zone	Easting	Northing	Bearing	Tree	Shrub	Grass	Forbs	Ferns	Other	Tree	Shrub	Grass	Forbs	Ferns	Other	Lge Tree	Hollow bearing tree	Litter Cover (%)	Logs	Tree Stem 5-10	Tree Stem 10-20	Tree Stem 20-30	Tree Stem 30-50	Tree Stem 50-80	Tree Regen	HTE (%)
B01	1594	Poor	1	345705	6370357	130	2	0	5	7	0	2	20	0	2.8	1	0	0.4	2	0	48.4	0.0	Y	Y	Y	Y	Y	N	0.8
B02	1594	Lawn	2	345719	6370224	298	0	0	1	7	1	0	0.0	0.0	35.0	6.0	0.2	0.0	0	0	1.2	0.0	N	N	N	N	N	N	60.0
B03	1594	Weedy	3	345522	6369618	358	0	0	1	2	0	0	0.0	0.0	90.0	2.1	0.0	0.0	0	0	14.4	0.0	N	N	N	N	N	N	0.0
B04	1594	Lawn	2	345577	6369692	106	0	0	1	1	0	0	0.0	0.0	70.0	0.1	0.0	0.0	0	0	29.0	0.0	N	N	N	N	N	N	10.2
B05	1594	Poor	1	345684	6370029	308	1	0	4	4	0	0	25.0	0.0	47.1	13.3	0.0	0.0	2	1	72.0	0.0	N	Y	Y	N	Y	N	7.7
B06	1594	Lawn	2	345558	6369897	190	0	0	3	1	0	0	0.0	0.0	41.5	5.0	0.0	0.0	0	0	2.0	0.0	N	N	N	N	N	N	40.4
B07	1594	Poor	1	345521	6370402.0	101	2	1	3	7	0	0	10.0	8.0	35.0	3.5	0.0	0.0	0	1	35.0	0.0	N	Y	Y	Y	Y	N	9.4

Appendix C Flora and Fauna Species Tables

Flora			BAM Plots							
Family	Species Name	Common Name	B01	B02	B03	B04	B05	B06	B07	Incidental
Aizoaceae	* <i>Galenia pubescens</i>	Galenia					x			
	<i>Tetragonia tetragonoides</i>	New Zealand Spinach					x			
Apiaceae	<i>Centella asiatica</i>	Indian Pennywort		x						
Asteraceae	* <i>Ambrosia tenuifolia</i>	Lacy Ragweed					x			
	* <i>Arctotheca calendula</i>	Capeweed				x				
	* <i>Bidens</i> spp.		x				x		x	
	<i>Chrysocephalum apiculatum</i>	Common Everlasting	x							
	* <i>Cirsium vulgare</i>	Spear Thistle		x		x				
	* <i>Conyza bonariensis</i>	Flaxleaf Fleabane	x		x	x	x			
	<i>Euchiton japonicus</i>		x	x						
	<i>Euchiton</i> spp.	A Cudweed			x			x		
	* <i>Facelis retusa</i>		x		x	x				
	* <i>Gamochaeta pensylvanica</i>	Cudweed		x						
	* <i>Gamochaeta purpurea</i>	Purple Cudweed				x				
	* <i>Hypochaeris glabra</i>	Smooth Catsear	x							
	* <i>Hypochaeris radicata</i>	Catsear	x	x	x	x	x	x		
	* <i>Senecio madagascariensis</i>	Fireweed	x			x	x	x	x	
	* <i>Soliva sessilis</i>	Bindyi	x	x	x	x		x		
	* <i>Sonchus oleraceus</i>	Common Sowthistle				x	x			
Boraginaceae	* <i>Heliotropium amplexicaule</i>	Blue Heliotrope					x	x	x	
Caryophyllaceae	* <i>Arenaria leptoclados</i>	Lesser Thyme-leaved Sandwort		x						
	* <i>Cerastium glomeratum</i>	Mouse-ear Chickweed				x				
	* <i>Paronychia brasiliiana</i>	Chilean Whitlow Wort, Brazilian Whitlow				x	x			

C-2

Myrtaceae	<i>Eucalyotus amplifolia</i>	Cabbage Gum							x	
	<i>Eucalyptus moluccana</i>	Grey Box	x				x		x	
	<i>Eucalyptus tereticornis</i>	Forest Red Gum	x							
	<i>Melaleuca sieberi</i>									x
	<i>Melaleuca styphelioides</i>	Prickly-leaved Tea Tree								
Oleaceae	* <i>Olea europea</i>	African Olive							x	
Onagraceae	<i>Ludwigia peploides</i> subsp. <i>montevidensis</i>	Water Primrose		x					x	
Oxalidaceae	<i>Oxalis perennans</i>		x	x	x	x	x			
Phormiaceae	<i>Dianella longifolia</i>	Blueberry Lily	x							
Phyllanthaceae	* <i>Phyllanthus virgatus</i>	Wiry Spurge	x							
Plantaginaceae	* <i>Plantago lanceolata</i>	Lamb's Tongues	x	x	x	x	x	x	x	
Poaceae	<i>Aira cupaniana</i>	Silvery Hairgrass					x			
	* <i>Aristida calycina</i>		x							
	* <i>Bromus catharticus</i>	Praire Grass					x			
	<i>Cenchrus clandestinus</i>	Kikuyu Grass		x			x	x		
	* <i>Cynodon dactylon</i>	Common Couch	x	x	x	x	x	x	x	
	* <i>Ehrharta erecta</i>	Panic Veldtgrass					x		x	
	<i>Eleusine tristachya</i>	Goose Grass						x		
	* <i>Eragrostis brownii</i>	Brown's Lovegrass	x							
	* <i>Eragrostis curvula</i>	African Lovegrass	x						x	
	* <i>Hyparrhenia hirta</i>	Coolatai grass							x	
	<i>Lolium perenne</i>	Perennial Ryegrass	x				x			
	<i>Microlaena stipoides</i>	Weeping Grass					x			
	<i>Panicum simile</i>	Two-colour Panic						x		
	* <i>Paspalidium</i> spp.						x			
	<i>Paspalum dilatatum</i>	Paspalum	x			x		x	x	

	<i>Rytidosperma racemosum</i>	Wallaby Grass					x			
	* <i>Rytidosperma</i> spp.		x							
	<i>Themeda triandra</i>		x							
	* <i>Urochloa decumbens</i>	Signal Grass		x						
	* <i>Vulpia myuros</i>	Rat's Tail Fescue		x	x					
	<i>Rumex brownii</i>	Swamp Dock							x	
Polygonaceae	<i>Persicaria lapathifolia</i>	Pale Knotweed		x						
Portulacaceae	<i>Portulaca oleracea</i>	Pigweed							x	
Primulaceae	* <i>Lysimachia arvensis</i>	Scarlet Pimpernel	x	x		x	x			
Ranunculaceae	<i>Clematis glycinoides</i>	Headache Vine	x							
Rubiaceae	* <i>Richardia humistrata</i>							x		
Solanaceae	* <i>Cestrum aurantiacum</i>	Orange Cestrum					x			
	* <i>Solanum nigrum</i>	Black-berry Nightshade					x			
Typhaceae	<i>Typha orientalis</i>	Broad-leaved Cumbungi		x						
Verbenaceae	* <i>Verbena bonariensis</i>	Purpletop	x			x				

* = non-native species

Fauna	
Scientific Name	Common Name
<i>Anas superciliosa</i>	Pacific Black Duck
<i>Acridotheres tristis</i>	Common Myna
<i>Aythya australis</i>	Hardhead
<i>Cacatua sanguinea</i>	Little Corella
<i>Corvus coronoides</i>	Australian Raven
<i>Chenonetta jubata</i>	Australian Wood Duck
<i>Egretta novaehollandiae</i>	White-faced Heron
<i>Eolophus roseicapilla</i>	Galah
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater
<i>Gallinula tenebrosa</i>	Dusky Moorhen
<i>Grallina cyanoleuca</i>	Magpie-lark
<i>Hirundo neoxena</i>	Welcome Swallow
<i>Litoria fallax</i>	Eastern dwarf tree frog
<i>Platycercus eximius</i>	Eastern rosella
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet
<i>Vanellus miles</i>	Masked Lapwing

* = non-native species

(V) = listed as Vulnerable under the BC & EPBC Act

Appendix D EPBC Likelihood of Occurrence Table

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Birds				
<i>Actitis hypoleucos</i>	Common Sandpiper	Migratory/Marine	The Common Sandpiper is found along all coastlines of Australia and in many areas inland. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. The Subject Land is not within coastal or inland wetland. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land is no longer presenting as a functioning wetland and does not provide suitable habitat for a wetland dependent species.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-Oak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark <i>Eucalyptus eugenioides</i> and other <i>Stringybark</i> species, and <i>Broad-leaved Ironbark E. fibrosa</i> can also contribute important nectar flows at times. The Subject Land is outside of BAM Important Areas Map for this species. Further, the site lacks diversity of mature trees, high canopy cover and abundance of mistletoes preferred by this species. While Swamp Mahogany <i>Eucalyptus robusta</i> do occur on the site, the habitat is small and fragmented as well as highly disturbed being between cleared agricultural land. It is unlikely that this species uses habitat on the Subject Land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory/Marine	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. These are widespread but scattered further west of the line joining Bourke and Dareton. Sightings have been recorded at Milparinka, the Bulloo River and Thurloo Downs (Higgins 1999). The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines (Higgins 1999). They forage aerially, up to hundreds of metres above ground, but also less than 1 m above open areas or over water. The species could feasibly utilise the subject land to forage aerially, however marginally. This will not be impacted by the proposed works. There is a single record of the species within 10 km, dated from 2007. Therefore, there are no current records within the locality.	Unlikely
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered	Inhabits dense tall sedge vegetation and permanent wetlands. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha</i> spp.) and spikerushes (<i>Eleocharis</i> spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch. No suitable habitat occurs within the Subject Land.	Unlikely
<i>Bubulcus ibis</i> as <i>Ardea ibis</i>	Cattle Egret	Migratory/Marine	The Cattle Egret occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. It has occasionally been seen in arid and semi-arid regions however this is extremely rare. High numbers have been observed in moist, low-lying poorly drained pastures with an abundance of high grass; it avoids low grass pastures. It has been recorded on earthen dam walls and ploughed fields. It is commonly associated with the habitats of farm animals, particularly cattle, but also pigs,	

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			sheep, horses and deer. The Cattle Egret is known to follow earth-moving machinery and has been located at rubbish tips. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora. They have sometimes been observed in swamps with tall emergent vegetation (Marchant & Higgins 1990; Morton et al. 1989). The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land is no longer presenting as a functioning wetland and does not provide suitable habitat for a wetland dependent species. There are no bionet records of the species within 10 km of the subject land.	
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Migratory/Marine	The Sharp-tailed Sandpiper spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands, and coastal areas with much beachcast seaweed. Sometimes they occur on rocky shores and rarely on exposed reefs. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land is no longer presenting as a functioning wetland and does not provide suitable habitat for a wetland dependent species. There are no bionet records of the species within 10 km of the subject land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered/ Migratory/Marine	Inhabits intertidal mud flats in estuaries, bays, lakes and lagoons or areas of bare mud or sand on which to forage. In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one year old birds remain in Australia rather than migrating north. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land is no longer presenting as a functioning wetland and does not provide suitable habitat for a wetland dependent species. There are no Bionet records of the species within 10 km of the subject land.	Unlikely
<i>Calidris melanotos</i>	Pectoral Sandpiper	Migratory/Marine	The Pectoral Sandpiper is widespread, but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land is no longer presenting as a functioning wetland and does not provide suitable habitat for a wetland dependent species. There are no Bionet records of the species within 10 km of the subject land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Callocephalon fimbriatum</i>	Gang-Gang Cockatoo		The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Feeds on eucalyptus seeds. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are a total of 29 Bionet records of the species within 10 km of the subject land dated between 1996 – 2019.	Unlikely
<i>Calyptorhynchus lathamii</i>	South-eastern Glossy Black-Cockatoo		The Glossy Black-Cockatoo is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (<i>Allocasuarina littoralis</i>) and Forest Sheoak (<i>A. torulosa</i>) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, <i>Allocasuarina diminuta</i>, and <i>A. gymnothera</i>. 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 (<i>Casuarina cristata</i>). Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> 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.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are a total of 17 Bionet records of the species within 10 km of the subject land, all of which are historic (dated between 1987 – 2008) bar one 2020 record. There are <i>Casuarina glauca</i> stands immediately adjacent to the subject land boundary, however not impacted by the proposal, therefore unlikely to impact the species.	
<i>Chalcites osculans</i> as <i>Chrysococcyx osculans</i>	Black-eared Cuckoo	Migratory/Marine	The Black-eared Cuckoo is widespread on mainland Australia, but avoids the wet, heavily forested areas on the east coast and the south-west corner of Western Australia. It is an occasional vagrant to offshore islands and Tasmania. The Black-eared Cuckoo is found in drier country where species such as mulga and mallee form open woodlands and shrublands. It is often found in vegetation along creek beds. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land.	Unlikely
<i>Cuculus optatus</i>	Oriental Cuckoo	Migratory/Marine	This species migrates to the north and east coasts of Australia during the non-breeding season over winter. Mainly inhabiting forests, the Oriental cuckoo occurs in mixed, deciduous and coniferous forest. It is present at all levels of the forest canopy, and can be found at a range of elevations, occasionally being recorded in mountains as high up as 1,100 metres. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land.	

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Erythrotriorchis radiatus</i>	Red Goshawk	Vulnerable	The Red Goshawk occurs from the north-west to north-east coast of Australia. The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. In NSW favoured habitat is mixed subtropical rainforest and Melaleuca forest along coastal rivers, often in rugged terrain.. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land.	Unlikely
<i>Falco hypoleucos</i>	Grey Falcon	Vulnerable	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. No suitable habitat occurs within the Subject Land and site is outside known or predicted range. There are no Bionet records of the species within 10 km of the subject land.	Unlikely
<i>Gallinago hardwickii</i>	Latham's Snipe	Migratory/Marine	Latham's Snipe is a non-breeding visitor to south-eastern Australia and is a passage migrant through northern Australia. The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) . However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. The structure and composition of the vegetation that occurs around these wetlands is not important in determining the suitability of habitat (Naarding 1983). The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			current school, therefore the subject land provides marginal habitat. There are a total of four Bionet records of the species within 10 km of the subject land.	
<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable	The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i>. No suitable habitat occurs within the Subject Land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land.	Unlikely
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Migratory/Marine	The White-bellied Sea-Eagle is distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea and sewage ponds). Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are a total of 15 Bionet records of the species within 10 km of the subject land, dated from 2000- 2019. No stick nests were noted during site visits.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Hirundapus caudacutus</i>	White-throated Needletail	Vulnerable	White-throated Needletails occur in Australia only between late spring and early autumn, but mostly in summer, when they sometimes form large flocks, appearing as a swirling cloud of birds. They have been seen catching flying insects at heights of more than a kilometre. Sometimes they form mixed-species feeding flocks with other swifts, such as Fork-tailed Swifts or swallows. These feeding flocks may be associated with thunderstorms, the uplift of which may assist with their flight and carry insects high into the air. This species is primarily aerial, and while individuals may temporarily use trees on the site to roost, the species is unlikely to depend on any habitat within the Subject Land. There are a total of 15 Bionet records of the species within 10 km of the subject land.	Unlikely
<i>Lathamus discolor</i>	Swift Parrot	Critically Endangered	This species migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there is abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i>, Spotted Gum <i>Corymbia D-9acrocar</i>, Red Bloodwood <i>C. gummifera</i>, Mugga Ironbark <i>E. sideroxylon</i>, and White Box <i>E. albens</i>. Commonly used lerp infested trees include Inland Grey Box <i>E. macrocarpa</i>, Grey Box <i>E. moluccana</i> and Blackbutt <i>E. pilularis</i>. The Subject Land contains a small number of trees of <i>E. moluccana</i>, and there are up to 252 Bionet records of the species within a 10 km Bionet Search, dated between 1990 and 2022. The closest of which is 3.3 km to the south dated from 2014. It is unlikely that the migratory species would rely on the feed trees within the subject land, given the relatively young cohort of suitable feed trees and lack of connectivity within the broader landscape. The species is not associated with the PCT present within the subject lands, There are no recent records within 7km of the site and the it is not part of the important mapped areas for the swift parrot. It is unlikely the species would depend upon any habitat within the site.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Monarcha melanopsis</i>	Black-faced Monarch	Migratory/Marine	The Black-faced Monarch is widespread in eastern Australia. In Queensland, it is widespread from the islands of the Torres Strait and on Cape York Peninsula, south along the coasts (occasionally including offshore islands) and the eastern slopes of the Great Divide, to the New South Wales border. In New South Wales and the Australian Capital Territory, the species occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park, Wombeyan Caves and Canberra. The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land.	Unlikely
<i>Motacilla flava</i>	Yellow Wagtail	Migratory/Marine	Occurs throughout Australia. Can be found in a range of land uses including pastures, wetlands, shrublands, grasslands and man made environments. The yellow wagtail typically forages in damp grassland and on relatively bare open ground at edges of rivers, lakes and wetlands, but also feeds in dry grassland and in fields of cereal crops. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There is a single historic Bionet record of the species within 10 km of the subject land dated from 2012.	Unlikely
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Migratory/Marine	The Satin Flycatcher is widespread in eastern Australia and vagrant to New Zealand (Blakers et al. 1984; Coates 1990a). In Queensland, it is widespread but scattered in the east, being recorded on passage on a few islands in the western Torres Strait. Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moister, taller forests than the Leaden Flycatcher, <i>Myiagra rebecula</i>, often occurring in gullies. They also occur in	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land.	
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	Critically Endangered	Within Australia, the Eastern Curlew has a primarily coastal distribution. The species is found in all states and rarely inland. The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	Unlikely
<i>Pandion haliaetus</i>	Osprey	Migratory/Marine	The breeding range of the Eastern Osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island. Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	
<i>Rhipidura rufifrons</i>	Rufous Fantail	Migratory/Marine	The Rufous Fantail occurs in coastal and near coastal districts of northern and eastern Australia. In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (<i>Eucalyptus microcorys</i>), Mountain Grey Gum (<i>E. cypellocarpa</i>), Narrow-leaved Peppermint (<i>E. radiata</i>), Mountain Ash (<i>E. regnans</i>), Alpine Ash (<i>E. delegatensis</i>), Blackbutt (<i>E. pilularis</i>) or Red Mahogany (<i>E. resinifera</i>); usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests; for example near Bega in south-east NSW, where they are recorded in temperate Lilly Pilly (<i>Acmena smithii</i>) rainforest, with Grey Myrtle (<i>Backhousia myrtifolia</i>), Sassafras (<i>Doryphora sassafras</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>) subdominants. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including Spotted Gum (<i>Eucalyptus maculata</i>), Yellow Box (<i>E. melliodora</i>), ironbarks or stringybarks, often with a shrubby or heath understorey. They are also recorded from parks and gardens when on passage. In north and north-east Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine forests, semi-deciduous vine thickets or thickets of Paperbarks (<i>Melaleuca</i> spp.) (Higgins et al. 2006). The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	Unlikely
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Most records of the Australian Painted Snipe are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	
<i>Symposiachrus trivirgatus</i> as <i>Monarch trivirgatus</i>	Spectacled Monarch	Migratory/Marine	This species occurs around the coast of NSW. The Spectacled Monarch prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	Unlikely
<i>Tringa nebularia</i>	Common Greenshank	Migratory/Marine	The Common Greenshank does not breed in Australia, however, the species occurs in all types of wetlands across Australia. The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Frogs				
<i>Heleioporus australiacus</i>	Giant burrowing Frog	Vulnerable	The Giant Burrowing Frog is distributed in south eastern NSW and Victoria, and appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	Unlikely
<i>Litoria aurea</i>	Green and Golden Bell Frog	Vulnerable	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha</i> spp.) or spikerushes (<i>Eleocharis</i> spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (<i>Gambusia holbrooki</i>), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. No suitable habitat occurs within the Subject Land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	Unlikely
<i>Mixophyes balbus</i>	Stuttering Frog, Southern Barred Frog (in Victoria)	Vulnerable	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Stuttering Frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. It is the only <i>Mixophyes</i> species that occurs in south-east NSW and in recent surveys it has only been recorded at three locations south of Sydney, and Dorrigo being the stronghold.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			No suitable habitat occurs within the Subject Land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	
Reptiles				
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	Vulnerable	The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Nocturnal. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevices or hollows in large trees within 500m of escarpments in summer. Feeds mostly on geckos and small skinks; will also eat frogs and small mammals occasionally. No suitable habitat occurs within the Subject Land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	Unlikely
<i>Delma impar</i>	Striped Legless Lizard, Striped Snake-lizard	Vulnerable	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass <i>Themeda triandra</i>, spear-grasses <i>Austrostipa</i> spp. and poa tussocks <i>Poa</i> spp., and occasionally wallaby grasses <i>Rytidosperma</i> spp. Sometimes present in modified grasslands with a significant content of exotic grasses. Usually found where soils are predominantly basalt with a high clay content and a propensity for cracking. Favoured habitat typically contains little bare ground, with plant litter to a depth of approximately 3 cm. No suitable habitat occurs within the Subject Land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land. No suitable habitat occurs within the subject land.	
Mammals				
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Found mainly in areas with extensive cliffs and caves. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), 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. No caves are present within the Subject Land thus no suitable habitat critical to the species survival beyond forage occurs within the subject land. There are twelve Bionet records of the species within 10 km of the subject land, dated between 2007 - 2020. The species is unlikely to persist within the subject land due to the lack of suitable structural habitat.	Unlikely
<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spot-tailed Quoll, Endangered (southeastern mainland population)	Vulnerable	Inhabits a wide range of habitat types, including woodlands, rainforest, coastal heath and inland riparian forest. This species uses fallen logs and hollow bearing trees. Predates primarily on terrestrial fauna, however is an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. No suitable habitat occurs within the Subject Land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are a total of six historic Bionet records of the species within 10 km of the subject land, dated between 1980 - 2016. The species is unlikely to persist within the subject land. No suitable habitat occurs within the subject land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Macropus parma</i>	Parma Wallaby	Vulnerable	Their range is now confined to the coast and ranges of central and northern NSW from the Gosford district to the Queensland border. Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas. During the day they shelter in dense cover. No suitable habitat occurs within the Subject Land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	
<i>Petauroides volans</i>	Greater Glider	Vulnerable	Inhabits and is restricted to eucalypt forests and woodlands. This species favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. There are no Bionet records of the species within 10 km of the subject land. The species is unlikely to persist within the subject land.	Unlikely
<i>Petaurus australis</i>	Yellow-bellied Glider	Vulnerable	The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. No suitable habitat occurs within the Subject Land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are a total of 17 historic Bionet records of the species within 10 km of the subject land, dated between 2002 - 2016. The species is unlikely to persist within the subject land. No suitable habitat occurs within the subject land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	Vulnerable	This species occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Generally, browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night. No suitable habitat occurs within the Subject Land. The subject land is identified to contain PCT 1594 which occurs as a forested wetland formation. However, the subject land has since been modified through agricultural practices, clearing and the current school, therefore the subject land provides marginal habitat. There are a total of five historic Bionet records of the species within 10 km of the subject land, dated from 2006. The species is unlikely to persist within the subject land. No suitable habitat occurs within the subject land.	Unlikely
<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)	Koala (combined populations of QLD, NSW & ACT)	Vulnerable	Inhabit eucalypt woodlands and forests in a fragmented distribution throughout eastern Australia. In NSW this species mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range but have been recorded in the southern tablelands. This species feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Spend most of their time in trees but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. No Koala records exist according to Bionet within 2.5 km of the site in the last 18 years. Further, Koala feed trees listed in Schedule 2 comprise less than 15% of the trees in Vegetation Zone 1, which is the only VZ containing native canopy. Significant barriers to Koala movement within the Subject Lands exist, reducing the likelihood that Koalas could utilise the Subject Land for transitory forage or refuge. No secondary indications (scats, fur, scratches consistent with Koala and belly rub trees) were observed during surveys over the site. It is unlikely this species utilises or traverses the subject land. A total of 14 Bionet records occur within 10 km of the subject land boundary, dated between 1980 – 2018.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo (SE Mainland) [	Vulnerable	The long-nosed potoroo is found on the south-eastern coast of Australia, from Queensland to eastern Victoria and Tasmania, including some of the Bass Strait islands. There are geographically isolated populations in western Victoria. In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. No suitable habitat occurs on site, nor are there any Bionet records within 10 km of the subject land boundary.	Unlikely
<i>Pseudomys novaehollandiae</i>	New Holland Mouse, Pookila	Vulnerable	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, NSW and Queensland. The species is now largely restricted to the coast of central and northern NSW, with one inland occurrence near Parkes. The New Holland Mouse has been found from coastal areas and up to 100 km inland on sandstone country. The species has been recorded from sea level up to around 900 m above sea level. Soil type may be an important indicator of suitability of habitat for the New Holland Mouse, with deeper top soils and softer substrates being preferred for digging burrows (Wilson & Laidlaw 2003). In Victoria, the species has been recorded on deep siliceous podsols, sandy clay, loamy sands, sand dunes and coastal dunes. Due to the largely granivorous diet of the species, sites where the New Holland Mouse is found are often high in floristic diversity, especially leguminous perennials. The mouse is known to inhabit open heathland, open woodland with a heathland understorey and vegetated sand dunes, generally in areas with soils suitable for digging. No suitable habitat occurs on site, there are two historic Bionet records of the species (both 2001) which occur approximately 8km south east of the subject land boundary. It is unlikely the species occurs within the subject land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occurs 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. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. There are a total of 129 Bionet records of the species within 10 km of the subject land, dated from 2003 - 2022. The species is unlikely to persist within the subject land. No known roosting colonies are present on site. Nearest roosting colony is 4 km away at East Cessnock. While foraging potential exists on the site, it is marginal in comparison to adjacent retained and neighbouring riparian vegetation.	Unlikely
Flora				
<i>Acacia bynoeana</i>	Bynoe's Wattle	Vulnerable	<i>Bynoe's wattle</i> is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. The species is currently known from about 30 locations in heath or dry sclerophyll forest on sandy soils. This species occurs in heath or dry sclerophyll forest on sandy soils. Prefers open, sometimes disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include <i>Corymbia gummifera</i>, <i>Eucalyptus haemastoma</i>, <i>Eucalyptus parramattensis</i>, <i>Banksia serrata</i> and <i>Angophora bakeri</i>. No associated PCTs occur on the subject land, which also lacks significant populations of overstorey species commonly cooccurring with this species. A total of six Bionet records occur within 10 km of the subject land boundary, dated between 1995 – 2009.	Unlikely
<i>Allocasuarina glareicola</i>		Endangered	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Grows in Castlereagh woodland on lateritic soil. Found in open	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			woodland with <i>Eucalyptus parramattensis</i>, <i>Eucalyptus fibrosa</i>, <i>Angophora bakeri</i>, <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i>. Common associated understorey species include <i>Melaleuca nodosa</i>, <i>Hakea dactyloides</i>, <i>Hakea sericea</i>, <i>Dillwynia tenuifolia</i>, <i>Micromyrtus minutiflora</i>, <i>Acacia elongata</i>, <i>Acacia brownei</i>, <i>Themeda australis</i> and <i>Xanthorrhoea minor</i>. The Subject Land is significantly geographically removed from the potential range of this species.	
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	Vulnerable	This species is known to be extremely cryptic as it does not flower each year. Known to occur within a wide range of habitats including woodlands to swamp heaths. Within the Hunter region larger populations have been typically found in woodland dominated by <i>Eucalyptus racemosa</i> (Scribbly Gum) and it prefers areas with an open grassy understorey. The species typically prefers moist sandy soils in sparse to dense heath and sedge land, or moist to dry clay loams in coastal forests. This species is known to occur in association with <i>C. subulata</i> and <i>C. erecta</i>. The Subject Land is unlikely to be habitat for this species as no associated PCTs occur on the site.	Unlikely
<i>Cynanchum elegans</i>	White-flowered Wax Plant	Endangered	The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation and other associated vegetation types such as littoral rainforest; coastal scrub and open forest and woodland. Species associated include; Coastal Tea-tree <i>Leptospermum laevigatum</i> – Coastal Banksia <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> coastal scrub; Forest Red Gum <i>Eucalyptus tereticornis</i> aligned open forest and woodland; Spotted Gum <i>Corymbia maculata</i> aligned open forest and woodland; and Bracelet Honey myrtle <i>Melaleuca armillaris</i> scrub to open scrub. No suitable habitat occurs within the Subject Land.	Unlikely
<i>Eucalyptus glaucina</i>	Slaty Red Gum	Vulnerable	Found only on the north coast of NSW and in separate districts: near Casino where it can be locally common, and farther south, from Taree to Broke, west of Maitland. Grows in grassy woodland and dry eucalypt forest. Grows on deep, moderately fertile and well-watered soils. Assessment of the site confirmed this conspicuous species is absent.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Eucalyptus parramattensis subsp. decadens</i>	Earp's Gum, Earp's Dirty Gum	Vulnerable	This species occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant. In the Kurri Kurri area, <i>E. parramattensis</i> subsp. <i>decadens</i> is a characteristic species of 'Kurri Sand Swamp Woodland in the Sydney Basin Bioregion', an endangered ecological community under the TSC Act. In the Tomago Sandbeds area, the species is usually associated with the 'Tomago Swamp Woodland' as defined by NSW NPWS (2000). Generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant. Assessment of the site confirmed this conspicuous species is absent.	Unlikely
<i>Eucalyptus pumila</i>	Pokolbin Mallee	Vulnerable	Currently known only from a single population west of Pokolbin in the Hunter Valley. Historical records also exist for Wyong and Sandy Hollow, however, has not been recorded recently in these areas. The single known population occupies north-west-facing slopes derived from sandstone. Present as a mid-canopy species to a height of 6 m within dry sclerophyll woodland which has a canopy comprising <i>Eucalyptus fibrosa</i>, <i>Callitris endlicheri</i> and, to a lesser extent, <i>Corymbia maculata</i>. Very little is known about the biology or ecology of this species. No suitable habitat exists on the subject site, and assessment of the site confirmed this conspicuous species is absent.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Euphrasia arguta</i>		Critically Endangered	Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on the grassy country near Bathurst', and 'in meadows near rivers'. Plants from the Nundle area have been reported from eucalypt forest with a mixed grass and shrub understorey; here, plants were most dense in an open disturbed area and along the roadside, indicating the species had regenerated following disturbance. The number of plants at a given site may vary over time depending on the season and disturbance history. Near Nundle, local populations had apparently declined at sites that had been disturbed twice within three years, in contrast with sites that were disturbed only once. No suitable habitat exists on the site, and the history of disturbance further reduces the likelihood that the species will be encountered on the site.	Unlikely
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	Vulnerable	This species is sporadically distributed throughout the Sydney Basin with sizeable populations in the Hunter in the Cessnock - Kurri Kurri area (particularly Werakata NP). Separate populations are also known from Putty to Wyong and Lake Macquarie on the Central Coast. This species grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Occurs in a range of vegetation types from heath and shrubby woodland to open forest, the Hunter in Kurri Sand Swamp Woodland and is also known to occur in <i>C. maculata</i>- <i>A. costata</i> open forest. Associated species in the Kurri Sand Swamp Woodland include <i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>, <i>Angophora bakeri</i> and <i>E. fibrosa</i> with <i>Acacia elongata</i>, <i>Dillwynia parvifolia</i>, <i>Melaleuca thymifolia</i>, <i>Grevillea montana</i>, <i>Eragrostis brownii</i> and <i>Aristida vagans</i>. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Hunter occurrences are usually 30-70m ASL, while the southern Sydney occurrences are typically at 100-300m ASL. Often occurs in open, slightly disturbed sites such as along tracks. No suitable habitat or associated PCTs occur on the Subject Land.	Unlikely
<i>Leionema lamprophyllum</i> subsp. <i>fractum</i>		Critically Endangered	This species occurs in sparse heathland or very open low woodland in skeletal sandy soils on exposed rocky terrain. Currently known only from the Broken Back Range near Cessnock, with a historical collection from Munghorn Gap Nature Reserve near Wollar. No suitable habitat occurs within the Subject Land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Persicaria elatior</i>	Knotweed, Tall Knotweed	Vulnerable	In northern NSW it is known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). The species also occurs in Queensland. This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance. There are no Bionet records of the species within 10km of the subject land. Marginal suitable habitat occurs as the Subject Land is classified as a forested wetland, however due the modification of the habitat in the area due to past and present land uses and lack of Bionet records the species is unlikely to occur.	Unlikely
<i>Persoonia hirsuta</i>	Hairy Geebung, Hairy Persoonia	Endangered	<i>Persoonia hirsuta</i> has a scattered distribution around Sydney. The species is distributed from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. <i>Persoonia hirsuta</i> has a large area of occurrence, but occurs in small populations, increasing the species' fragmentation in the landscape. The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone. It is usually present as isolated individuals or very small populations. There are no Bionet records of the species within 10km of the subject land. No suitable habitat occurs within the Subject Land.	Unlikely
<i>Persoonia pauciflora</i>	North Rothbury Persoonia	Critically Endangered	<i>Persoonia pauciflora</i> is found in dry open forest or woodland dominated by Spotted Gum (<i>Corymbia maculata</i>), Broad-leaved Ironbark (<i>Eucalyptus fibrosa</i>) and/or Narrow-leaved Ironbark (<i>E. crebra</i>) and supporting a moderate to sparse shrub layer and grassy groundcover. The majority of the population is known to occur on silty sandstone soils derived from the Farley Formation. Extremely restricted distribution; all but one of the plants which make up the only known population occur within a 2.5 km radius of the original specimen at North Rothbury in the Cessnock local government area. There are no Bionet records of the species within 10km. No suitable habitat occurs within the Subject Land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Pomaderris brunnea</i>	Rufous Pomaderris, Brown Pomaderris	Vulnerable	Brown Pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria. Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines. The species has been found in association with <i>Eucalyptus amplifolia</i>, <i>Angophora floribunda</i>, <i>Acacia parramattensis</i>, <i>Bursaria spinosa</i> and <i>Kunzea ambigua</i>. There are no Bionet records of the species within 10km of the subject land. Marginal suitable habitat occurs within the Subject Land as associated species occur however, it is geographically removed from known populations.	Unlikely
<i>Prasophyllum sp. Wybong</i> (C. Phelps ORG 5269)	a leek-orchid	Critically Endangered	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. <i>Prasophyllum sp. Wybong</i> (C. Phelps ORG 5269) is a terrestrial orchid known from seven populations in open eucalypt woodland and grassland in New South Wales. The species' area of occupancy is estimated to be 1.5 km² with an estimated population size based on surveys in 2006 of 460 mature individuals. No suitable habitat occurs within the Subject Land, which is geographically removed from known populations.	Unlikely
<i>Prostanthera cineolifera</i>		Vulnerable	The distribution of <i>Prostanthera cineolifera</i> is uncertain, but it is considered to be restricted to only a few localities near Walcha, Scone and St Albans, NSW. <i>Prostanthera cineolifera</i> occurs in sclerophyll forests (Harden, 2002) and open woodlands on exposed sandstone ridges and is often found in association with shallow or skeletal sands. No suitable habitat occurs within the Subject Land.	Unlikely
<i>Pterostylis gibbosa</i>	Illawarra Greenhood, Rufa Greenhood,	Endangered	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Hunter region, the species grows in open woodland dominated by Narrow-leaved Ironbark <i>E. crebra</i>, Forest Red Gum and Black Cypress Pine <i>Callitris endlicheri</i>. The Illawarra Greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
	Pouched Greenhood		underground tuber in late summer, followed by the flower stem in winter. After a spring flowering, the plant begins to die back and seed capsules form (if pollination has taken place). As with many other greenhoods, male fungus gnats are believed to be the pollinator. The Illawarra Greenhood can survive occasional burning and grazing because of its capacity to reshoot from an underground tuber. There are no Bionet records of the species within 10km of the subject land. No suitable habitat occurs within the subject land.	
<i>Rhizanthella slateri</i>	Eastern Underground Orchid	Endangered	The Eastern Underground Orchid occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November. There are no Bionet records of the species within 10km of the subject land. No suitable habitat occurs within the subject land.	Unlikely
<i>Rhodamnia rubescens</i>	Scrub Turpentine, Brown Malletwood	Critically Endangered	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of <i>R. rubescens</i> typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. No suitable habitat occurs within the subject land.	Unlikely
<i>Rhodomyrtus psidioides</i>	Native Guava	Critically Endangered	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			catchments and along the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. No suitable habitat occurs within the subject land.	
<i>Rutidosia heterogama</i>	Heath Wrinklewort	Vulnerable	On the Central Coast it is located north from Wyong to Newcastle. This species grows in heath on sandy soils and moist areas in open forest and has been recorded along disturbed roadsides. No suitable habitat occurs within the subject land.	Unlikely
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub	Vulnerable	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. No suitable habitat occurs within the subject land.	Unlikely
<i>Tetratheca juncea</i>	Black-eyed Susan	Vulnerable	Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. It is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest. The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape. While some studies show the species has a preference for cooler southerly aspects, it has been found on slopes with a variety of aspects. It generally prefers well-drained sites below 200m elevation and annual rainfall between 1000 - 1200mm. The preferred substrates are sandy skeletal soil on sandstone, sandy-loam soils, low nutrients; and clayey soil from conglomerates, pH neutral. There are no Bionet records of the species within 10km of the subject land. No suitable habitat occurs within the subject land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
<i>Thesium australe</i>	Austral Toadflax, Toadflax	Vulnerable	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Although originally described from material collected in the SW Sydney area, populations have not been seen in a long time. It may persist in some areas in the broader region. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (<i>Themeda australis</i>). There are no Bionet records of the species within 10km of the subject land. No suitable habitat occurs within the subject land.	Unlikely

Appendix E EPBC Assessment

EPBC Listed Vulnerable Species

Grey-Headed Flying-Fox	
Significant Impact Guideline	Assessment
Lead to a long-term decrease in the size of an important population of a species	Approximately 0.09 ha of marginal foraging habitat exists within the subject land. The species is not associated with the PCT present within the subject land however, there is potential for the species to forage on the eucalypts and melaleuca species present within the subject land boundary and broader study area. The subject land occurs within a mosaic of native remnant vegetation and areas cleared as agricultural land, with approximately 314 ha of the land within the 1500 m buffer from the subject land estimated as containing native wooded vegetation. Therefore, the subject land represents approximately 0.02% of the available foraging habitat for the species within this area. Therefore, it is unlikely the proposal will lead to the long-term decrease of an important population.
Reduce the area of occupancy of an important population	No. The subject land is unlikely to support an important population. The closest known active camp is located within East Cessnock approximately 4 km away. The population is estimated to contain over 50,000 individuals at a time. The subject land serves solely as potential foraging habitat for this population.
Fragment an existing important population into two or more populations	No. The proposal will not create new points of fragmentation of or split an existing population into two or more. The subject land is located on an already fragmented area with an existing school site surrounded by predominantly cleared agricultural lands. A small amount of marginal foraging habitat will be removed however, this will not impact dispersal and movements for the species.
Adversely affect habitat critical to the survival of a species	The proposal will impact up to 0.09 ha of potential foraging habitat for the species, this 0.02% of available habitat within the 1500 m of the subject land. Therefore, it is unlikely the clearance associated with the proposal will adversely affect the survival of the species.
Disrupt the breeding cycle of an important population	No. The subject land is exclusively foraging habitat, therefore there is no risk to breeding cycle impacts.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will impact up to 0.09 ha of potential foraging habitat for the species, this represents up to approximately 0.02% of available habitat within the 1500 m of the subject land. The proposal will not modify, destroy, remove isolate, or decrease habitat to the extent that the species is likely to decline at a regional scale or local.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (<i>Vulpes vulpes</i>), rabbits (<i>Oryctolagus cuniculus</i>) and cats (<i>Felis catus</i>). The proposal is unlikely to alter the potential for impacts from these species.
Interfere with the recovery of the species.	The recovery plan takes focus on maintaining critical habitat, primarily in the form of camp site. The proposal will not impact a camp site or day roost sites, solely foraging habitat. Given the highly mobile nature of the species and high-quality potential foraging habitat to the north of the site, it is unlikely the proposal will interfere with the recovery of the species.
Conclusion	Non-significant impact

Appendix F BAM Credit Report Summary

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00030003/BAAS17044/21/00030004	21035 - SPCC 10 Lomas Lane	14/10/2022
Assessor Name	Report Created	BAM Data version *
Matt Doherty	04/11/2022	55
Assessor Number	BAM Case Status	Date Finalised
BAAS17044	Finalised	04/11/2022
Assessment Revision	Assessment Type	
2	Major Projects	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAI	Ecosystem credits

BAM Credit Summary Report

Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter												
1	1594_1594_poor	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	47.7	47.7	0.09	PCT Cleared - 0%	High Sensitivity to Gain	Endangered Ecological Community	Critically Endangered	2.00		2
										Subtotal		2
Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter												
2	1594_1594_lawn	Not a TEC	12.1	12.1	2	PCT Cleared - 0%	Low Sensitivity to Gain			1.00		0
3	1594_1594_weedy	Not a TEC	11.5	11.5	0.27	PCT Cleared - 0%	High Sensitivity to Gain			1.50		0
										Subtotal		0
										Total		2

Species credits for threatened species

BAM Credit Summary Report

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAI	Species credits
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Appendix G Personnel Qualifications

Name	Title	Qualifications	Roles
Matt Doherty	Director	- BAM Assessor (#BAAS17044) B. Landscape Management and Conservation (Soil and Water Management) - Bush Regeneration Cert IV	Review and approval of BDAR.
Coral Pearce	Senior Ecologist	- BAM Assessor (BAAS#21024) - Bachelor of applied Science (Ecology and Environmental Science) - Masters (Research) Mammal Ecology	Field work including PCT identification, BAM plots and surveys for threatened species habitat; Assist with BDAR production
Chris Spraggon	Ecologist	B. Science (Honours) - Conservation & Land Management Cert III	BDAR production
Simone Yasui	Ecologist	Doctor of Philosophy (Ecology)	Assist with field work
Ali Bragg	Field Ecologist	B. Animal Science (Honours)	Assist with field work
Ellen Saxon	GIS Officer	- Bachelor of Environmental Science & Management - Advanced ArcGIS Training, XGIS - Diploma in Conservation & Land Management	Mapping & assist with BDAR production (Figures & mapping)

Appendix H EPBC Assessment

EPBC Act Assessment of Significance for Critically endangered and endangered ecological communities

An assessment of significance has been prepared for *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* which is listed as Critically Endangered under the EPBC Act. Under the EPBC Act, an action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- reduce the extent of an ecological community
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- adversely affect habitat critical to the survival of an ecological community
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community,
- including, but not limited to:
 - assisting invasive species, that are harmful to the listed ecological community, to become established, or
 - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological
- community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community

These impact criteria are assessed below.

Impact Criteria for Critically Endangered Ecological Community	<i>River Flat Eucalypt Forest</i>
<i>Reduce the extent of an ecological community</i>	The assessed vegetation zone is 0.16 ha in size, and consists almost exclusively of canopy (both remnant and planted) with a heavily managed and mulched understorey. Although equivalence to this ecological community could not be ruled out, it is a heavily disturbed parcel of vegetation and is unlikely to represent a functional extension to the ecological community. Further, the area of disturbance represents an insignificant proportion of the estimated 10.600 ha remaining in NSW according to the federal conservation advice, being less than two thousandths of a percent. Hence the proposal is not likely to reduce the extent of the community.
<i>Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines</i>	The vegetation assessed for removal is at the boundary of already fragmented and disturbed native vegetation and broadly cleared agricultural landscape. The subject site represents no connectivity to the west that could be facilitated by the assessed vegetation, and as above the assessed area represents a marginal remnant of the ecological community. The assessed vegetation therefore presents as a disturbed boundary extrusion of the ecological community, and the proposal will not fragment or increase fragmentation of the ecological community.

<i>Adversely affect habitat critical to the survival of an ecological community</i>	The assessed vegetation represent very low diversity and limited to no connectivity with respect to the ecological community. The proposal is unlikely to impact any adjacent remnant patches of the ecological community, and therefore highly unlikely to adversely affect habitat critical to the survival of the ecological community.
<i>Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns</i>	With reference to the above assessments, the assessed vegetation has predominantly cleared and managed/mulched understorey and ground layer. The abiotic factors attributed to the assessed vegetation would be highly modified and likely degraded, no significant water flows over the area, and the very small size of the assessed vegetation patch at 0.16 ha mean that the proposal is highly unlikely to modify or destroy abiotic factors necessary for the survival of the ecological community.
<i>Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting</i>	The assessed vegetation represents a very small, marginal patch of the ecological community, being only 0.16 ha of low-diversity vegetation, the removal of which is highly unlikely to cause any change to the species composition of the ecological community. Furthermore, no ongoing disturbance will occur following the removal of the small area required for the proposal.
<i>Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:</i> -Assisting invasive species, that are harmful to the listed ecological community, to become established, or -Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	The assessed vegetation which is to be impacted as part of the proposal is of such a small area (0.16 ha) that it is highly unlikely that it is possible for the proposal to cause any reduction in the quality or integrity of the ecological community in the region. The impact of the proposal is not likely to increase exotic/invasive species which are harmful to this ecological community, and no such species known to impact the ecological community occur on the subject land. The proposal will not increase the use of fertilisers, herbicides or pesticides or their runoff into the ecological community.
<i>Interfere with the recovery of an ecological community</i>	The assessed vegetation represents a disturbed and marginal patch of the ecological community on the interface of a disturbed riparian corridor and a broadly cleared agricultural area, and on school grounds. The assessed vegetation could not feasibly contribute to the recovery of the ecological community, and hence the proposal is highly unlikely to interfere with the recovery of the ecological community