Western Sydney University Milperra Campus: Commercial Area

Biodiversity Development Assessment Report

Mirvac Residential

19 December 2024

Final

cumberland ecology

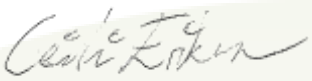
PART OF SLR

(02) 9868 1933 | PO Box 2474 Carlingford Court NSW 2118 | cumberlandecology.com.au

Report No. 23021RP6

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Version	Date Issued	Amended by	Details
Final	19/12/2024	AM, CP	Final report

Approved by:	Cecilia Eriksson Pinatacan
Position:	Senior Project Manager/GIS Specialist
Signed:	
Date:	19 December, 2024

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Glossary

Term / Abbreviation	Definition
APZ	Asset Protection Zone
Assessment area	Area of land within a 1500 m buffer around the outer boundary of the subject land
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BC Regulation	NSW *Biodiversity Conservation Regulation 2017*
BDAR	Biodiversity Development Assessment Report
Biosecurity Act	NSW *Biosecurity Act 2015*
BOS	Biodiversity Offset Scheme
CEEC	Critically Endangered Ecological Community
Conservation area	The area zoned C2 – Environmental Conservation
Council	Canterbury-Bankstown City Council
DA	Development Application
DBH	Diameter at Breast Height
Cth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
NSW DCCEW	NSW Department of Climate Change, Energy, the Environment and Water
DCP	Development Control Plan (Canterbury-Bankstown DCP 2023)
EHG	Environment and Heritage Group (of DPE)
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GIS	Geographic Information System
GPS	Global Positioning Software
ha	Hectares
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	Local Environment Plan (Canterbury-Bankstown LEP 2023)
LGA	Local Government Area (Canterbury-Bankstown)
PCT	Plant Community Type
SAII	Serious and Irreversible Impact
Study area	The land surveyed as part of the project
Subject land	The land proposed as a development site (see **Figure 2**)
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community

Term / Abbreviation	Definition
the 'client'	Mirvac Residential
the 'Plan'	*Canterbury-Bankstown Biodiversity Strategic Plan 2015-2025*
the 'Project'	The redevelopment of the WSU Milperra Campus
VI	Vegetation Integrity
WSU	Western Sydney University
WSU Milperra Campus	The land subject to Clause 11.13 of the Canterbury Bankstown DCP

Declarations

Certification under clause 6.16 *Biodiversity Conservation Act 2026* and declared Conflicts of Interest

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the *Biodiversity Conservation Act 2016* (BC Act).

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest. This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature: 

Date: 19 December 2024

BAM Assessor Accreditation no: BAAS19052

Authors and Contributors

This report, and associated field surveys and Geographic Information Systems (GIS) mapping, was prepared with the assistance of additional personnel as outlined in **Table 1**.

Table 1 Personnel

Name	Tasks	Relevant Qualifications / Training	BAM Accredited Assessor No.
Dr David Robertson	Project direction	Doctor of Philosophy. Ecology, University of Melbourne, 1986 Bachelor of Science (Honours) in Ecology, University of Melbourne, 1980 BAM Accredited Assessor Training. Muddy Boots, 2017	BAAS17027
Cecilia Eriksson Pinatacan	Field surveys, PCT/TEC/BAM-C calculation review and document review	Master of Science (Major in Marine Science and Management). University of Technology Sydney, 2013 Bachelor of Science (Honours) in Marine Biology, University of Technology Sydney, 2008 BAM Accredited Assessor Training. Greencap, 2023	BAAS19052
Alix Murray	Document preparation, data analysis, BAM calculations	Bachelor of Biology and Psychology. University of Newcastle Upon Tyne, 2017. Master of Biodiversity, Conservation and Ecosystem Management. University of Newcastle Upon Tyne, 2018.	
Katrina Wolf	Field surveys	Bachelor of Science (Environmental). The University of Sydney, 2007	BAAS18010

Name	Tasks	Relevant Qualifications / Training	BAM Accredited Assessor No.
		BAM Accredited Assessor Training. Muddy Boots, 2017	
Jesse Luscombe	GIS mapping	Bachelor of Marine Science. Macquarie University, 2013 Certificate III in Conservation and Land Management. TAFE NSW, 2016 BAM Accredited Assessor Training. Muddy Boots, 2018	-
Bryan Furchert	Field surveys, PCT selection, TEC analysis, vegetation descriptions	Bachelor of Biodiversity and Conservation. Macquarie University, 2012 Diploma of Conservation and Land Management. TAFE NSW, 2008 BAM Accredited Assessor Training. Muddy Boots, 2017	BAAS18095
Jacqueline Britton	Field surveys	Bachelor of Environmental Science (Land & Water). Charles Sturt University, 2011. ArcGIS for Environmental Management, Ryde Campus, TAFE NSW, 2018 BAM Accredited Assessor Training. Greencap, 2024	BAAS21003

1. Introduction

Cumberland Ecology was commissioned by Beveridge Willams, on behalf of Mirvac Residential (the 'client'), to prepare a Biodiversity Development Assessment Report (BDAR) for the proposed subdivision and development of the disused Western Sydney University Milperra Campus, located a 2 & 2A Bullecourt Avenue, Milperra (the 'WSU Milperra Campus').

The redevelopment of the WSU Milperra Campus (hereafter referred to as the 'project') is proposed to be conducted in stages in accordance with the project's masterplan (**Figure 1**), and will ultimately involve the subdivision of land into residential lots, park areas, a business area that will contain a childcare centre, sales office and café with the associated infrastructure (roads, drainage basins) within the larger WSU Milperra Campus site.

This BDAR has been prepared to support a development application (DA) for the Commercial Area, which is proposed to be located in the northeastern part of the WSU Milperra Campus.

1.1. Requirement for BDAR

Under the BC Act, all development requiring development consent under Part 4 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) that is likely to significantly affect threatened species, as set out in Clause 7.2 of the *Biodiversity Conservation Act 2016* (BC Act) and Section 7.1 to 7.3 of the *NSW Biodiversity Conservation Regulation 2017* (BC Regulation), must be assessed using the Biodiversity Assessment Method (BAM) with the results presented in a BDAR. The project has been determined to have an impact on land mapped on the Biodiversity Values Map (BV Map) and therefore this BDAR has been prepared.

This BDAR has been prepared in accordance with the BAM (DPIE 2020). Under the BAM, the project qualifies for the 'Streamlined Assessment Module – small area' development, as it involves the clearing of ≤1 ha of native vegetation on land with a minimum lot size of <1 ha under the *Canterbury-Bankstown Local Environmental Plan 2023* (Canterbury-Bankstown LEP). Therefore, this BDAR has been prepared in accordance with Appendix C of the BAM.

Parts of the site consist of native vegetation (trees and shrubs) of planted origin. This includes the scattered trees planted within the gardens among buildings and trees within the existing car park. Under the BAM, impacts on planted native vegetation as part of a development can be assessed using the 'Streamlined Assessment Module – Planted native vegetation' as set out in Appendix D of the BAM. Accordingly, the impacts on the planted native vegetation within the subject land have therefore been assessed using the streamlined assessment module for planted native vegetation in accordance with Appendix D of the BAM.

1.2. Purpose

The purpose of this BDAR is to document the findings of an assessment undertaken for the project in accordance with Stage 1 (Biodiversity Assessment) and Stage 2 (Impact Assessment) of the BAM.

Specifically, the objectives of this BDAR are to:

- Identify the landscape features and site context (native vegetation cover) within the subject land (all areas impacted by the project) and assessment area;

- Assess native vegetation extent, plant community types (PCTs), threatened ecological communities (TECs) and vegetation integrity (site condition) within the subject land;
- Assess habitat suitability for threatened species that can be predicted by habitat surrogates (ecosystem credits) and for threatened species that cannot be predicted by habitat surrogates (species credit species);
- Identify potential prescribed biodiversity impacts on threatened species and communities;
- Describe measures to avoid and minimise impacts on biodiversity values and prescribed biodiversity impacts during project planning;
- Describe impacts to biodiversity values and prescribed biodiversity impacts and the measures to mitigate and manage such impacts;
- Identify the thresholds for the assessment and offsetting of impacts, including:
    - Impact assessment of potential entities of serious and irreversible impacts (SAII);
    - Impacts for which an offset is required;
    - Impacts for which no further assessment is required;
    - Describe the application of the no net loss standard, including the calculation of the offset requirement; and

A compliance table showing how this report meets the requirements of BAM is provided in **Appendix A**.

1.3. Project Description

1.3.1. Location

The WSU Milperra Campus is located entirely within the suburb of Milperra in the Canterbury-Bankstown Local Government Area (LGA) and is located approximately 20 kilometres (km) west of the Sydney Central Business District. It is located at 2 and 2A Bullecourt Avenue, Milperra, which is legally known as Lot 2 DP1291984 and Lot 1 DP101147. For the purpose of this project, the WSU Milperra Campus was subject to surveys which included the pavements and vegetation outside of the WSU Milperra Campus boundary. The area subject to surveys will be referred to as the 'study area' throughout this BDAR.

The Commercial Area development site (hereafter referred to as the 'subject land') is situated in the northeastern portion of the study area, largely in the area zoned as B1 – Neighbourhood Centre (**Figure 2**) and is approximately 1.97 hectares (ha) in area. The study area covers an area of approximately 19.7 ha and is generally bounded by an industrial estate to the north and east, the M5 Southwest Motorway to the south, and residential development to the west. The subject land is bordered to the north and east by an area zoned as C2 – Environmental Conservation that contains an area of good-quality remnant Cumberland Plain Woodland positioned in the northeast corner of the study area, which will hereafter be referred to as 'the conservation area' (**Figure 2**).

A site map and location map have been prepared in accordance with the BAM and are presented in **Figure 2** and **Figure 3**, respectively.

1.3.2. Project Overview

The project will be conducted in several stages and will ultimately result in the development of residential lots and parkland areas with associated infrastructure (roads, drainage basins) within the final development footprint. The project is to be developed in stages and will comprise the following components:

- Subdivision and construction of residential dwellings;
- Construction of a main 'connector' road to existing road network;
- Vegetation removal;
- Tree protection works for retained trees within residential sub-division;
- Earthworks (including cut and fill works) and remediation of contaminated soil;
- Construction of roads and infrastructure;
- Construction of bio-detention basins for stormwater management; and
- Landscaping.

Within the subject land, as part of the Commercial Area stage of the project, the following is proposed to occur:

- Child Care Alterations/Additions (internal/external)
    - Increase in numbers to 95 children and 16 staff (currently 67 children and 10 staff);
    - Outdoor play space extension;
    - Associated car parking and driveway from Road No. 2;
- Construction of Road No. 2;
- Road No. 2 Intersection with Horsley Road;
- Removal of the roundabout on Horsley Road;
- Installation of services and foot pathing in Road No. 2;
- Stormwater and rain garden structures; and
- Tree Removal.

1.3.2.1. Planning Proposal

Following the approval of the Planning Proposal lodged by the client for the rezoning of the WSU Milperra Campus, it was rezoned R1 – General Residential, B1 – Neighbourhood Centre, C2 – Environmental

Conservation and RE1 – Public Recreation. Parts of the R1 and RE1 zones, particularly in the north, and all of the C2 zone, are currently mapped as Biodiversity under the Canterbury-Bankstown LEP.

The Environment and Heritage Group (EHG) provided advice and recommendations for the rezoning following its approval, a number of which are applicable to biodiversity and have been included in the Canterbury-Bankstown DCP 2023. ***Section 8.6*** of this report details how the proposed development complies with the relevant clauses in the Canterbury-Bankstown LEP and the Canterbury-Bankstown DCP.

1.3.3. Identification of the Development Site Footprint

The layout of the Commercial Area DA is shown in **Figure 4**. The development site footprint comprises 1.97 ha of land directly impacted by the Commercial Area DA and is referred to within this BDAR as the subject land. All temporary/ancillary construction facilities and infrastructure will be contained within the development footprint. Therefore, for the purposes of this assessment, the subject land comprises both the construction footprint and the operational footprint of the Commercial Area DA.

1.3.4. General Description of the Subject Land

1.3.4.1. Historical and Present Land Use

The WSU Milperra Campus is one of eleven Western Sydney University Campuses within metropolitan Sydney. The site is approximately 19.7 ha in size and is bounded by Bullecourt Avenue to the north, Horsley Road to the east, the M5 Southwest Motorway to the south and Ashford Avenue to the west. There is an industrial warehouse estate to the north and east of the study area, and residential properties to the west. Within the bounded area, there is a Council operated hockey field in the northwest, and Mt St Joseph's Catholic School in the southeast. Prior to establishing in 1975, the majority of the study area, excluding the conservation area, has been historically cleared and used for agricultural purposes.

The subject land is located in the northwestern portion of the study area. It currently includes an active childcare centre, that is proposed to be expanded as part of this stage of the project. The conservation area, containing the highest quality Cumberland Plain Woodland in the study area, is located to the north and east of the subject land.

1.3.4.2. Topography and Soils

The study area has a relatively flat topography, with elevations ranging between approximately 3 m Australian Height Datum in the north to about 20 m above the Australian Height Datum in the south.

The Soil Landscapes of the Penrith 1:100 000 Sheet Map (Hazelton et al. 1989) and soil landscapes available on eSpade (DPIE 2020a) indicates that the study area is mapped as the Blacktown soil landscape. The Blacktown soil landscape comprises gently undulating rises on Wianamatta Group shales with red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines.

1.3.4.3. Hydrology

There are no watercourses or waterbodies within the subject land or study area.

1.3.4.4. Vegetation

The vegetation of the Canterbury-Bankstown LGA and greater Western Sydney area have been heavily cleared for urban development. The vegetation in the study area was historically cleared for agriculture, before being cleared for the development of the university in 1975.

The subject land consists of areas mapped as Cumberland Plain Woodland, as well as planted native vegetation, exotic vegetation and exotic dominated grassland. Parts of the subject land are mapped in the Canterbury-Bankstown LEP as "Terrestrial Biodiversity" and a portion of the subject land is also mapped on the Biodiversity Values Map (BV Map) under the criteria of 'threatened species or communities with potential for serious and irreversible impacts' (**Figure 5**).

1.4. Information Sources

1.4.1. Databases

Several databases were utilised during the preparation of this BDAR, including:

- NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) BioNet Atlas (DCCEEW (NSW) 2024a);
- NSW DCCEEW Threatened Biodiversity Data Collection (DCCEEW (NSW) 2024b);
- NSW DCCEEW BioNet Vegetation Classification database (DCCEEW (NSW) 2024b);
- Commonwealth DCCEEW Species Profile and Threat Database (DCCEEW (Cwlth) 2024); and
- Commonwealth DCCEEW Directory of Important Wetlands in Australia (C'wth DCCEEW 2024).

1.4.2. Literature

This BDAR has utilised and/or given due consideration to the results and/or spatial data from the following documents:

- Vegetation Mapping of the Sydney Metropolitan Area;
- Western Sydney University Milperra Campus Redevelopment Preliminary Ecological Assessment (Ecological 2022b);
- Western Sydney University Milperra Campus Redevelopment Ecological Assessment (Ecological 2022a);
- Western Sydney University Milperra Campus Arboricultural Impact Assessment Report (Temporal Tree Management 2024); and
- Planning Proposal, Western Sydney University Milperra (Elton Consulting 2023);
- Canterbury-Bankstown Local Environment Plan (LEP) 2023 (Canterbury-Bankstown LGA 2023b);
- Canterbury-Bankstown Development Control Plan (DCP) 2023 (Canterbury-Bankstown LGA 2023a); and

- Bankstown City Council Biodiversity Strategic Plan 2015-2025 (Bankstown City Council 2015).

As part of the preparation of this BDAR, relevant legislation, policies and guidelines were also reviewed. Other sources of information have been referenced throughout this BDAR.

1.4.3. Aerial Photography

The aerial imagery utilised in this BDAR is sourced from NearMap and is dated 22 July 2024. Historical aerial imagery from 1943 as available on SixMaps, as well as historical aerial imagery from the 1960s – 1990s, sourced from NSW Government Spatial Services – historical imagery viewer, was also consulted.

2. Methodology

2.1. Review of Existing Data

Existing information on biodiversity values within the assessment area was reviewed, which includes:

- Species data that is held in the BioNet Atlas;
- NSW State Vegetation Type Map (SVTM) (DPE 2024);
- BioNet Vegetation Classification database (DCCEEW (NSW) 2024b);
- Threatened Biodiversity Data Collection (TBDC) (DCCEEW (NSW) 2024c); and
- The following existing reports, including vegetation mapping:
    - Western Sydney University Milperra Campus Redevelopment Preliminary Ecological Assessment (Ecological 2022b);
    - Western Sydney University Milperra Campus Redevelopment Ecological Assessment (Ecological 2022a);
    - Western Sydney University Milperra Campus Arboricultural Impact Assessment Report (Temporal Tree Management 2024); and
    - Planning Proposal, Western Sydney University Milperra (Elton Consulting 2023).

This existing information was considered and included, where appropriate, into survey design, vegetation mapping and reporting.

2.2. Landscape Features

Landscape features requiring consideration were initially determined via desktop assessment. The field surveys undertaken on 20 – 23 August 2024 sought to verify the occurrence of the following landscape features:

- Rivers, streams and estuaries;
- Important and local wetlands;
- Karsts, caves, crevices, cliffs and areas of geological significance; and
- NSW BioNet Landscapes.

No amendments were required to be made to any of these landscape features following field surveys.

2.3. Native Vegetation Survey

2.3.1. Vegetation Mapping

Vegetation mapping studies have been undertaken across the subject land, study area and surrounds, including broad scale mapping of the Sydney Metropolitan Area and ground-truthing of the study area by Eco Logical for the Planning Proposal (Ecological 2022b, a). The vegetation within the entire subject land and study area

was ground-truthed by a botanist and ecologist from Cumberland Ecology on 20 – 23 August 2024 to examine and verify the mapping of the condition and extent of the different plant community types (PCTs). Mapping of plant communities within the subject land was undertaken by random meander surveys through patches of vegetation, noting key characteristics of areas in similar broad condition states such as similar tree cover, shrub cover, ground cover, weediness or combinations of these. Soils were also inspected.

Records of plant community boundaries were made using a hand-held Global Positioning System (GPS) and mark-up of aerial photographs. The resultant information was synthesised using GIS to create a spatial database that was used to interpret and interpolate the data to produce a vegetation map of the subject land.

2.3.2. Vegetation Integrity Assessment

A plot-based vegetation survey and vegetation integrity assessment was undertaken concurrently within the study area in accordance with the BAM (hereafter referred to as 'BAM plots'). These BAM plots were undertaken in accordance with Section 4.2.1 and Section 4.3.2 of the BAM.

Surveys were undertaken across the subject land and the entire study area concurrently. As previously mentioned, the subject land and associated Commercial Area development are part of the larger overall project within the grounds of the former university. As a result, the placement of BAM plots was focused on sampling the vegetation in the entire study area rather than each separate stage of development. Within portions of the study area, such as within the subject land, there are buildings and with a limited amount of vegetation. Hence, there is not enough space to complete a representative BAM plot within the vegetation in the subject land. Therefore, some of the BAM plots used in this assessment for the vegetation occurring in the subject land were undertaken outside of the subject land, in other representative areas of vegetation in the same condition within the broader study area where there was enough space to complete a BAM plot. A list of all flora species recorded within the study area can be found in **Appendix B**.

A total of seven (7) BAM plots were undertaken within the study area on 20 - 23 August 2024, and their locations are shown on **Figure 6**. The BAM plots required the establishment of a 20 x 50 m plot with an internal 20 x 20 m plot. The following data was collected within each BAM plot:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within the 20 m x 20 m floristic plot;
- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within the 20 m x 20 m floristic plot;
- Cover of 'High Threat Exotic' weed species within the 20 m x 20 m floristic plot;
- Assessment of function attributes within the 20 m x 50 m plot, including:
    - Count of number of large trees;
    - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
    - Regeneration based on the presence of living trees with stems <5 cm DBH;

- The total length in metres of fallen logs over 10 cm in diameter;

- Assessment of litter cover within five 1 m x 1 m plots evenly spread within each 20 m x 50 m plot; and
- Number of trees with hollows that are visible from the ground within each 20 m x 50 m plot.

The location of BAM plots has sought to capture the environmental variation of the PCTs identified within the subject land and study area. **Table 2** summarises the plot requirements based on the size and number of vegetation zones in the subject land. As shown in this table, the minimum number of plots has been completed for each vegetation zone in the study area, albeit outside of the subject land.

Table 2 BAM plot survey requirements

Vegetation Zone	PCT	Condition	Area within Subject Land (ha)	Area within Study Area (ha)	Minimum Number of Plots Required for Study Area	Number of Plots Completed
1	3320	Canopy Only	0.04	0.85	1	1
2	3320	Mown	0.03	0.15	1	1
3	3320	Exotic Ground	0.18	0.64	1	2

2.4. Threatened Species Survey

As the project is being assessed under the BAM Streamlined Assessment Module – small area development, candidate species credit species that are not at risk of an SAII and are not incidentally recorded in the subject land do not require further assessment.

2.4.1. Threatened Flora

2.4.1.1. Habitat Constraints

Under Section 5.2.2 of the BAM, species credit species can be excluded from further assessment, and thereby targeted surveys, if it is determined that none of the species-specific habitat constraints are present within the subject land. Furthermore, under Section 5.2.3 of the BAM, a candidate species credit species can be considered unlikely to occur in the subject land (or specific vegetation zones) if after carrying out a field assessment, the assessor determines that the habitat is substantially degraded such that the species is unlikely to utilise the study area (or specific vegetation zones).

Desktop assessments and field surveys within the subject land and study area included assessment of habitat constraints and microhabitats for predicted species credit flora species. A number of species were excluded from further assessment as the species-specific habitat constraints were absent from within the subject land.

2.4.1.2. Targeted Species Survey

Targeted threatened flora surveys were undertaken within the subject land and study area for species credit species that were assessed as candidate species credit species for further assessment (see ***Section 5.3***).

Table 3 provides a summary of the flora species credit species surveyed for within the subject land.

Table 3 Threatened flora survey dates and methods

Scientific Name	Recommended Survey Period	Dates of Survey within Study Area	Survey Method
Eucalyptus bethamii	All year	20 – 23 August 2024	Random meander, plot survey
Micromyrtus minutiflora	All year	20 – 23 August 2024	Random meander, plot survey
Pterostylis saxicola	All year	20 – 23 August 2024	Random meander, plot survey

A random meander survey was utilised for the threatened flora surveys. Due to the small area and the relative lack of understorey vegetation within the subject land, a random meander was deemed appropriate for the survey and was supplemented by the aforementioned vegetation integrity plot surveys. The random meander survey and plot surveys were undertaken by a botanist and ecologists.

2.4.2. Threatened Fauna Species Survey

2.4.2.1. Habitat Constraints

Under Section 5.2.2 of the BAM, species credit species can be excluded from further assessment, and thereby targeted surveys, if it is determined that none of the species-specific habitat constraints are present within the study area. Furthermore, under Section 5.2.3 of the BAM, a candidate species credit species can be considered unlikely to occur on the study area (or specific vegetation zones) if after carrying out a field assessment, the assessor determines that the habitat is substantially degraded such that the species is unlikely to utilise the study area (or specific vegetation zones)

Desktop assessments and field surveys within the study area included assessment of habitat constraints and microhabitats for predicted species credit fauna species. This included desktop assessment of proximity of the study area to features such as caves and waterways and field inspection of microhabitats including leaf litter, stick nests, hollowing-bearing trees, significant bush rock, fallen logs, culverts, water bodies and decorticating bark.

Due to the historic disturbance and lack of structural layers within the subject land, the habitats within the subject were sufficiently degraded to rule out the presence of all candidate fauna species credit species generated by the BAM-C, however 19 hollow bearing trees (comprising a mix of live trees and dead stags) were identified within the study area, three of which are present in the subject land (**Figure 7**).

2.4.2.2. Targeted Species Survey

No threatened fauna species have been assessed as candidate species credit species for further assessment (see ***Section 5.3***) due to disturbed nature of the subject land. Hence, no targeted fauna species surveys were undertaken as part of this assessment.

2.5. Weather Conditions

Weather conditions during the field survey was appropriate for detection of a range of flora and fauna species. A summary of weather conditions in the wider locality of the study area (BOM Weather Station 066137 - Bankstown Airport) during the field survey is provided in **Table 4**.

Table 4 Weather conditions during the field surveys

Date	Temperature Minimum (°C)	Temperature Maximum (°C)	Rainfall (mm)
20/08/2024	7.2	23.0	0
21/08/2024	12.6	26.6	0
22/08/2024	11.9	23.6	0
23/08/2024	6.8	22.8	0

3. Landscape Features

3.1. Assessment Area

The subject land is approximately 1.72 ha in size and is shown in **Figure 2** and **Figure 3**. As the project is being assessed as a non-linear project, the assessment area comprises the area of land within a 1,500 m buffer around the outer boundary of the subject land. The assessment area is approximately 810.33 ha in size and is shown in **Figure 3**.

3.2. Landscape Features

Landscape features identified within the subject land and assessment area are outlined below. The extent of these features within the subject land is shown in **Figure 2** and the extent within the assessment area is shown in **Figure 3**.

3.2.1. IBRA Bioregions and IBRA Subregions

The subject land and assessment area occur within the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and within the Cumberland IBRA Subregion.

3.2.2. Rivers, Streams and Estuaries

No mapped watercourses occur within the subject land, however numerous watercourses occur within the assessment area. In addition to the Georges River (sixth or higher order) that flows approximately 1km from the western boundary of the subject land, several first, second and fourth/fifth order streams occur within the assessment area. In accordance with Appendix 3 of the BAM, a riparian corridor of 10 m, 20 m, 40 m and 50 m either side of the waterway applies to 1st, 2nd, 4th/5th and ≥6th order streams, respectively.

3.2.3. Important Wetlands

No wetlands (artificial or natural) occur within the subject land and there are no important wetlands included in the DCCEEW Nationally Important Wetlands or the *State Environmental Planning Policy (Resilience and Hazards) 2021* database in the subject land or assessment area.

3.2.4. Habitat Connectivity

The subject land does not form part of a regional biodiversity corridor, flyway for migratory species, or estuary.

The subject land contains native vegetation that provides connectivity to the conservation area from the southern section of the study area, in a south-north direction. It also provides limited connectivity between urban backyard trees with other retained native vegetation in the surrounding properties in the east. Ground-dwelling native fauna species are unlikely to use the subject land as 'stepping stone' habitat to reach the Killara, Horsely Park and Kelso Park Reserves in the south, as they are separated from the study area by the M5 South Westen Motorway.

The southern boundary of the study area has been mapped in the *Canterbury-Bankstown Biodiversity Strategic Plan 2015-2025* (the 'Plan') as containing a 'transition corridor' (see Figure 11 of the Plan) (Bankstown City Council 2015), which was identified as an already vegetated tract of land within the previous Bankstown LGA. This is known as the M5 Motorway Corridor, and the removal of vegetation within the subject land will not

break the connectivity of this corridor, but it may marginally reduce the stepping stone habitat to reach this corridor.

3.2.5. Karsts, Caves, Crevices, Cliffs and Areas of Geological Significance

No karsts, caves, crevices, cliffs or areas of geological significance have been identified within the subject land or assessment area based on searches of available aerial imagery from NearMap, or topographic data available from SixMaps.

3.2.6. Areas of Outstanding Biodiversity Value

No Areas of Outstanding Biodiversity Value have been mapped within the subject land or assessment area.

3.2.7. NSW (Mitchell) Landscapes

The subject land is wholly located within the 'Ashfield Plains' NSW (Mitchell) Landscape. The assessment area mostly comprises the 'Ashfield Plains' NSW (Mitchell) Landscape and the 'Georges River Alluvial Plain' NSW (Mitchell) Landscape, however areas of the 'Woronora Plateau' NSW (Mitchell) Landscape are present in the south of the assessment area (see **Figure 3**).

3.2.8. Soil Hazard Features

No soil hazard features have been identified within the subject land or the assessment area.

3.3. Native Vegetation Cover

The native vegetation cover was determined using GIS. To map native vegetation cover within the subject land and assessment area, this assessment utilised the detailed vegetation mapping prepared by Cumberland Ecology in conjunction with the SVTM prepared by NSW DCCEEW. The native vegetation cover within the assessment area is shown in **Figure 3**. It occupies approximately 99.23 ha, which represents approximately 12.25% of the assessment area (approximately 810.33 ha). Therefore, the native vegetation cover value is assigned to the cover class of >10-30%.

The remaining land within the assessment area comprises cleared land and exotic vegetation. No significant differences between the aerial photographs used in this assessment and the native vegetation cover shown in **Figure 3** have been identified. This BDAR has been assessed as a non-linear project.

4. Native Vegetation

4.1. Native Vegetation Extent

The subject land and wider study area have been subject to detailed surveys by Cumberland Ecology for the purpose of this BDAR. The native vegetation extent within the subject land was determined through aerial photograph interpretation and field surveys. The native vegetation extent within the subject land is shown in **Figure 8**. It occupies approximately 0.37 ha, which represents approximately 18.27% of the subject land. The native vegetation extent within the subject land comprises planted and remnant native vegetation.

The remaining areas within the subject land comprise cleared land, including buildings and roads, and exotic vegetation, totalling an area of approximately 1.6 ha (**Figure 8**). In accordance with Section 4.1.2 of the BAM, these areas do not require further assessment, unless they provide habitat for species credit species or are proposed for restoration as part of an offset.

No differences between the aerial photographs used in this assessment and the native vegetation extent shown in **Figure 8** have been identified.

4.2. Plant Community Types

4.2.1. Overview

The analysis determined that the native vegetation within the subject land aligned with one PCT held within the BioNet Vegetation Classification database, however this was present in three different condition states. **Table 5** provides a summary of the PCTs identified within the subject land, whilst the distribution of the PCTs is shown in **Figure 9**. Details of the vegetation within the subject land are outlined below, including justification for PCT selection.

Table 5 Plant Community Types and other vegetation within the subject land

PCT #	PCT Name	Subject Land (ha)
3320	Cumberland Shale Plains Woodland (Mown)	0.03
3320	Cumberland Shale Plains Woodland (Exotic Ground)	0.18
3320	Cumberland Shale Plains Woodland (Canopy)	0.04
-	Planted Native Vegetation	0.11
-	Exotic Woody Vegetation	0.18
-	Exotic Dominated Grassland	0.32
-	Cleared Land	1.10
	Total:	**1.97**

4.2.2. PCT 3320 - Cumberland Shale Plains Woodland

Vegetation Formation: Grassy Woodlands

Vegetation Class: Coastal Valley Grassy Woodlands

Percent Cleared Value: 93.03

4.2.2.1. General Description

This community is a tall sclerophyll open forest to woodland with a sparse mid-stratum of soft-leaved shrubs and small trees with a grassy ground cover on the undulating shale plains of western Sydney (EHG 2024). The canopy very frequently includes *Eucalyptus tereticornis* and *Eucalyptus moluccana*, with ironbarks (*Eucalyptus crebra* and *Eucalyptus fibrosa*) occasionally present, however prominent in localised areas, and the stringybark species *Eucalyptus eugenioides* commonly occurs. The sparse shrub to small tree layer very frequently includes *Bursaria spinosa* and one or more species of Acacia, of which *Acacia parramattensis, Acacia decurrens* and *Acacia falcata* are the most frequent and abundant.

The mid-dense ground layer typically includes grasses, forbs, twiners and a hardy fern. Microlaena stipoides is almost always present and *Themeda triandra, Dichondra repens, Brunoniella australis, Cheilanthes sieberi subsp. sieberi, Desmodium varians, Aristida vagans* and *Glycine tabacina* are very frequent. This is the most widespread PCT on the Cumberland Plain, occupying much of the plain between Bankstown and the Hawkesbury and Nepean rivers. It typically occurs in a warm, moist climate below 120 metres asl however can occur up to 200 metres asl on the undulating terrain between Douglas Park and Campbelltown to the east of the Nepean River. While widespread, this PCT primarily occurs in small, often disturbed patches within a rural or urban matrix.

Within the wider study area, PCT 3320 occurs as a large intact patch in the north-east, and as scattered patches otherwise throughout the study area, in varying condition. There are three vegetation zones of this PCT within the study area, all of which occur in the subject land.

4.2.2.2. Vegetation Zones within the Subject Land

i. PCT 3320_Exotic_Ground

This vegetation condition has a native dominated canopy of *Eucalyptus moluccana* and *Eucalyptus tereticornis,* and to a lesser extent *Eucalyptus crebra. Allocasuarina littoralis* (Black Oak), *Exocarpos cupressiformis*, *and Acacia decurrens* (Black Wattle) are present in the sub-canopy along with younger individuals of the canopy species. The shrub layer is dominated by native species, and includes *Ozothamnus diosmifolius, Olearia viscidula*, and *Bursaria spinosa*, and the vulnerable *Acacia pubescens* (Downy Wattle). The presence of scattered individuals of native species which do not match well with shales in Western Sydney, such as *Zieria smithii*, have probably been planted in the patch, potentially by bushland regenerators. Exotic species are relatively common and include *Olea europaea* subsp. *cuspidata* (African Olive) and *Ochna serrulata*.

The ground layer in this vegetation zone is highly dominated by exotic species in most areas, often with sub-dominant occurrences of the grasses such as *Entolasia marginata* (Bordered Panic), and *Microlaena stipoides* var. *stipoides*. Native forbs are present, though not as commonly as in the intact form, and include *Dianella longifolia* and *Dichondra repens* (Kidney Weed).

Dominant exotic grass species include *Ehrharta erecta* (Panic Veldtgrass), *Ehrharta longiflora* (Annual Veldtgrass), and *Megathyrsus maximus* (Guinea Grass). Common exotic forbs include *Bidens pilosa* and *Asparagus aethiopicus.*

Photograph 1 PCT 3320 (exotic ground) within the subject land

ii. PCT 3320_Mown

This condition zone comprises remnant Cumberland Plain Woodland trees with some native species remaining in the ground layer, however with an absent shrub layer, and closely cropped ground layer due to mowing. Canopy species include *Eucalyptus moluccana* and *Eucalyptus tereticornis*.

Native species persisting in the ground layer include *Microlaena stipoides* var. *stipoides, Eragrostis leptostachya* (Paddock Lovegrass)*, Bothriochloa decipiens* var. *decipiens* (Pitted Bluegrass)*,* and *Rytidosperma racemosa*. Native forbs include *Cotula australis* (Common Cotula), *Oxalis perennans*, and *Veronica plebeia* (Trailing Speedwell).

Exotic grass species are dominant in the ground layer and include *Poa annua* (Winter Grass), *Paspalum dilatatum*, *Ehrharta erecta,* and *Briza minor* (Little Quaking Grass).

Photograph 2 PCT 3320 (mown) within the subject land

iii. PCT 3320_Canopy Only

This condition zone includes remnant or regrowth PCT 3320 canopy trees across the subject land, and potentially in some cases planted individuals, with an entirely artificial understorey and ground layer. Review of historical aerial photographs from the 1940s onwards shows that although the majority of the study area has been cleared at various points in time, woody vegetation, such as shrubby regrowth can be seen in most places where there are currently scattered occurrences of PCT 3320 trees over an exotic ground layer. As such, unless trees related to this PCT occurred as straight rows of young trees, as a precautionary approach all of these trees are considered to be remnant or regrowth. Understorey species are limited to varying garden plantings, where present, and where trees occur in the open, they occur over a mown ground layer of exotic lawn grass species and lawn weeds.

Canopy trees across the Subject Land include *Eucalyptus tereticornis, Eucalyptus moluccana, Eucalyptus crebra,* and *Angophora floribunda*. Shrubs are a varying mix of native species, mostly cultivars, such as *Callistemon viminalis* and exotic shrub species such as *Murraya paniculata* (Orange Jessamine).

Mown exotic grass species include *Cenchrus clandestinus* (Kikuyu) and *Cynodon dactylon* var. *dactylon* (Couch). There are occasional scatter persisting native species in the ground layer such as the native grass *Microlaena stipoides* var. *stipoides* and the forb *Dichondra repens*.

Photograph 3 Example of PCT 3320 (canopy only) in nearby areas of the study area

4.2.2.3. Justification of PCT Selection

Identification of this PCT within the subject land was guided by review of existing data, and the results of the surveys undertaken by Cumberland Ecology. The data collected during surveys of the subject land was analysed in conjunction with a review of the PCTs held within the BioNet Vegetation Classification database. In selecting searching for suitable PCT, consideration was initially given to the following:

- IBRA subregion: Cumberland;
- Vegetation formation: Grassy Woodlands;
- Alignment with TEC: Cumberland Plain Woodland; and
- Canopy species: *Eucalyptus moluccana*, *Eucalyptus crebra,* and *Eucalyptus tereticornis*.

Table 6 PCT 3320 Selection Justification

Filter	Selection/Discussion
Likely PCT matches from SVTM (pre-1750) over or nearby to PCT 3320 polygons in site-specific mapping	PCT shortlist: 3320, 3448

Filter	Selection/Discussion
Plot to PCT Centroid Matches (Top 5) – 2 plots	3319, 3320, 3321, 3260, 4025, 4024, 4058
Selection	PCT 3319 was discarded as the community does not occur on hilly terrain of the cumber plain. PCT 3321 was discarded as the Subject Land does not occur in a shale/sandstone transitional area. PCT 3448 is mapped across this area by the State Vegetation Type Map but was discarded based on the lack of *Eucalyptus fibrosa*. PCT 4023 was discarded as this community is heavily dominated by *Casuarina glauca*. PCT 4024 was discarded as this community nearly always includes *Eucalyptus baueriana* in the canopy, and occurs on alluvial flats. PCT 4025 was discarded as this community occurs on alluvial flats alongside streams that drain the Cumberland Plain. PCT 4058 was discarded as this community occurs in hinterland areas on creeks draining sandstone. PCT 3260 was discarded as this occurs on coastal fringes only. PCT 3320 was selected as this community very frequently includes *Eucalyptus tereticornis, Eucalyptus moluccana*, and with ironbarks (*Eucalyptus crebra* and *Eucalyptus fibrosa*). The canopy of vegetation within the Subject Land is dominated by *Eucalyptus tereticornis* and *Eucalyptus moluccana*, with *Eucalyptus crebra* occurring frequently. Cumberland Plain Woodland, associated with PCT 3320, is described as occurring on Wianamatta Shale derived soils (NSW Scientific Committee 2009a), which matches the soil landscape matching of the Subject Land as containing the Blacktown soils landscape consisting of Wianamatta Group shales. This was evidenced on site by all areas consisting of red/brown clays, and a general absence of sandstone rocks in surface soils, which would indicate PCT 3321. The location in Western Sydney on the Cumberland Plain is also consistent with the description of this PCT (NSW Scientific Committee 2009a). Species matches of the PCT with plots include: *Eucalyptus crebra, Eucalyptus moluccana, Eucalyptus tereticornis, Bursaria spinosa* (Blackthorn), *Microlaena stipoides* var. *stipoides, Cymbopogon refractus,* and *Caesia parviflora var. parviflora*.

4.2.2.4. Alignment with Threatened Ecological Communities

Within the BioNet Vegetation Classification, PCT 3320 is associated with the following TEC:

- Cumberland Plain Woodland in the Sydney Basin Bioregion.

This TEC is listed as critically endangered under the BC Act and the EPBC Act.

Occurrences of PCT 3320 within the subject land, with the exception of the canopy only vegetation zone, are expected to conform to the BC Act listing for the TEC. The final determination does not state condition classes, and as such most remnant or regrowth vegetation comprising PCT 3320 species is expected to conform to the BC Act listing. However, the final determination describes Cumberland Plain Woodland as:

> The ground cover is dominated by a diverse range of grasses including *Aristida ramosa* (Purple Wiregrass), *A. vagans* (Threeawn Speargrass), *Cymbopogon refractus* (Barbed Wire Grass), *Dichelachne micrantha* (Plumegrass), *Echinopogon caespitosus* (Forest Hedgehog Grass), *Eragrostis leptostachya* (Paddock Lovegrass), *Microlaena stipoides* (Weeping Grass), *Paspalidium distans* and *Themeda australis* (Kangaroo Grass), and with graminoids *Carex inversa* (Knob Sedge), *Cyperus gracilis, Lomandra filiformis* subsp. *filiformis* (Wattle Mat-rush) and *L. multiflorus* subsp. *multiflorus* (Many-flowered Mat-rush). The ground cover also includes a diversity of forbs such as *Asperula conferta* (Common Woodruff), *Brunoniella australis* (Blue Trumpet), *Desmodium varians* (Slender Tick Trefoil), *Dianella longifolia* (Blue Flax Lily), *Dichondra repens* (Kidney Weed), *Opercularia diphylla*, *Oxalis perennans* and *Wahlenbergia gracilis* (Australian Bluebell), as well as scramblers, *Glycine* spp. and *Hardenbergia violacea* (Native Sarsaparilla) and the fern *Cheilanthes sieberi* (Poison Rock Fern).

It also states:

> After total or partial clearing, the tree canopy may remain sparse or may regrow to form dense stands of saplings and small trees, which are typically associated with a ground layer of reduced cover and diversity. Either or both of the upper-storey and mid-storey may be absent from the community. Native grasslands derived from clearing of the woodland and forest are also part of this community if they contain characteristic non-woody species listed in paragraph 3.

All conditions of PCT 3320 within the subject land are expected to conform to the EPBC Act Listed community, with the exception of the canopy only vegetation zone, as they are all part of the same patch which overall conforms to the following condition thresholds:

- Remnant / regrowth vegetation, native shrubs and ground layer present
- Vegetation patch is >0.5 ha in size
- Native canopy > 10%
- Perennial native ground cover > 30%

The canopy only form within the subject land does not conform to the EPBC Act listed community as it does not meet the minimum condition thresholds described in the Listing Advice (Threatened Species Scientific Committee 2009) for the community, due either/or having less than 30% cover of perennial native understorey species, not occurring in a patch of the community or of native vegetation > 5ha in size, or not containing hollow trees.

4.3. Non-PCT Vegetation Communities

4.3.1. Planted Native Vegetation

Planted native vegetation occur mainly in the southern half of the subject land. This vegetation community consists of planted native canopy trees, shrubs, and ground layer species throughout a large amount of garden throughout the subject land, and as scattered tree plantings. It includes species not indigenous to Sydney such as *Callistemon viminalis*, and species that occur naturally within Sydney but are not expected to be naturally occurring such as *Corymbia maculata* (Spotted Gum).

These native trees occur over a ground layer in lawn areas dominated by exotic grass species such as *Cenchrus clandestinus* (Kikuyu), and *Cynodon dactylon* var. *dactylon*. Exotic forbs are also common under trees and include *Hypochaeris radicata* (Catsear), and *Modiola caroliniana*.

The BAM includes a streamlined assessment module for "Planted Native Vegetation". This module simplifies the assessment of impacts on planted native vegetation within a development site. The decision-making key outlined in Section D.1 of Appendix D of the BAM provides a framework to determine whether the streamlined assessment module for planted native vegetation can be applied to a site.

An assessment against the decision-making key in Appendix D of the BAM was undertaken and it was determined that areas mapped as planted native vegetation in the subject land did not need to be assigned to a PCT. **Table 7** provides an assessment against the decision-making key for the subject land.

The planted origin of the areas identified as 'Planted Native Vegetation' in the subject land is evident when reviewing a series of historical imagery from the 1940s onwards to present day, as per imagery held within the Historical Imagery Viewer, and described in **Section 1.3.4**.

Table 7 Decision-making key to determine the application of the streamlined assessment module for planted native vegetation

Decision-Making Key	Response
1. Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal?	No – planted native vegetation does not form a mosaic with remnant native vegetation. The mosaic only applies to scattered native plantings in areas that could be assigned to a PCT. The areas of planted native vegetation within the subject land are separated from areas of PCTs that occur in the north-eastern corner of the study area, and have an exotic dominated ground layer, or a ground layer of garden plantings.
2. Is the planted native vegetation: a. planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and	No – the planted native vegetation has not been planted for the purposes of environmental rehabilitation or restoration, or to replace or regenerate a PCT or threatened species population

Decision-Making Key	Response
b. the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat?	or habitat. Plantings are predominately a mix of species which would not have historically been indigenous to the suburb, and plantings do not occur in association with any attempts at revegetation of the shrub or ground layer, they occur over exotic dominated grassland or garden plantings.
3. Is the planted/translocated native vegetation individuals of a threatened species or other native species planted/translocated for the purpose of providing threatened species habitat under one of the following: a. a species recovery project b. Saving our Species project c. other types of government funded restoration project d. condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat e. legal obligation as part of a condition or ruling of court. This includes regulatory directed or ordered remedial plantings (e.g. Remediation Order for clearing without consent issued under the BC Act or the Native Vegetation Act) f. ecological rehabilitation to re-establish a PCT or TEC that was, or is carried out under a mine operations plan, or g. approved vegetation management plan (e.g. as required as part of a Controlled Activity Approval for works on waterfront land under the NSW Water Management Act 2000)?	No – the planted native vegetation has not been planted to provide habitat for threatened species under any of options a-g and does not comprise individuals of any translocated threatened species.
4. Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration without a legal obligation to secure or provide for management of the native vegetation?	No – planted native vegetation was not undertaken for the purposes of revegetation, rehabilitation or restoration. They are parkland/garden plantings within the grounds of a former university.
5. Is the native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as: windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, gardens and sport fields/complexes, macadamia plantations or teatree farms?	Yes – native species have been planted for aesthetic/horticultural purposes only as part of the landscaping within the grounds of a university. Planted native vegetation has been considered for use by threatened species within **Chapter 5** of this BDAR.
6. Is the planted native vegetation a species listed as a widely cultivated native species on a list approved by the Secretary of the Department (or an officer authorised by the Secretary)?	Yes, some vegetation is on this list. *Cynodon dactylon* is present within mown and unmown grassland areas (it is considered exotic in this BDAR as per

Decision-Making Key	Response
	the Flora of Australia). *Callistemon viminalis* is present in landscape plantings.

An example of this vegetation community is seen below in **Photograph 4.**

Photograph 4 Example of planted native vegetation within nearby areas of the study area

4.3.2. Exotic Vegetation and Exotic Dominated Grassland

Exotic vegetation occurs throughout garden plantings in the subject land, such as the shrubs *Murraya paniculata* and *Pyrus calleryana,* and the tree species *Jacaranda mimosifolia*. It is also present as patches of Exotic Dominated Grassland. This vegetation community occurs as maintained lawns/open space throughout the subject land. It is dominated by exotic grass species. Species include *Cenchrus clandestinus* (Kikuyu Grass), and *Cynodon dactylon* var. *dactylon* (Couch). A number of exotic forbs are also common and include *Plantago lanceolata* (Lamb's Tongues), *Gamochaeta americana* (Cudweed), and *Modiola caroliniana* (Red-flowered Mallow).

An example of this community is shown in **Photograph 5**.

Photograph 5 Exotic vegetation within the subject land

4.4. Threatened Ecological Communities

The occurrences of the PCT 3320 identified within the subject land have all been assessed as being associated with a TEC under the BC Act, and all occurrences, other than PCT 3320 (canopy only), are associated with a TEC under the EPBC Act. No other vegetation within the subject land conforms to a TEC under the BC Act and/or EPBC Act. **Table 8** summarises the TECs identified within the subject land and their distribution is shown in **Figure 10**.

Table 8 Threatened ecological communities within the subject land

TEC Name	BC Act Status	EPBC Act Status	Associated PCT	Associated Vegetation Zone	Subject Land (ha)
Cumberland Plain Woodland in the Sydney Basin Bioregion	CEEC	Does not conform to listing	3320 Cumberland Shales Plain Woodland	Canopy Only	0.04
Cumberland Plain Woodland in the Sydney Basin Bioregion	CEEC	CEEC	3320 Cumberland	Exotic Ground	0.18

TEC Name	BC Act Status	EPBC Act Status	Associated PCT	Associated Vegetation Zone	Subject Land (ha)
			Shales Plain Woodland		
Cumberland Plain Woodland in the Sydney Basin Bioregion	CEEC	CEEC	3320 Cumberland Shales Plain Woodland	Mown	0.03

4.5. Vegetation Integrity Assessment

The native vegetation identified within the subject land was assigned to vegetation zones based on PCTs and broad condition states. Patch sizes were subsequently assigned for each of the vegetation zones. The extent of the vegetation zones and associated patch size classes within the subject land are shown in **Figure 2** and **Figure 11**.

The vegetation zones were assessed using survey BAM plots (see ***Section 2.3.2***) to determine the vegetation integrity score. BAM plot data utilised within the BAM-C to determine the vegetation integrity score is provided in **Appendix C** whilst flora data collected from field surveys in the entire study area is provided in **Appendix B**. Data was collected digitally using the ArcGIS Survey123 app on an Android operating system, and as such there are no scans of field data sheets appended. The vegetation integrity assessment utilised the benchmark data held within the BAM-C (as derived from the BioNet Vegetation Classification). Therefore, this assessment did not utilise local benchmarks.

Vegetation zones, patch sizes, and vegetation integrity (VI) scores for the subject land are summarised in **Table 9**.

Table 9 Vegetation integrity scores for the subject land

Vegetation Zone	PCT	Condition	Area (ha)	Patch Size Class	VI Score	Hollow-bearing Trees Present?
1	3320	Canopy Only	0.04	>100	23.4 (Composition = 5.6, Structure = 52.4, Function = 43.9)	No
2	3320	Mown	0.03	>100	54.6 (Composition = 35.6, Structure = 78.4, Function = 58.3)	Yes
3	3320	Exotic Ground	0.18	>100	54.2 (Composition = 29.2, Structure = 76.1, Function = 71.7)	Yes

5. Threatened Species

5.1. Identifying Threatened Species for Assessment

The BAM Calculator (BAM-C) generates a list of threatened species requiring assessment utilising several variables. The following criteria have been utilised to predict the threatened species requiring further assessment in the BAM-C:

- IBRA region: Sydney Basin;
- IBRA subregion: Cumberland;
- Associated PCTs: 3320;
- Percent native vegetation cover in the assessment area: 12.25%;
- Patch size: >100 ha; and
- Credit type: Ecosystem and/or Species Credit species.

Based on the above variables, the BAM-C generated a list of 29 ecosystem credit species and eight species credit species. These totals include four dual credit species which are considered as ecosystem credit species for their foraging habitat and as species credit species for their breeding habitat. Ecosystem credit species and species credit species are assessed further in ***Section 5.2*** and ***Section 5.3***, respectively.

In accordance with Section D.2 of the BAM, the suitability of the planted native vegetation for use by threatened species was included within the threatened species surveys conducted for flora and fauna (see **Section 2.4** and **Section 2.5**). As no habitat features (nests, hollows) were observed and no evidence of use by threatened species was detected within the areas of Planted Vegetation in the subject land, these areas were not considered to comprise habitat for threatened species.

5.2. Ecosystem Credit Species

5.2.1. Overview

Table 10 lists the predicted ecosystem credit species for the vegetation zones within the subject land and whether they have been retained within the assessment following consideration of habitat constraints, geographic limitations, vagrancy and quality of microhabitats. All ecosystem species have been retained in the assessment. The highest sensitivity class of these species is "High Sensitivity to Potential Gain", which has subsequently been utilised by the BAM-C for the calculation of ecosystem credits.

5.2.2. Justification for Removal

No ecosystem credit species have been removed from the assessment; therefore, no justification for removal is provided.

Table 10 Ecosystem credit species requiring further assessment

Scientific Name	Common Name	Relevant PCT	Sensitivity to Gain Class	Retained in Assessment?	Justification if Not Retained
Anthochaera phrygia	Regent Honeyeater (foraging habitat)	3320	High	Yes	-
Artamus cyanopterus cyanopterus	Dusky Woodswallow	3320	Moderate	Yes	-
Callocephalon fimbriatum	Gang-gang Cockatoo (foraging habitat)	3320	Moderate	Yes	-
Calyptorhynchus lathami	Glossy Black- Cockatoo (foraging habitat)	3320	High	Yes	-
Chthonicola sagittata	Speckled Warbler	3320	High	Yes	-
Circus assimilis	Spotted Harrier	3320	Moderate	Yes	-
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	3320	High	Yes	-
Daphoenositta chrysoptera	Varied Sittella	3320	Moderate	Yes	-
Dasyurus maculatus	Spotted-tailed Quoll	3320	High	Yes	-
Ephippiorhynchus asiaticus	Black-necked Stork	3320	Moderate	Yes	-
Falco subniger	Black Falcon	3320	Moderate	Yes	-
Glossopsitta pusilla	Little Lorikeet	3320	High	Yes	-
Haliaeetus leucogaster	White-bellied Sea-Eagle (foraging habitat)	3320	High	Yes	-
Hieraaetus morphnoides	Little Eagle (foraging habitat)	3320	Moderate	Yes	-
*Hirundapus caudacutus****	White-throated Needletail	3320	High	Yes	-
Lathamus discolor	Swift Parrot (foraging habitat)	3320	Moderate	Yes	-
Lophoictinia isura	Square-tailed Kite (foraging habitat)	3320	Moderate	Yes	-

Scientific Name	Common Name	Relevant PCT	Sensitivity to Gain Class	Retained in Assessment?	Justification if Not Retained
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	3320	Moderate	Yes	-
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	3320	High	Yes	-
Miniopterus australis	Little Bent-winged Bat (foraging habitat)	3320	High	Yes	-
Miniopterus orianae oceanensis	Large Bent-winged Bat (foraging habitat)	3320	High	Yes	-
Neophema pulchella	Turquoise Parrot	3320	High	Yes	-
Pandion cristatus	Eastern Osprey (foraging habitat)	3320	Moderate	Yes	-
Petroica boodang	Scarlet Robin	3320	Moderate	Yes	-
Petroica phoenicea	Flame Robin	3320	Moderate	Yes	-
Pteropus poliocephalus	Grey-headed Flying Fox (foraging habitat)	3320	High	Yes	-
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	3320	High	Yes	-
Stagonopleura guttata	Diamond Firetail	3320	Moderate	Yes	-
Varanus rosenbergi	Rosenberg's Goanna	3320	High	Yes	-

**** Species not listed under BC Act but listed under Commonwealth EPBC Act.*

5.3. Species Credit Species

5.3.1. Overview

A total of nine species credit species are predicted, including four dual credit species which are considered as species credit species for their breeding or important habitat. One additional species credit species that was not predicted to occur was recorded during surveys and was subsequently added to the list of candidate species. As the project is being assessed under the BAM Streamlined Assessment Module – small area development, candidate species credit species that are not at risk of an SAII and are not incidentally recorded on the subject land do not require further assessment.

Table 11 lists the flora and fauna species credit species predicted for the vegetation zones within the subject land, and whether they have been retained within the assessment following consideration of habitat constraints, geographic limitations, vagrancy and quality of microhabitats. Under Sections 5.2.2 and 5.2.3 of the BAM, further species credit species can be excluded from further assessment if an assessment of habitat constraints and microhabitats determines that the habitat within the subject land is substantially degraded such that the species credit species is unlikely to occur.

Detailed habitat assessments of the site were undertaken as described in ***Section 2.4.*** The habitat assessments focussed on habitat features relevant to species credit species predicted to occur. This included determining the presence/absence of the habitat constraints identified for the predicted threatened species and the condition of these habitat constraints and other microhabitats.

The habitat assessment surveys conducted during August 2024 focused on determining if habitat for any potential species credit species (or relevant breeding component for dual credit species) was either not present or substantially degraded such that the species is unlikely to utilise the subject land or a specific vegetation zone in accordance with the requirements of Step 3 (a) of Section 6.4 of the BAM. Based on the results of the survey, a number of species were removed from consideration due to either the habitat being too degraded or required habitat constraints not being present as shown in **Table 11** (flora) and **Table 12** (fauna).

A total of three flora species have been retained for further assessment and have been targeted during surveys outlined in ***Section 2.4***.

Table 11 Predicted flora species credit species

Scientific Name	Common Name	Retained in Assessment?	Sensitivity to Gain Class	Suitable Habitat within Planted Native Vegetation?
Acacia pubsecens	Downy Wattle	Yes	High	No
Deyeuxia appressa	*Deyeuxia appressa*	No	High	No
Eucalyptus benthamii	Camden White Gum	Yes	High	No
Micromyrtus minutiflora	*Micromyrtus minutiflora*	Yes	High	No
Pterostylis saxicola	Sydney Plains Greenhood	No	Very High	No

Table 12 Predicted fauna species credit species

Scientific Name	Common Name	Retained in Assessment?	Sensitivity to Gain Class	Suitable Habitat within Planted Native Vegetation?
Anthochaera phrygia	Regent Honeyeater (breeding habitat)	No	High	No
Chalinolobus dwyeri	Large-eared Pied Bat	No	Very High	Yes
Lathamus discolor	Swift Parrot (breeding habitat)	No	Moderate	No
Miniopterus australis	Little Bent-winged Bat (breeding habitat)	No	Very High	No
Miniopterus schreibersii oceanensis	Large Bent-winged Bat (breeding habitat)	No	Very High	No

5.3.2. Justification for Removal

5.3.2.1. Deyeuxia appressa

Deyeuxia appressa has been removed due to the fact that it has not been recorded since 1942 as per the TBDC and is only known from two locations pre-1942 (Killara and Georges River south of Bankstown) (NSW Scientific Committee 2004a, EHG 2024c), and is assumed extinct in the wild. The two records are associated with damp habitats – these microhabitats are not present within the subject land. Further, microhabitats associated with the ground layer are considered degraded due to the history of agricultural use, and recent landscaping such that the understorey is planted and maintained as manicured gardens. The subject land is outside of the known geographical range for this species, and does not contain the relevant microhabitats.

5.3.2.2. Sydney Plains Greenhood

The Sydney Plains Greenhood (*Pterostylis saxicola*) has been removed because it is only known to occur in five locations within western Sydney: Georges River National Park, close to Yeramba Lagoon, Peter Meadows Creek, and St Marys Towers, none of which are in the subject land. This species is associated with sandstone rock shelves above cliff lines, or mossy rocks in gullies, neither of which are present in the subject land.

5.3.2.3. Regent Honeyeater

The Regent Honeyeater (*Anthochaera phrygia*) has been removed from the assessment as the subject land is not located within an area on the important habitat map for the species.

5.3.2.4. Large-eared Pied Bat

The Large-eared Pied Bat (*Chalinolobus dwyeri*) has been removed from the due to the absence of microhabitats required by the species within this zone. The species has been found roosting in caves, overhangs, abandoned mine tunnels and disused fairy martin nests, and is known to breed in disused mines and sandstone caves (DERM 2011). This species has been recorded foraging in a range of vegetation types, including dry and wet sclerophyll forest, grassy woodland, Callitris dominated forest, tall open eucalypt forest with a rainforest sub-canopy, sub-alpine woodland and sandstone outcrop country (DERM 2011). The subject land does not include these relevant microhabitats.

5.3.2.5. Swift Parrot

The Swift Parrot (*Lathamus discolor*) has been removed from the assessment as the subject land is not located within an area on the important habitat map for the species.

5.3.2.6. Little Bent-winged Bat

The Little Bent-winged Bat (*Miniopterus australis*) has been removed from the assessment as the habitat constraints for the species are absent from the subject land. The TBDC lists the following habitat constraint for the species: *Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature*. None of these habitat features, or records held within BioNet, are present within the subject land.

5.3.2.7. Large Bent-winged Bat

The Large Bent-winged Bat (*Miniopterus orianae oceanensis*) has been removed from the assessment as the habitat constraints for the species are absent from the subject land. The TBDC lists the following habitat constraint for the species: *Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave;" observation type code "E nest-roost;" with numbers of individuals >500*. None of these habitat features, or records held within BioNet, are present within the subject land.

5.4. Presence of Candidate Species Credit Species

5.4.1. Surveys

A summary of the species credit species surveyed within the subject land, including whether they were recorded in the subject land, is provided in **Table 13** below. Details on the extent and condition of habitat for species present in the subject land are provided in ***Section 5.4.2***.

Further details on the methodology of targeted surveys undertaken for the candidate species credit species for further assessment are included in ***Section 2.4.1*** (flora) and ***Section 2.4.2*** (fauna).

Table 13 Species credit species assessed as present within the subject land

Species	Present in Subject Land	Method of Identification	Biodiversity Risk Weighting
Acacia pubescens	Yes	Survey	2
Eucalyptus benthamii	No	Survey	3
Micromytrus minutiflora	No	Survey	3

5.4.2. Expert Report

This assessment has not utilised any expert reports.

5.4.3. Extent of Habitat

The following section outlines the extent and condition of habitat used for the creation of species polygons for candidate species present within the subject land.

5.4.3.1. Downy Wattle

Five individuals of the Downy Wattle (*Acacia pubescens*) were recorded during the surveys of the study area. Although not present in the subject land, due to its proximity to it and the removal of 0.15 ha of suitable habitat, it has been included as a species credit species for the purpose of this BDAR. As such, a species polygon has been created for the purposes of calculating the impacts on the species. The species polygon for the Downy Wattle has been created in accordance with the habitat requirements outlined in the TBDC, and includes the following steps:

- Identify the PCTs/vegetation zones associated with the Downy Wattle in the TBDC;

- Create a shape file for the relevant vegetation zones (using GIS) to create the extent of the final species polygon.

The species polygon was then used to calculate the area of each of the vegetation zones impacted for the purpose of calculating species credits for the Downy Wattle. The habitat condition and area for the species polygon is provided in **Table 14** below, whilst the species polygon for the Downy Wattle is shown in **Figure 12.**

Table 14 Details of the species polygon for the Downy Wattle

Species Credit Species	Vegetation Zone	Habitat Condition (VI) Loss)	Habitat within the Subject Land (ha)	Habitat to be Removed (ha)
Downy Wattle	3320_ExoticGround	-31.2	0.18	0.15

The mown and canopy condition states of Cumberland Plain Woodland have not been included in the species polygon for the Downy Wattle. The canopy condition exists throughout the study area as remnant trees over an exotic, planted understorey, that is maintained as manicured gardens, meaning that there is no possibility of the Downy Wattle establishing. The mown condition state is largely maintained as an Asset Protection Zone (APZ) surrounding the daycare centre, and so it does not contain shrubby, understorey vegetation. Due to the regular mowing of this area, the Downy Wattle would not be able to establish, hence this zone is not considered as suitable habitat for the species.

6. Prescribed Impacts

Prescribed impacts are identified in Clause 6.1 of the *Biodiversity Conservation Regulation 2017*. Prescribed impacts are those that are additional to the clearing of native vegetation and associated habitat. These include:

- Development on the habitat of threatened species or ecological communities associated with:
  - karst, caves, crevices, cliffs, rock outcrops and other geological features of significance;
  - human-made structures;
  - non-native vegetation;
- Development on areas connecting threatened species habitat, such as movement corridors;
- Development on water quality, water bodies and hydrological processes that sustain threatened species and TECs (including from subsidence or "upsidence" from underground mining);
- Wind turbine strikes on threatened and protected animals; and
- Vehicle strikes on threatened species or on animals that are part of a TEC.

An assessment of the relevance of these prescribed impacts to the project is provided in **Table 15**. The location of prescribed impacts is shown in **Figure 13**.

Table 15 Identification of prescribed impacts on the development site

Prescribed Impact	Relevance to the Project
Karst, caves, crevices, cliffs, rock outcrops and other geological features of significance	Not relevant. No karsts, caves, crevices, cliffs or areas of geological significance have been identified within the subject land or assessment area. Prescribed impact not relevant.
Human-made structures	Not relevant. The subject land contains an operational childcare centre that will be subject to modifications as part of the project. However, the building footprint will not be increased as all work will occur within the current building footprint, and the existing building will not be demolished, and so this prescribed impact is not relevant.
Non-native vegetation	Non-native vegetation occurring within the subject land comprises areas of exotic grasses, shrubs and trees within the exotic vegetation community mapped. This vegetation may provide some low-value habitat for native fauna species, including threatened birds and bats, on occasion. Impacts to non-native vegetation would occur during the construction phase of the project and result in a long-term impact.
Habitat connectivity	The subject land contains native vegetation that has some minor connectivity to other retained native and planted vegetation in the study area and M5 Motorway Corridor. The proposed development will not fragment or break existing levels of connectivity but will result in a minor reduction to the area of 'stepping-stone' habitat available as a whole.
Waterbodies, water quality and hydrological processes	No waterbodies are present within the subject land. The project will alter current hydrological processes and has the potential to impact water

Prescribed Impact	Relevance to the Project
	quality, noting that the existing hydrological processes are presently engineered as a result of past residential development. Any changes to water quality and/or hydrological processes will be appropriately managed through design and are anticipated to meet all Council requirements. The impacts to water quality and hydrological processes would primarily occur during construction and would be short-term.
Wind farm developments	Not relevant. The project does not comprise a wind farm development
Vehicle strikes	The childcare centre within the subject land is currently operational, so threatened fauna species are already at risk of vehicle strike. There may be a slight increase in the number of vehicles accessing the subject land during the construction phase of the project, however impacts will be minimised as vehicle movement will be limited through the introduction of speed limits.

7. Avoid and Minimise Impacts

This section includes demonstration of efforts to avoid and minimise impacts on biodiversity values identified within the subject land, which includes assessment of direct, indirect and prescribed impacts. The subject land includes the area to be completely cleared for the proposed development (the development site footprint) as well as areas that will be accessible to the future residents (the operational footprint).

7.1. Avoid and Minimise Direct and Indirect Impacts on Native Vegetation and Habitat

This section summarises the need for the proposed project in the local area, the suitability of the location chosen for the project, and the specific considerations for the design of the development footprint, including consideration of biodiversity values as well as non-biodiversity constraints. The development footprint is shown in **Figure 4**.

It should be noted that the avoidance for the study area (which includes the subject land) was done as part of the Planning Proposal, and so avoidance measures were applied to the redevelopment as a whole and not for individual stages. Vegetation mapping on the SVTM and ground-truthing by Eco Logical determined that the area currently zoned as C2 – Environmental Conservation contained the highest quality vegetation in the study area. As a result, most of the north-eastern corner of the study area was avoided during the design process of the developable areas for the project.

As the avoidance of impacts on native vegetation and habitat were dealt with on a project basis, rather than individual project stages, the subsequent sections of this chapter include a discussion of the avoidance measures implemented for the overall project rather than just the subject land/Commercial Area of the project.

7.1.1. Need for the Project

The project masterplan was designed specifically for the WSU Milperra Campus, and so no other locations were considered as part of the planning for the project. A Planning Proposal was submitted in 2021 for the rezoning of the WSU Milperra Campus from SP2 – Education Establishment to a combination of R1 – General Residential, C2 – Environmental Conservation, B1 – Neighbourhood Centre and RE1 – Public Recreation (Elton Consulting 2023), with the aim to provide more housing diversity and to assist in addressing the increasing demand for housing in the local area The Planning Proposal was approved in 2023, and the project masterplan was developed specifically for the WSU Milperra Campus in accordance with the objectives of various governing bodies and legislation, as described in the sections below.

7.1.1.1. Western Sydney University

The WSU Milperra Campus has been relocated to Bankstown with the aim of changing the current 'suburban' campus network into a hybrid campus model which includes both suburban and city centre campuses. This Strategy was endorsed by the University Board of Trustees in June 2017, and the relocation ensures that the university is in a more accessible location for many students, due to the Metro, bus and train lines within Bankstown CBD. It has been proposed that the WSU Milperra Campus site should be repurposed for reinvestment into the WSU's new campus, as well as it's education and research offerings, which is consistent with the University's objectives and functions under the *Western Sydney University Act 1997*.

The masterplan for the project has been prepared in support of the university's transformative initiative, with the aim of improving the local area for existing and future residents. The project will provide a diverse range of housing to support affordability, a walkable and cycle-friendly neighbourhood with shops and services, and open space for active and passive recreation.

The childcare centre within the subject land consists of two day-care centres; one pre-school and one out-of-hours care facility. The pre-school currently operates as the 'Western Sydney University Early Learning Bankstown', which has a capacity of 67 places. The planning proposal enabled the subject land to be rezoned as B1 – Neighbourhood Centre, which will allow the current childcare centre to be upgraded to allow more spaces, and it will provide opportunities for small-scale commercial, and business uses to meet the day-to-day needs of the residents.

The 'no go' approach would not enable redevelopment, and so would not allow for the reinvestment into the WSU's new campuses.

7.1.1.2. Canterbury-Bankstown Development Control Plan 2023

The Canterbury-Bankstown DCP includes a specific clause (Clause 11.13) that applies to the entire WSU Milperra Campus, with a number of objectives relating to the overall layout and future development of the site. These include:

- The WSU Milperra Campus will accommodate a new low-rise medium density precinct that will provide up to 430 dwellings, offering a diverse housing product that will help to meet existing and future local housing demand;
- The proposed development must aim to provide a positive contribution to the existing and future residential context, while conserving any significant remnant vegetation;
- The redevelopment of the precinct will create new destinations for public interaction by integrating the new residential neighbourhood with the existing community through the creation of new proposed open spaces and connected streets, pedestrian paths and cycleways that increase connectivity across the precinct;
- A neighbourhood centre will cater for small scale retail opportunities and businesses whilst supporting the precinct's existing childcare services, providing a high-quality community meeting point; and
- The remnant Cumberland Plain woodland in the C2 Conservation Zone in the north-eastern corner of the site will be retained and maintained.

These objectives are only relevant to the WSU Milperra Campus site, and so the project masterplan has been prepared with these in mind and for the study area.

7.1.1.3. Our Greater Sydney 2056 – South District Plan

The South District Plan is a 20-year plan to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision for Greater Sydney. The focus of this plan is the

identification of planning priorities to achieve a liveable, productive and sustainable future for the South District, which include the Canterbury-Bankstown LGA. The relevant objectives of the South District Plan are:

- Greater housing supply;
- Housing is more diverse and affordable;
- Great places that bring people together; and
- Environmental heritage is identified, conserved and enhanced.

The former NSW Department of Planning and Environment's projections of population growth and household growth in the South District translates to a need for an additional 83,500 homes between 2016 and 2036. The proposed development will supply 420 new dwelling types, with a diverse range of affordability, to respond to the changing household and age profile of the South District.

The project masterplan has focused on providing a 'great place to live' within the WSU Milperra Campus site. It will provide three open spaces for active and passive recreation, and a walkable and cycle-friendly neighbourhood with shops and services, including a childcare centre. The area mapped as C2 – Environmental Conservation is proposed to be retained and managed to improve the condition of the Cumberland Plain Woodland currently present, and canopy tree species representative of Cumberland Plain Woodland are to be retained where possible throughout the overall study area.

As Bankstown and its surrounds is one of the preferred areas to live within the South District, the location of the WSU Milperra Campus is ideal for the proposed development. The project masterplan has been prepared to achieve the objectives laid out in the South District Plan for the WSU Milperra Campus.

7.1.1.4. State Environmental Planning Policy (Transport and Infrastructure) 2021

The project is consistent with the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) (NSW Government 2021). This policy aims to facilitate the effect delivery of infrastructure across the State along with providing for consultation with relevant public authorities during the assessment process. The T&I SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency and aims to provide for the effective delivery of Educational Establishments and Childcare Facilities across the state by improving regulatory certainty and simplifying the approval pathway.

The planning proposal does not contain provisions that conflict or obstruct the application of the T&I SEPP. The proposal has retained the childcare facility on site and has proposed to upgrade it to provide more spaces for children, which will assist with local containment and will reduce the dependency on external infrastructure for convenience. It has also enabled the development of a larger scale and more accessible university campus within the Bankstown CBD. As stated in consultation with the government, the delivery of expanded or new educational establishments is preferred in alternate locations, and so the 'no-go' approach for this project would not align with the aims of the T&I SEPP.

7.1.2. Project Location

Section 7.1.1 of the BAM states that knowledge of biodiversity values should inform the decision-making process relating to the location of a project. Measures to avoid or minimise impacts from clearing native vegetation and threatened species habitat can include locating the project in areas lacking or with low biodiversity values, avoiding areas mapped on the important habitat map, or avoiding native vegetation that is a TEC. A discussion of the considerations, measures and constraints relevant to avoidance are discussed in the sections below.

7.1.2.1. Considerations

In selecting the project's final development footprint, the following matters were considered in accordance with the BAM:

a. Knowledge of biodiversity values should inform decisions about the location of the proposal.

As described in ***Section 7.1.1***, the project masterplan has been prepared in accordance with the planning proposal that considered relevant legislation for the WSU Milperra Campus. The project masterplan has been prepared to be largely within cleared areas with either planted or exotic vegetation in order to reduce impacts on areas of Cumberland Plain Woodland. The masterplan has been prepared to conserve areas of better-quality Cumberland Plain Woodland in the conservation area, and more of the canopy layer surrounding the parks will be retained in future stages of the project as a result of the ecological assessment conducted on-site.

Although the masterplan has generally avoided impacts to the Cumberland Plain Woodland within the study area, 0.02 ha of mown and 0.05 ha of exotic ground condition is to be cleared to facilitate road access for the childcare centre, however due to the proximity of these areas to the road they are already in a disturbed condition and suffering edge effects.

0.1 ha of ground layer exotic ground Cumberland Plain Woodland will be removed to facilitate a carpark with enough spaces to satisfy the requirements of the childcare centre, however all trees within this area are to be retained. The proposed carpark is largely located within cleared areas used for water tanks and a driveway, within an area that is currently maintained under an APZ, meaning that there is very little understorey to be removed to facilitate the carpark.

In total, this stage of the project proposes to clear approximately 0.07 ha of Cumberland Plain Woodland, 0.1 ha of understorey Cumberland Plain Woodland, and retain 0.03 ha. Approximately six trees representative of Cumberland Plain Woodland are to be removed at this stage of the project, two of which are semi-mature and have the potential to be replanted in other parts of the study area.

b. Selecting a final proposal location may be an iterative process.

The project masterplan went through a number of iterations at the pre-lodgement stage for the Planning Proposal to better maximise tree retention and to reduce the impact on Cumberland Plain Woodland within the study area.

c. Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal in areas lacking biodiversity values.

The project masterplan was prepared to be largely in cleared areas and to avoid impacts on Cumberland Plain Woodland. The childcare centre is surrounded by Cumberland Plain Woodland to the north and east, and so any modifications to this make it difficult to totally avoid impacts to Cumberland Plain Woodland.

The subject land contains areas of both the mown vegetation zone and the exotic ground vegetation zone of Cumberland Plain Woodland. The development footprint has been prepared to limit the impacts to Cumberland Plain Woodland, as it has avoided all areas of the intact vegetation zone, which contains the best-quality vegetation within the study area and so provides the highest biodiversity values. Additionally, the childcare centre building is not to be extended, and so the building footprint has not been increased, and the majority of trees within the subject land are to be retained.

The Cumberland Plain Woodland to be removed within the subject land is in a degraded condition, either with an exotic, weedy understorey or completely lacking an understorey due to APZ maintenance. The vegetation to be removed is located on the edges of the patch of Cumberland Plain Woodland, and so it is likely that they are already subject to 'edge effects'. Edge effects are impacts that occur at the interface between natural habitats, especially forests and disturbed or developed land (Yahner 1988). When an edge is created between woodland and a cleared area, such as in the case of the subject land between the Cumberland Plain Woodland and the access road for the childcare centre, changes to ecological processes within the vegetation can extend between 10 m and 100 m from the edge (Yahner 1988). These include microclimatic changes in light, temperature, humidity and wind, which can favour a suite of different species and therefore cause significant changes to the ecology of the patch (Lindenmayer and Fischer 2006). Edge effects can also result from the increase in noise and artificial light from a project.

In addition to the edge effects, the Cumberland Plain Woodland to be removed either exists alongside a functional carpark, so will be subject to regular disturbance from cars and pedestrians, or within the backyard of the childcare centre which is regularly used by the children for play. It is unlikely that either of these areas would have provided high quality habitat for native fauna species, especially as there are much better-quality and undisturbed areas within the study area and its surrounds.

The current location of the masterplan avoids the areas of remnant, intact Cumberland Plain Woodland in the conservation area, which has the highest biodiversity values within the study area.

d. Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e., areas that have a low vegetation integrity score).

Approximately 25% of the subject land (0.5ha) comprises exotic vegetation, that is considered to be of low biodiversity value and does not require offsetting, and open cleared areas which are likely to have very little if any biodiversity value at all.

The masterplan has avoided impacts to areas with the highest VI score, as the area of intact, good-quality vegetation in conservation area is to be conserved and avoided. Although there will be a slight impact to the exotic ground condition of Cumberland Plain Woodland, this will largely be in the most degraded areas of this condition along the edges closest to the childcare centre and along the road. Areas which support the population of *Acacia pubescens* have also been avoided.

e. Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal in areas that avoid habitat for species with a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC or a highly cleared PCT.

No species credit species have been assessed as present within the subject land, however due to the proximity of the recorded *Acacia pubescens* to the subject land it has been included in this assessment. Five clumps of *Acacia pubescens* have been recorded within the exotic ground vegetation zone of Cumberland Plain Woodland, and so as a precautionary measure, it has been assumed that the removal of any of this community has the potential to impact on the population. Nonetheless, none of the recorded *Acacia pubescens* clumps will be removed by the development.

The area of the exotic ground condition to be removed within the subject land largely consists of poor quality, degraded vegetation along the frequently used access road from Horsely Road into the childcare centre. The vegetation along the access road is already in a degraded condition, due to edge effects and the disturbance from vehicles and pedestrians utilising the childcare centre. The intersection has also been amended to reduce the impacts on the conservation area, and the driveway to the childcare centre has been curved in order to retain a mature *Eucalyptus tereticornis* (Forest Red Gum), which is included in the Final Determination for Cumberland Plain Woodland (NSW Scientific Committee 2009b).

Due to the expansion of the childcare centre and the prospect of a café in the future, there is a need to provide a minimum of 30 car park spaces. The car park has been largely located in previously cleared areas, however 0.1 ha of understorey Cumberland Plain Woodland will be removed to satisfy the carpark requirements. The carpark has been designed to retain all trees within this area, and only exotic dominated understorey will be removed. This area is currently maintained as an APZ under a previous DA (DA-752/2011), and so there will be very little understorey to be removed to facilitate the carpark.

As discussed in previous sections, better-quality areas of intact Cumberland Plain Woodland in the conservation area will be retained and managed under a Vegetation Management Plan (VMP) in the wider study area.

f. Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal in areas outside of the buffer area around breeding habitat features such as nest trees or caves.

No threatened species habitat features are proposed to be removed at this stage of the project; however, a Hollow Offset Replacement Strategy and Nestbox Management Plan has been prepared for the conservation area to be used as a guideline if any additional hollow-bearing trees are recorded during pre-clearance surveys (Cumberland Ecology 2024).

7.1.2.2. Measures

In selecting the project's final development footprint, the following avoidance and minimisation measures have been considered in accordance with the BAM:

a. Consideration of alternative modes or technologies that would avoid or minimise impacts on biodiversity values

The project is limited in usage of alternative technologies as accommodation is being built. There are no alternative technologies that would provide for the area required to service accommodation needs within the study area which would reduce biodiversity impacts in the form of vegetation clearing.

b. Consideration of alternative routes that would avoid or minimise impacts on biodiversity values.

The project has amended the intersection between Road 2 and Horsely Road to reduce the impact on the conservation area and has curved the driveway to the childcare centre in order to retain a mature *Eucalyptus tereticornis*.

c. Consideration of alternative locations that would avoid or minimise impacts on biodiversity values.

As noted previously, the project masterplan has been prepared in accordance with the planning proposal and so alternative locations are not possible. The project has however reduced impacts on biodiversity values by retaining the area of good-quality Cumberland Plain Woodland in the conservation area.

d. Consideration of alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values.

The project masterplan has been prepared in accordance with the planning proposal for the WSU Milperra Campus. As mentioned previously, the planning proposal has avoided all good-quality areas of Cumberland Plain Woodland that are present in the conservation area.

7.1.3. Project Design

In determining the design of the project masterplan, the project has sought to avoid and minimise direct impacts on native vegetation and habitat by:

- Avoidance of good-quality, intact native vegetation Cumberland Plain Woodland in the conservation area;
- Amendments to the overall project design and layout to maximise the retention of native trees, in particular those representative of Cumberland Plain Woodland, around the areas of parklands within the study area;
- Amendments to the intersection between Road 2 and Horsely Road to reduce the impact on the conservation, and curving the driveway to retain a mature *Eucalyptus tereticornis*;
- Locating any temporary or ancillary construction facilities required during construction within the subject land to avoid additional clearing of vegetation;
- Not increasing the building footprint for the childcare centre, despite the fact modifications are required;
- The outdoor play area of the childcare centre will be confined to the existing cleared areas, and so no additional impact will occur;
- The fire tanks and associated driveway in the conservation area are to be removed, therefore increasing the size of the conservation area;

- The carpark and associated driveway to be constructed will be entirely located within the B1 zone, and will not require the removal of any additional trees;
- Incorporating a detailed landscape design as part of the project, that will utilise species of Cumberland Plain Woodland, from seeds that have been collected and propagated from within the study area;
- A Vegetation Management Plan has been prepared and will be implemented for the ongoing management, restoration and enhancement of retained Cumberland Plain Woodland within the study area; and
- Minimise impacts to biodiversity through the implementation of a suite of mitigation measures (***Sections 8.6 - 8.7***), including sedimentation control, tree protection measures, nest box installation and clearing protocols such as pre-clearance and ecological clearance supervision.

7.2. Avoid and Minimise Prescribed Impacts

7.2.1. Non-native Vegetation

Areas of non-native vegetation within the subject land are in the form of low-biodiversity exotic vegetation and exotic dominated grasslands.

Although the non-native vegetation may provide some habitat value for native fauna in terms of shelter and foraging resources, these areas are unlikely to be favoured over forest/woodland habitats located in the conservation area. The proposed development will remove approximately 0.5 ha of non-native vegetation. The development has prioritised the retention of the good-quality native vegetation that conforms to Cumberland Plain Woodland in the conservation area and has therefore predominantly situated the development in the areas of exotic vegetation and planted native vegetation. As such, impacts to the areas of non-native vegetation are not able to be avoided as part of the project. It is noted that the replanting of native species will occur within the subject land as part of the project's Landscape Plan which will provide sheltering and foraging resources for native species in the short to long-term.

7.2.2. Habitat Connectivity

The vegetation within the subject land is part of the large patch of Cumberland Plain Woodland in the conservation area, and so it assists connectivity between the conservation area to the northeast and the treed vegetation within the study area to the south, though these are separated and fragmented by the university urban landscape. No habitat corridor connectivity will be broken or fragmented due to the proposed vegetation removal, there will just be a minor reduction in the 'stepping-stone' habitat between the subject land and the M5 Motorway Corridor along the southern boundary of the study area, however the habitat connectivity will be retained through the proposed retention of vegetation within the subject land and study area and improved through proposed plantings under a Landscape Plan.

When considering the requirements associated with the extent of earthworks and services required, it would not be possible to avoid all impacts on native vegetation and meet the aims of the project.

7.2.3. Waterbodies, Water Quality and Hydrological Processes

Potential indirect impacts to water quality and hydrological processes would primarily occur as a result of sediment inputs during construction and cannot be completely avoided. Erosion and sediment control measures will be implemented during construction following Managing Urban Stormwater: Soils and Construction ("the Blue Book") (Landcom 2004).

Table 16 Summary table of options for the project to avoid and minimise impacts on biodiversity

Action	Adopted (Yes/No/In part)	Justification	Timing (if adopted)	Responsibility (if adopted)	Outcome (if adopted)
Incorporation of suitable technologies and design configurations to minimise overall development site footprint	Yes	Although modifications are needed to the childcare centre to enable it to provide more spaces, the building footprint has not been increased in order to reduce the impacts on the surrounding Cumberland Plain Woodland, and the outdoor play area will be limited to previously cleared areas and will not result in the removal of any additional vegetation. The intersection of Road 2 and Horsely Road has been amended so that it minimises impact to the conservation area, and the driveway has been curved to allow for the retention of an additional mature *Eucalyptus tereticornis*.	During design and approval	Proponent and consultant team	Reduction of the development site footprint and will minimise impacts on biodiversity values within the subject land.
Implementation of a suite of mitigation measures	Yes	To minimise the impacts on biodiversity a suite of mitigation measures will be implemented such as nest box installation, pre-clearance/clearance measures, sediment controls, tree protection measures and the use of locally endemic species for landscape plantings.	Pre and post construction and during operation phase	Proponent and consultant team	Minimise impacts on biodiversity values of the subject land and adjoining areas.
Design amendments to various elements of the project design	Yes	The project masterplan underwent numerous iterations at the pre-lodgement phase.	During design and approval	Proponent and consultant team	Avoid and minimise impacts on native vegetation and TECs,

Action	Adopted (Yes/No/In part)	Justification	Timing (if adopted)	Responsibility (if adopted)	Outcome (if adopted)
					retain some level of habitat connectivity.
Partial development of the study area to avoid/minimise impacts on biodiversity and achieve greater tree retention	In part	The option to only undertake a partial development of the site, to avoid clearing is not in line with the objectives of the planning proposal and the Canterbury-Bankstown DCP. Nonetheless, the conservation area will be excluded from development to avoid/minimise impacts on biodiversity and retain trees (including hollow-bearing trees) where feasible	-	-	-
'Do-nothing' option to avoid all impacts on biodiversity	No	The do-nothing option for the project would maintain current vegetation cover on site but would not enable redevelopment.	-	-	-
Consideration of alternative sites and layouts within the subject land	Yes	Preliminary options were considered and investigated for the project. The final option selected has consideration to both biodiversity values and the development.	During design and approval	Proponent and consultant team	Retention of the intact Cumberland Plain Woodland in the conservation area.
Retention and enhancement of the conservation area	Yes	The final project design will retain the conservation area, which is made up of intact Cumberland Plain Woodland. This area will be managed under a VMP and enhanced using seeds propagated from within this area.	Post-approval and long-term	Proponent and consultant team	Retention of the intact Cumberland Plain Woodland in the conservation area.

8. Assessment of Impacts

8.1. Direct Impacts

8.1.1. Native Vegetation Clearing

The primary and direct impact resulting from the project is the loss of native vegetation and associated habitat within the subject land. **Tables 17-18** identify the proposed impacts to vegetation and threatened species habitat within the subject land.

Table 17 Extent of clearing impacts

Vegetation Zone	PCT #	PCT Class	Condition	Subject Land (ha)	Removed in Subject Land (ha)	Retained in Subject Land (ha)
1	3320	Canopy		0.04	0.04	0
2	3320	Mown		0.03	0.02	0.01
3	3320	Exotic Ground		0.18	0.15	0.03
-	-	Planted Native Vegetation		0.11	0.11	0
-	-	Exotic Vegetation		0.18	0.18	0
-	-	Exotic Dominated Grassland		0.31	0.31	0
-	-	Cleared Land		1.10	-	-

Table 18 Extent of threatened species impacts (species polygon) within the subject land

Scientific Name	Common Name	BC Act Status	Area (ha)
Acacia pubescens	Downy Wattle	V	0.15

8.2. Change in Vegetation Integrity Score

Table 19 details the change in vegetation integrity score (VI Score) for each vegetation zone and management zone. Three management zone types have been delineated to reflect the intended development within the development footprint, which includes areas of total vegetation retention, areas of tree retention/partial clearing, and areas if complete clearing. This includes:

- Management Zone 1 (MZ1) – Complete clearing: All structural layers of vegetation (canopy, mid-storey, groundcover) are proposed to be removed. Future vegetation integrity scores have been reduced to 0;
- Management Zone 2 (MZ2) - Tree Retention: Trees are proposed to be retained but remaining structural layers will be cleared. For MZ2 the future vegetation integrity scores have been modified as follows:
    - Future tree composition has been kept as per previous score;
    - Future composition of all other growth forms reduced to 0;

- Future tree structure kept as existing score;
- Future structure of all other growth forms reduced to 0;
- Function score for number of large trees and stem size class adjusted to maximum allowable future mean score; and
- Scores for all other functions reduced to 0.

- Management Zone 3 (MZ3) – Bush Regeneration: All vegetation layers are proposed to be retained and will be enhanced/managed under a vegetation management plan. As all structural, compositional and functional layers will be retained, the future vegetation integrity scores have been retained as per the recorded BAM plot scores;

Table 19 Changes in vegetation integrity score

Zone	Vegetation Zone Name	Management Zone	BRW	Area (ha)	VI Score			Total VI Loss
					Current	Future	Change	
1	3320_Canopy Only	MZ1: Cleared	2.5	0.05	23.4	0.00	-23.4	-23.4
2	3320_Mown	MZ1: Cleared	2.5	0.03	54.6	-54.6		-36.4
		MZ3: Bush Regeneration		0.12	54.6	54.6	0	
3	3320_Exotic Ground	MZ1: Cleared	2.5	0.08	54.4	0.00	-54.4	-31.2
		MZ2: Trees Retained		0.03	54.4	24.9	-29.3	
		MZ3: Bush Regeneration		0.15	54.4	54.4	0	

BRW = Biodiversity Risk Weighting
VI Score = Vegetation Integrity Score

8.3. Indirect Impacts

Table 20 outlines the indirect impacts to native vegetation and habitat. Due to the existing modified nature of the vegetation within the subject land, the indirect impacts of the project are not considered to be significant.

Table 20 Summary of indirect impacts

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
Inadvertent impacts on adjacent habitat or vegetation	Construction activities may result in inadvertent impacts on retained vegetation, such as increased sedimentation.	Retained vegetation within subject land and study area	Short term (during construction)	Cumberland Plain Woodland, Ecosystem credit species	Increased human activity during construction has the potential to disturb fauna within adjacent habitat areas. Resulting impacts to fauna include heightened vigilance and predator avoidance, which can disrupt foraging and roosting efficiency or deter wildlife from using particular areas. The civil works is likely to result in a temporary and minor permanent impact to ecological values due to increased human presence on site during the construction period.
Reduced viability of adjacent habitat due to edge effects	Impact unlikely. The vegetation to be removed as part of the project is along the edge of the Cumberland Plain Woodland TEC, and so the removal of this is				

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
	unlikely to cause any further edge effects.				
Reduced viability of adjacent habitat due to noise, dust or light spill	The construction activities associated with the project are likely to increase the noise, dust and light above current levels within the subject land.	Retained vegetation within subject land and study area	Short term (during construction) Potential long-term for light spill due to increased housing	Ecosystem credit species	Construction noise is expected to elicit some avoidance response from fauna using the surrounding vegetation though, with consideration of the extent of habitat available in the study area, this is likely to be a temporary and negligible to minor impact. Artificial light from residences may affect nocturnal and diurnal animals by disrupting patterns, with quality of light (e.g. wave length and colour), intensity and duration potentially evoking different responses. Impacts from increased light levels include disorientation from or attraction toward

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
					artificial sources of light; mortality from collisions with structures; and effects on light- sensitive cycles of species (e.g. breeding and migration for fauna and flowering in plants). The presence and intensity of artificial light will have most impact at the edge of adjacent vegetation communities. Furthermore, the civil works is likely to result in a negligible impact to wildlife due to the buffers proposed.
Transport of weeds and pathogens from the site to adjacent vegetation	A number of weeds are known to occur within the subject land and may be inadvertently spread to retained vegetation.	Retained vegetation within subject land and study area	Potential long-term	Ecosystem credit species, TECs	Reduced condition of the adjoining foraging habitat and Cumberland Plain Woodland.
Rubbish dumping	Increased pedestrian access may result in increased debris/ rubbish	Retained vegetation within subject land and study area	Long-term	Cumberland Plain Woodland, Ecosystem credit species	Inappropriate disposal of non-hazardous wastes can attract vermin and other wildlife. This may exacerbate other indirect

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
					impacts (e.g. road mortality). Litter may also enter wetlands, impacting on water quality. Fencing and signage will help reduce rubbish impacts.
Increased risk of starvation, exposure and loss of shade or shelter	Impact unlikely. Although the project will result in removal of several trees, these habitats are likely dominated by hardy, urban adapted species. Further habitats are retained in the wider study area as well as open space areas. Thus, the project is unlikely to cause displacement of fauna such that it increases the risk of starvation, exposure and loss of shade or shelter.	-	-	-	-
Trampling of threatened flora species	Impact unlikely. No threatened flora species have been observed and none are likely to occur, considering the disturbed	-	-	-	-

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
	and modified nature of the subject land.				
Inhibition of nitrogen fixation and increased soil salinity	Impact unlikely. The subject land is already highly modified from prior land uses and is likely to have elevated levels of nutrients such as N and P.	-	-	-	-
Fertiliser drift	Impact unlikely. Any application of fertiliser will be managed and monitored under a management plan.	-	-	-	-
Wood collection	Impact unlikely to occur, considering the nature of the subject land and the project as residential properties.	-	-	-	-
Bush rock removal and disturbance	Impact unlikely. No bush rock has been identified within the subject land or immediate vicinity, therefore the project is not considered to result in this indirect impact.	-	-	-	-

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
Increase in predatory species populations	Impact unlikely. As the subject land already occurs in a highly modified landscape the project is considered unlikely to result in an increase in predatory species populations.	-	-	-	-
Increase in pest animal populations	Impact unlikely. As the subject land already occurs in a highly modified landscape the project is considered unlikely to result in an increase in pest species populations.	-	-	-	-
Increased risk of fire	Impact unlikely. The project is unlikely to increase the risk of bushfire.	-	-	-	-

8.4. Prescribed Impacts

The project has been assessed as potentially resulting in four prescribed impacts (see ***Section 6.1***). An assessment of these prescribed impacts is provided below in accordance with Section 8.3 of the BAM.

8.4.1. Non-native Vegetation

8.4.1.1. Nature

Non-native vegetation is proposed to be cleared for the project. Non-native vegetation includes areas of exotic vegetation as shown in **Figures 8** and **9**.

8.4.1.2. Extent

The proposed development will clear a total of approximately 0.5 ha of non-native vegetation in the form of exotic grassland, shrub and tree species.

8.4.1.3. Duration

Impacts to non-native vegetation would occur during the construction phase of the project. The removal of the non-native vegetation is a long-term impact.

8.4.1.4. Threatened Entities Affected

The habitat provided by non-native vegetation may provide some foraging habitat for ecosystem credit species, such as microchiropteran bats and birds. However, the non-native vegetation is not considered suitable breeding/nest habitat due to lack of hollows and structural features, other than some minor woody weeds such as scattered shrubs.

8.4.1.5. Consequences

The project will result in a reduction in non-native vegetation by approximately 0.5ha. The reduction of this area of habitat is not considered to significantly impact upon threatened entities as other areas of suitable habitat, in the form of both native and non-native vegetation, will be retained within the retained area of Cumberland Plain Woodland in the conservation area, and in the numerous reserves to the south.

8.4.2. Habitat Connectivity

8.4.2.1. Nature

The native woody vegetation within the subject land is part of the patch of Cumberland Plain Woodland within the conservation area, and so it assists connectivity from the conservation area to other treed vegetation within the study area. The removal of 0.32ha of native vegetation will marginally decrease this connectivity. The construction of the project would be an impediment to the movement of some fauna species.

8.4.2.2. Extent

Habitat connectivity will be reduced through the removal of 0.32ha of native vegetation and 0.5ha of exotic vegetation. Stepping-stone habitat connectivity will remain through the retention of vegetation within the subject land and scattered throughout the study area, as well as through the replanting of native species identified in the project's Landscape Plan.

8.4.2.3. Duration

Direct impacts to habitat connectivity would occur during the construction and operational phase of the project. The reduction of habitat connectivity is a long-term impact.

8.4.2.4. Threatened Entities Affected

The habitat offered by extant vegetation may provide foraging habitat for ecosystem credit species, such as the Grey-headed Flying-fox, microchiropteran bats and birds. Some species such as the Grey-headed Flying-fox would be able to fly over the proposed buildings and would only be impacted through the direct loss of foraging habitat.

8.4.2.5. Consequences

The project will result in the direct reduction in native vegetation by 0.32 ha. Although vegetation clearing within the subject land will result in a slight reduction of the existing vegetation patch, the reduction of this area of habitat is not considered to significantly impact the movement of mobile fauna species as better-quality habitat is located to the north and south within reserves that will be retained, including the area of Cumberland Plain Woodland in the conservation area. For example, the Grey-headed Flying-fox forages opportunistically, often at distances up to 30 km from camps, and occasionally up to 60-70 km per night, in response to patchy food resources (NSW Scientific Committee 2004). It is considered unlikely that native fauna would be solely reliant on the habitat within the subject land for movement between different areas of habitat.

8.4.3. Waterbodies, Water Quality and Hydrological Processes

8.4.3.1. Nature

No waterbodies are present; however, the project has the potential to impact on water quality and hydrological processes.

8.4.3.2. Extent

The extent of impacts on water quality and hydrological processes are largely limited to the subject land; however, impacts outside of the subject land may occur during clearing operations if sediment controls are not appropriately implemented and maintained.

8.4.3.3. Duration

Impacts to water quality and hydrological processes are most likely to take place during construction. These will be managed through erosion and sediment control measures to prevent sediment laden run-off from leaving the subject land. Any minor changes to surface run-off will be permanent if the development is constructed.

8.4.3.4. Threatened Entities Affected

Any changes to water quality and hydrological processes are unlikely to affect threatened entities within the subject land or beyond.

8.4.3.5. Consequences

The consequences of impacts to water quality and hydrological processes are likely to be minor and would primarily take place during construction. These impacts can be mitigated through implementation of erosion and sediment control measures.

8.4.4. Vehicle Strike

8.4.4.1. Threatened Entities Affected

Ecosystem species, such as the Grey-headed Flying-fox and ground-dwelling fauna, such as the Spotted Tail Quoll.

8.4.4.2. Nature

The childcare centre and associated car park are currently operational, so the subject land is already subject to vehicles. However, vehicles will be accessing the other parts of the subject land regularly during the construction phase of the project, and so there will be an increase in the number of vehicles that will be accessing the subject land and will thereby increase the risk of fauna vehicle strike.

8.4.4.3. Extent

The risk of vehicle strike will be throughout the entire subject land during the construction phase of the project but will be limited to the car park and roads for the operational phase.

8.4.4.4. Duration

The increased risk of vehicle strike will be during the construction phase of the project, as the subject land is utilised as an operational childcare centre, and so threatened species are already at risk of vehicle strike.

8.4.4.5. Consequences

The subject land is utilised as an operational childcare centre, and so fauna are already at risk of vehicle strike. The construction of residential development within other sections of the study area will result in an increase in the number of vehicles that will be accessing the subject land and will thereby increase the risk of fauna vehicle strike. There will be a higher risk of vehicle strike during the construction phase of the project, as there will be a larger number of machines and vehicles accessing the entire site, however it is expected that there will be a speed limit introduced. Furthermore, it is expected vehicle movement will be slow within the car park and so the potential increase in fauna vehicle strike will be minimal.

8.5. Impacts to Canterbury-Blacktown Council Biodiversity Values

For the preparation of this BDAR, relevant plans and guidelines for the Canterbury-Bankstown LGA have also been reviewed. It is noted that part of the study area has been mapped as 'Biodiversity' under the Canterbury-Bankstown LEP 2023 (**Figure 5**).

8.5.1. Terrestrial Biodiversity

When a proposed development is predicted to impact land identified as 'Biodiversity' on the Terrestrial Biodiversity Map, the consent authority needs to consider Clause 6.4 'Biodiversity' in the Canterbury-Bankstown LEP before making a determination on a DA.

The objective of Clause 6.4 is as follows:

"The objective of this clause is to maintain terrestrial and aquatic biodiversity by

- *Protecting native fauna and flora;*
- *Protecting the ecological processes necessary for their continued existence; and*
- *Encouraging the conservation and recovery of native fauna and flora and their habitats."*

The subject land is entirely mapped as 'Biodiversity'. The mapping is somewhat "broad brush" and contains areas of remnant vegetation (comprising different condition states of Cumberland Plain Woodland), the childcare centre and associated structures, landscaped areas between buildings, university buildings and associated structures including car parks.

Table 21 below includes an assessment of paragraphs 3-4 of Clause 6.4. The relevant text from each of the paragraphs in the Canterbury-Bankstown LEP are recreated in the first column of the table, whilst responses to each paragraph are provided in the second column.

Table 21 Clause 6.4 of the Canterbury-Bankstown LEP

Canterbury-Bankstown LEP 2023	Response
(3) In deciding whether to grant development consent for development on land to which this clause applies, the consent authority must consider -	
a) Whether the impact of the proposed development on the following:	
i) An adverse impact on the condition, ecological value and significance of the flora and fauna on the land	The mapped polygon of 'Biodiversity' covering the subject land and surrounds is comprised of a mixture of three different condition states of Cumberland Plain Woodland, other planted native species, exotic vegetation and cleared land. The impacts to vegetation within the subject land will be limited to a loss of 0.32ha of native vegetation, and 0.82ha total vegetation, comprising areas of exotic vegetation, planted native vegetation and Cumberland Plain Woodland on the edge of the patch in a degraded condition. A total of 3.03 ha of Cumberland Plain Woodland (in various condition states) has been mapped within the study area alone, 0.25 ha of which occurs in the subject land and 0.11

Canterbury-Bankstown LEP 2023	Response
	ha of which will be completely removed, with 0.1 ha being partially impacted. The mapped Biodiversity polygon that encompasses the subject land covers an area of approximately 0.22ha of Cumberland Plain Woodland that will be impacted at this stage of the project. The subject land is likely to provide mainly foraging resources for some native fauna species, however due to the lack of nests and the presence of three hollows, all of which are to be retained, it is unlikely that the subject land comprises significant breeding habitat for native fauna species.
ii) An adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna	The removal of 0.02 ha of mown, 0.05 ha of exotic ground and 0.04 ha of canopy only condition Cumberland Plain Woodland is considered to potentially impact on a suite of species considered as "ecosystem credit species" under the BAM. The subject land lacks nests, and contains only three hollow-bearing trees, all of which are to be retained. It is likely that native fauna utilise the subject land for foraging as part of an extended foraging range, and the removal of 0.4 ha of woody vegetation, consisting of 0.11ha of Cumberland Plain Woodland which will remove six trees representative of the TEC will not have a significant effect on any population, as there is more suitable vegetation to be retained within the subject land and study area.
iii) The potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land	The project is not considered likely to significantly increase fragmentation within the subject land. The subject land is currently utilised as a childcare centre, which is subject to APZ requirements under its current DA (DA-752/2011), and so there is an APZ of 40m surrounding the centre and associated carpark, which is subject to ongoing maintenance and vegetation removal, and so a large portion of the subject land lacks biodiversity function and structure due to the APZ requirements. The areas of Cumberland Plain Woodland to be removed in the subject land are degraded, as they are along the southern and western boundary of the patch and so are influenced by 'edge effects' and are considered highly disturbed due to their proximity to the operational childcare centre.

Canterbury-Bankstown LEP 2023	Response
iv) An adverse impact on the habitat elements providing connectivity on the land	The existing vegetation within the subject land has connected and overlapping tree canopy, and spans throughout the conservation area and south into study area. At ground level within the study area, the mapped patch is fragmented by gardens, paths, roads and buildings and so has limited utility for native animals. However, at the level of the tree canopy it is relatively well connected and provides habitat for birds, bats, flying foxes and non-flying arboreal mammals, however it is separated to an extent by tall university buildings. The proposed development would marginally reduce the connected canopy layer; however, it will not fragment or isolate the patch further, and it will not break the connectivity between the conservation area and the remainder of the study area.
b) Appropriate measures to avoid, minimise or mitigate the impacts of the development	Avoidance of impacts to biodiversity values and the mitigation measures proposed are addressed in detail in **Chapter 7** of this BDAR.
c) Any opportunity to restore or enhance remnant vegetation, habitat and biodiversity corridors	The better-quality Cumberland Plain Woodland in the study area will be retained and will be subject to a VMP. Further landscape plantings, where possible using species of Cumberland Plain Woodland, will be planted throughout the study area to provide some measure of stepping stone connectivity within the urban landscape. Seed collection has been undertaken within the study area for the landscape plantings. Juvenile individuals of canopy Cumberland Plain Woodland to be removed within the subject land have the potential to be salvaged and replanted as landscape plantings, or within the conservation area (as per the Canterbury-Bankstown DCP). The intact area of Cumberland Plain Woodland within the study area will be retained and will continue to provide habitat for threatened species.
(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:	
a) is designed, sited and will be managed, to avoid a significant adverse environmental impact	The development has been sited to minimise impacts to Cumberland Plain Woodland within the study area. The area of good-quality, intact Cumberland Plain Woodland

Canterbury-Bankstown LEP 2023	Response
	will be retained as part of the project. The development footprint was designed to only remove degraded condition states of Cumberland Plain Woodland (ie have a limited or highly exotic understorey), the majority of which is managed as an APZ and so is already subject to maintenance and vegetation removal. Where possible, further tree retention have been included in the subject land.
b) if a significant adverse environmental impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise the impact.	The subject land is not currently managed to protect native flora and fauna. If approved, retained native vegetation will be managed as a suite of ameliorative measures is proposed for the project, as outlined in detail in this BDAR. These include: • Pre-clearance surveys and clearance supervision • Implementation of a sediment control plan • Landscape planting • Preparation and implementation of a Vegetation Management Plan for retained Cumberland Plain Woodland.

8.5.2. Canterbury-Bankstown DCP 2023

The Canterbury-Bankstown DCP includes a specific clause (Clause 11.13) that applies to the entire WSU Milperra Campus and therefore applies to the subject land. The ecological objectives of the clause are to ensure that any proposed development will not detrimentally affect the environment and ensure that satisfactory measures are incorporated to mitigate any impacts arising from the proposal development.

The following mitigation measures relevant to the subject land, which will be adhered to, have been listed in the DCP:

- A 35% tree canopy target through retention of existing trees and the planting of the following tree species:
    - *Eucalytpus moluccana* (Grey Box);
    - *Eucalyptus tereticornis* (Forest Red Gum);
    - *Eucalyptus crebra* (Narrow-leaved Iron Bark);
    - *Eucalyptus eugeniodes* (Thin-leaved Stringy Bark);
    - *Eucalyptus maculates/Corymbia maculata* (Spotted Gum); and
    - *Eucalyptus fibrosa* (Red Ironbark).

- A Vegetation Management Plan (VMP) should be prepared and implemented for all retained Cumberland Plain Woodland for the rehabilitation, management and long-term maintenance of the community;
- Any trees requiring consent for removal (as per Chapter 2.3 of the Canterbury-Bankstown LEP) must be replaced at a 3:1 ratio using a mix of local provenance large trees that conform with the Cumberland Plain Woodland within the study area;
- Native seed from the trees proposed for removal should be collected and propagated to be used in revegetating the study area;
- Juvenile native plants proposed to be removed should be salvaged and transplanted to areas that are to be conserved within the study area;
- Vegetation clearing should not take place in late winter/spring during the breeding period of birds, and a suitably qualified ecologist must be present during all tree removal; and
- Habitat that has the potential to be salvaged (eg tree hollows, tree trunks and root balls) should be reused within the study area for habitat enhancement.

8.6. Mitigation of Impacts to Native Vegetation and Habitat

A range of mitigation measures have been developed for the project to mitigate the impacts to native vegetation and habitat that are unable to be avoided. These include a range of measures to be undertaken before, during and after construction to limit the impact of the project. Each mitigation measure is discussed in detail below, and a summary is provided in **Table 22.**

8.6.1. Weed Management

In order to minimise the spread of weeds throughout the subject land and adjoining areas, appropriate weed control activities will be undertaken during vegetation clearing in accordance with the Greater Sydney Management Region and is subject to the Greater Sydney Regional Strategic Weed Management Plan 2023-2027 (LLS: Greater Sydney 2022) under the NSW *Biosecurity Act 2015*.

The *Biosecurity Act 2015* and regulations provide specific legal requirements for state level priority weeds and high risk activities, as provided in the Appendices of the Greater Sydney Regional Strategic Weed Management Plan 2023-2027 (LLS: Greater Sydney 2022). To comply with the objectives of the Greater Sydney Regional Strategic Weed Management Plan, it is recommended the following measures be implemented as part of weed management for the subject land.

8.6.1.1. Prevention

Appropriate construction site hygiene measures will be implemented to prevent entry of new weeds to the area such as the cleaning of equipment prior to entering the subject land.

8.6.1.2. Eradication

Initial weed management will be carried out within the subject land according to best-practice methods. The targeted species will be those listed under Appendices 1 and 2 of the *Greater Sydney Regional Strategic Weed*

Management Plan 2023-2027 (LLS: Greater Sydney 2022). Initial weed treatment will include eliminating woody species and targeting large dominant infestations of exotic herbs. This may be achieved via a combination of manual weed removal and herbicide use.

8.6.1.3. Containment

Follow-up monitoring and maintenance of retained vegetation and replanting areas managed under the project's Landscape Plan should be undertaken to contain any re-emergence of weed species.

8.6.2. Delineation of Clearing Areas

To avoid unnecessary removal or damage to retained trees, as per the arborist report (Temporal Tree Management, 2024), the clearing area will be clearly demarcated with temporary fencing and signed, where appropriate, to ensure no vegetation beyond these boundaries will be inadvertently cleared during the construction process. No machinery will be parked on areas beyond the temporary fencing and no access will be allowed during construction. Ancillary facilities such as stockpile sites, site compounds and construction zones will not be located beyond the limits of clearing. Site inductions are to be given by the civil contractor to ensure all site workers and visitors are aware of any no-access areas. Appropriate tree protection measures will be installed around all trees to be retained to prevent damage during adjacent cut and fill works.

8.6.3. Sedimentation Control Measures

The project may result in erosion and transport of sediments because of soil disturbance during construction. In order to prevent this impact, construction activities will be undertaken in accordance with "The Blue Book" (Landcom, 2004). These include implementation of the following measures:

- Installation of sediment control fences;
- Covering soil stockpiles; and
- Avoiding soil disturbance prior to heavy rainfall.

8.6.4. Pre-clearance Surveys

To avoid impacts to fauna species during construction, pre-clearing surveys are to be undertaken by a suitably qualified ecologist. Pre-clearing surveys will be undertaken ahead of clearing, to limit fauna injury and mortality and to identify habitat features to be relocated. Pre-clearance surveys will be conducted by suitably qualified ecologists and all fauna found during these surveys will be encouraged to move on or relocated by the ecologists into the retained Cumberland Plain Woodland in the conservation area.

Pre-clearing surveys will include:

- Demarcation of key habitat features as hollow-bearing trees and nests;
- Checking trees for the presence of bird nests and arboreal mammals, such as possums, and bats;
- Animals found to be occupying trees and habitat will be safely removed and relocated into nearby wooded habitat;

- Identification and nomination of hollow-bearing trees or hollows to be salvaged and used for site remediation; and
- Provision of a report following the completion of a pre-clearing survey, detailing the location and type of each habitat feature, and a record of all fauna species encountered.

Although the loss of hollows will be offset in accordance with the BAM, additional mitigation measures recommended in the Canterbury-Bankstown DCP included salvage of hollows that are structurally sound will enhance biodiversity values within the study area. Studies have found that the re-use of hollows, particularly large hollows, provides higher potential for uptake success compared to artificial nest boxes (Central Coast Council 2016).

Where feasible, salvaged hollows could potentially be relocated to suitably sturdy trees within the retained Cumberland Plain Woodland in the conservation area, or within the proposed parks (subject to public safety considerations). Identification of potential relocations sites can form part of future environmental management plans that generally form part of conditions of consent.

8.6.5. Staging of Clearing

The clearing will be conducted using a two-stage clearing process as follows:

Stage 1: Clearing will commence following the identification of potential habitat features by a qualified ecologist. Hollow-bearing trees marked during pre-clearing will not be cleared during the first stage; however, all vegetation around these trees will be cleared to enable isolation of the feature. All trees (as set out in the Canterbury-Bankstown DCP) and other habitat features, such as hollow-bearing logs, can be removed during Stage 1 only if done under supervision by a qualified ecologist. Identified hollow-bearing trees will be left at a minimum overnight after Stage 1 clearing to allow resident fauna to voluntarily move from the area.

Stage 2: After hollow-bearing trees have been left overnight, the trees will be cleared using the following protocols:

- Trees marked as containing hollows will be shaken by machinery prior to clearing to encourage any animals remaining to leave the hollows and move on;
- Use a bulldozer or excavator to start pushing the tree over. Move the bulldozer over the roots and continue gently pushing the tree over;
- Remove branches with hollows and sections of trunk and set aside for immediate transfer to a storage area for placement within retained vegetation; and
- All hollows will be investigated by an ecologist for the presence of fauna following felling of the tree.

The felled habitat tree will be left overnight to allow any remaining fauna time to leave the hollows and move on.

The two-stage clearing process enables fauna a chance to self-relocate upon nightfall, when foraging typically occurs.

Provisions will be made to protect any native fauna during clearing activities by the following means:

- All staff working on the vegetation clearing will be briefed about the possible fauna present and should avoid injuring any present;
- Animals disturbed or dislodged during the clearance but not injured will be assisted to move to adjacent bushland or other specified locations; and
- If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal (either taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanised).

Provision of a report following the completion of clearing works will be provided detailing the total number and species of individuals recorded and details of their release/health

8.6.6. Landscaping

Residential development areas are proposed to be landscaped using native species to the fullest extent feasible, thus providing additional 'stepping stone' movement habitat as well as foraging resources for native species in the long term. While the landscaped areas will not be regenerated to Cumberland Plain Woodland, the proposed landscaping will provide additional habitat and connectivity for native species within the site.

Landscaping should be undertaken in accordance with the Canterbury-Bankstown DCP which has the objective of a 35% tree canopy target through retention of existing trees and the planting of the following tree species:

- *Eucalytpus moluccana* (Grey Box);
- *Eucalyptus tereticornis* (Forest Red Gum);
- *Eucalyptus crebra* (Narrow-leaved Iron Bark);
- *Eucalyptus eugeniodes* (Thin-leaved Stringy Bark);
- *Eucalyptus maculates/Corymbia maculata* (Spotted Gum); and
- *Eucalyptus fibrosa* (Red Ironbark).

It should be noted that Mirvac are currently propagating trees from the conservation area to be planted in the subject land following the construction of houses. It is expected that the 35% tree canopy target will be met in conjunction with future DAs, and that the entire study area will reach this target rather than the individual stages.

8.6.7. Vegetation Management Plan

As part of the project, a Vegetation Management Plan (VMP) has been prepared for the area of retained Cumberland Plain Woodland in the conservation area (our reference – 23021RP5).

The VMP provides guidelines for the revegetation, regeneration and management of vegetation of Cumberland Plain Woodland that is broadly representative of the original community found within the study area. Thus,

under the VMP, the condition of existing Cumberland Plain Woodland will be enhanced, creating higher quality habitat for native fauna and flora species.

8.6.8. Fencing and Signage

Areas set aside for revegetation and conservation are to be fenced off to protect areas from inappropriate access, and trampling while revegetation works are undertaken.

8.7. Mitigation of Prescribed Impacts

The following mitigation measures, described in ***Section 8.6***, are relevant to the prescribed impacts applicable to the project:

- Delineation of clearing limits;
- Pre-clearance survey;
- Staging of clearing;
- Structure removal supervision;
- Sedimentation control measures; and
- Landscaping.

No additional mitigation measures are proposed for prescribed impacts.

8.7.1. Vehicle Strike

The following mitigation measures are proposed for the prescribed impact of vehicle strike:

- Signage: appropriate signage notifying vehicles of potential fauna presence should be installed along the access road;
- Speed limits: Speed limits will be introduced to restrict the speed of vehicles travelling along the access road; and
- Lighting: Low wattage lighting, and minimal / well-spaced streetlights should be considered. The use of lights with flat glass aero screen rather than reflector glass covers may be an option to reduce glare, thus reducing impact on nocturnal fauna. The location of streetlights is subject to the final road design plans.

Table 22 Summary of mitigation measures for impacts to native vegetation and habitat

Mitigation Measure	Proposed Techniques	Timing	Frequency	Responsibility	Risk of Failure	Risk and Consequences of Residual Impacts
Weed management	Appropriate weed control activities will be undertaken in accordance with the Greater Sydney Regional Strategic Weed Management Plan 2023 – 2027 (LLS: Greater Sydney 2022)	Construction	Prior to construction, following vegetation clearing	Contractor	High	Spread of weeds throughout the subject land and surrounding land.
Delineation of clearing limits	Clearing limits marked either by high visibility tape on trees of metal/wooden pickets, fencing or an equivalent boundary marker. Disturbance, including stockpiling, restricted to clearing limits.	Construction	Once	Contractor	High	Unnecessary damage to trees to be retained.
Tree protection measures	Inductions to communication tree protection measures. Installation of fences around specified tree protection zones. All tree work is to be carried out by a suitably qualified and insured Arborist.	Construction	Throughout construction period	Contractor	High	Unnecessary damage to trees to be retained within the subject land.
Sedimentation control	Construction activities will be undertaken in accordance with "The Blue Book" (Landcom 2004). These include implementation of the following measures: Installation of sediment control fences; Covering soil stockpiles; and Avoiding soil disturbance prior to heavy rainfall	Construction	Throughout construction period	Contractor	High	Sedimentation into retained and adjoining vegetation.

Mitigation Measure	Proposed Techniques	Timing	Frequency	Responsibility	Risk of Failure	Risk and Consequences of Residual Impacts
Pre-clearance survey	Pre-clearance surveys will be conducted in all areas of vegetation that are required to be cleared. Pre-clearing surveys will be undertaken within one week of clearing. Habitat features will be marked during the pre-clearing survey.	Construction	Once	Contractor	Moderate	Increased and unnecessary mortality of native fauna.
Staging of clearing	Vegetation clearing will be conducted using a two-stage clearing process. Animals disturbed or dislodged during the clearance but not injured will be assisted to move to adjacent bushland or other specified locations. If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal (either taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanized)	Construction	Once	Contractor	High	Increased and unnecessary mortality of native fauna.
Landscaping	Landscaping and the planting of street trees within the study area should have an overall canopy cover of a minimum of 35% in accordance with the Canterbury-Bankstown DCP, using a mixture of the species listed in ***Section 8.6.7***.	Construction	Once	Contractor	High	Loss of habitat and connectivity
Vegetation Management Plan	A VMP providing guidelines for the revegetation and management of the conservation area has been prepared.	Concurrent with	As per VMP schedules, likely over a	Contractor	Moderate	Loss of habitat and connectivity

Mitigation Measure	Proposed Techniques	Timing	Frequency	Responsibility	Risk of Failure	Risk and Consequences of Residual Impacts
		construction works	minimum period of 5 years			
Fencing and signage	Fencing and signing of conservation and revegetation areas.	Construction and operation	Throughout duration of the civil works	Contractor	Moderate	Trampling of vegetation, failure of revegetation, disturbance to fauna

8.8. Adaptive Management of Uncertain Impacts

The project is considered unlikely to result in any uncertain impacts that require adaptive management.

8.9. Use of Biodiversity Credits to Mitigate or Offset Indirect or Prescribed Impacts

Due to the small scale of indirect and prescribed impacts, the project does not propose to use additional biodiversity credits to mitigate or offset these impacts.

9. Thresholds for Assessment

9.1. Introduction

The assessment thresholds that must be considered include the following:

- Impacts on an entity that is at risk of a serious and irreversible impact;
- Impacts for which the assessor is required to determine an offset requirement;
- Impacts for which the assessor is not required to determine an offset requirement; and
- Impacts that do not require further assessment by the assessor.

The following sections outline these assessment thresholds and their relevance to the project.

9.2. Impacts on Serious and Irreversible Impact Entities

One SAII entity, Cumberland Plain Shale Woodland CEEC, will be impacted by the project. The location of the Cumberland Plain Shale Woodland in relation to the subject land is shown in **Figure 13**. A total of 0.21ha of Cumberland Plain Shale Woodland will be impacted, including 0.11ha of total removal and 0.1ha of partial removal with only understorey being affected, within the subject land. Section 9.1 of the BAM requires the provision of additional information regarding SAII entities that are TECs. The additional information is required to assist the consent authority to evaluate the nature of an impact on a potential entity at risk of a serious and irreversible impact.

The additional information requirements, and the responses to each requirement, are shown in **Table 23**.

Table 23 Additional impact assessment provisions for Cumberland Plain Woodland

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
1	The action and measures taken to avoid the direct and indirect impact on the TEC at risk of an SAII (or reference to where these have been addressed in the relevant section of the BDAR)	Avoidance of impacts to biodiversity values is addressed in detail in **Chapter 7** of this BDAR.
2	The assessor must consult the TBDC and/or other sources to report on the current status of the TEC including:	-
(a)	Evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal)	The current total geographic extent of Cumberland Plain Woodland varies depending on the source interrogated. The current extent of Cumberland Plain Woodland in the TBDC is described as only less than 9% of the original extent remaining and does not include a conclusive total area for the community. BioNet Vegetation Classification Database estimates the current area of occupancy of the community based on the PCTs conforming to Cumberland Plain Woodland (3319, 3320) as approximately 11,153 ha of the original 'Pre-European Extent' published on the database of 130,605 ha. The Final Determination for Cumberland Plain Woodland (NSW Scientific Committee 2011) identifies that the TEC is restricted in geographic distribution to the Sydney Basin Bioregion and was estimated to have an extant area of approximately 11,054 ha (±1,564

BAM Section 9.1.1 Additional Impact Assessment Provisions Criteria	Response
	ha) according to mapping by (Tozer 2003), which covered the Cumberland Plain. This is reported by the final determination as being a reduction from the 'pre-European distribution' by 8.8% (±1.2%) suggesting the pre-European distribution of the community to cover approximately 125,613 ha. Cumberland Plain Woodland is also associated with a targeted recovery plan for the Cumberland Plain that was prepared by the Department of Environment, Climate Change and Water (DECCW) in 2011 (DECCW 2011). This document is the currently accepted standard for the retention and recovery of TECs in the Cumberland Plain. Table 2 of the recovery plan displays an estimated current total of Cumberland Plain Woodland of 24,530 ha, however, it is reported that a small portion of this total does not meet the listing criteria for the TEC. The same table also estimates the 'pre-1750 (ha)' total of the community at 125,449 ha being a reduction in area to current levels of approximately 19.5%. Of the current total area, the recovery plan reports approximately 967 ha identified as occurring within reserves. According to the Threatened Ecological Communities Greater Sydney mapping dataset (DPIE 2021), the current extent of Cumberland Plain Woodland in NSW is approximately 21,951 ha. This mapping dataset has been derived from the extraction of relevant vegetation map units contained in a variety of existing vegetation mapping projects held by DCCEEW and expert input. However, it is noted that the dataset acknowledges that one of the limitations of the dataset is that areas

BAM Section 9.1.1 Additional Impact Assessment Provisions Criteria	Response
	identified as TEC may be a different TEC. The extent of this mapping in relation to the subject land and study area is shown in **Figure 13**. Following a review of the above information for the extent of Cumberland Plain Woodland, both current and prior to European settlement, it is clear there is some variation in area calculations. Therefore, the total current area of the community is likely to be in the middle of these areas. It is noted however, that it is unanimously accepted by all sources that the community has suffered extensive clearing to a level that the community requires significant external intervention to maintain and recover the community within the Sydney Basin Bioregion. The estimated reduction in the geographic extent of Cumberland Plain Woodland since 1970 is not available in the TBDC, BioNet Vegetation Classification Database, the final determination or the recovery plan, and was not identified from a search of available literature. Nonetheless, the pre-European extent of Cumberland Plain Woodland is listed as approximately 125,449 ha within the Cumberland Plain Recovery Plan (DECCW 2011). No published data was found in the literature on the 1970 extent of Cumberland Plain Woodland and an accurate estimate of the reduction in distribution between the current extent and the 1970 geographic extent cannot be provided.

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
(b)	The extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by: Change in community structure Change in species composition Disruption of ecological processes Invasion and establishment of exotic species Degradation of habitat; and Fragmentation of habitat	According to the Final Determination for Cumberland Plain Woodland (NSW Scientific Committee 2011), there has been a very large reduction in the ecological function of the community through processes such as: • Extensive removal of large old trees; • Tree-felling for crops and pastures; • Fragmentation of habitat; • Grazing by livestock and rabbits; • Modification of understory, to be dominated by woody exotic species; • Soil chemical and structural modification associated with agricultural uses; • Changes in frequency of fire regimes; • Prevention of recruitment of species, through continued under-scrubbing and mowing; and • Reduction of understorey complexity, through the reduction of native shrub cover, resulting in degradation of habitat.
(c)	Evidence of restricted geographic distribution (Principle 3, clause 6.7(2)(c) BC Regulation), based on the TEC's geographic range in NSW according to the: • extent of occurrence • area of occupancy, and • number of threat defined locations	Paragraph 11 of the NSW Scientific Final Determination for Cumberland Plain Woodland (NSW Scientific Committee 2011) notes that the community is restricted in geographic distribution to the Sydney Basin Bioregion, however it is noted that this is based on an estimated extant area of 2,810 km2, which was established from outdated mapping undertaken by (Tozer 2003).

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
		Based on current available information it is estimated that the current area of occupancy is between approximately 11,000 ha and 25,000 ha according to resources reviewed for Criteria 2(a). No threat defined locations are specifically identified in the TBDC, however the ecological community is critically endangered across its range. According to the Final Determination (NSW Scientific Committee 2011), small, protected areas of the community exist in reserves such as Kemps Creek, Mulgoa and Windsor Downs, Scheyville National Park, and Leacock, Rouse Hill and Western Sydney Regional Parks.
(d)	Evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation)	This principle is not identified as applicable to BDARs. The TEC does respond to management, with several successful management measures outlined in the Best Practice Guidelines for Cumberland Plain Woodland (DEC 2005).
3	Where the TBDC indicates that data is 'unknown' or 'data deficient' for a TEC for a criterion listed in Section 9.1.1(2), the assessor must record this in the BDAR.	Not applicable.
4 (a)	The impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal: in hectares; and as a percentage of the current geographic extent of the TEC in NSW	The proposal will remove approximately 0.04 canopy only, 0.02ha mown, 0.05ha exotic ground Cumberland Plain Woodland at this stage of the project and will remove 0.1ha of understorey only of the exotic ground Cumberland Plain Woodland. The extent of the TEC in NSW differs depending on the information source. Based on a review of vegetation mapping layers, the estimated

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
		geographic extent in NSW varies between approximately 11,000 ha and 25,000 ha according to resources reviewed for *BAM Section Criteria 2. a)*. Based on the existing literature, the lowest number quoted for the estimated geographic extent of Cumberland Plain Woodland is 11,054 ha (NSW Scientific Committee 2011). Based on the lower of the numbers outlined above, the extent of Cumberland Plain Woodland to be impacted by the project at this stage is less than 0.0019% of the current geographic extent of the TEC in NSW.
(b)	The extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by:	-
	Estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500m of the development footprint or equivalent area for other types of proposals	The project is not likely to significantly increase fragmentation or isolation of an important area of the TEC, as it requires minor clearing of a modified patch of this community. While the removal of PCT 3320 from within the subject land will result in a slight reduction in the overall size of the stepping stone 'patches' of Cumberland Plain Woodland extending from the study area into the subject land, it will not result in an increase in fragmentation of the TEC or lead to further isolation of patches of the TEC.

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
		Based on the TEC Greater Sydney mapping (DPIE 2021), there are no occurrences of Cumberland Plain Woodland (or PCT 3320) within 500m of the subject land, outside of the study area. Therefore, the removal of 0.21 ha represents approximately 6.9% of the occurrence of the TEC within the locality of the study area.
(c)	Describing the impacts on connectivity and fragmentation of the remaining areas of the TEC measures by:	
	Distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and	The removal of Cumberland Plain Woodland within the subject land will result in minor fragmentation of the locally occurring patch of native vegetation which will remain connected across the study area and wider locality.
	Estimated maximum dispersal distance for native flora species characteristic of the TEC, and	The main dispersal mechanisms for flora species associated with Cumberland Plain Woodland include one or a combination of the following: • Animals, • Wind, • Water runoff, and • Gravity. Eucalypts within the community are likely to rely on animal assisted dispersal by highly mobile vertebrate pollinators (birds and bats) which disperse pollen over large areas when foraging (Southerton et al. 2003). The maximum dispersal distance for native flora species characteristic of the community is estimated to be at least 1000 m and potentially much further.

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
		Although the patch of native vegetation will be fragmented, this will be minor, and the dispersal distances will not increase as a result of the project. It has also been proposed that the landscape street planting will use canopy species diagnostic of Cumberland Plain Woodland, and so the fragmentation will only be short term.
	Other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development	The areas of PCT 3320 within the subject land occur remnant native trees over a mown or an exotic dominated understorey. The change in the area to perimeter ratio of Cumberland Plain Woodland as a result of the development is negligible, considering only trees along the edge of the TEC are being removed in the subject land. As the proposed landscaping works will improve the current connectivity between the PCT 3320 in the subject land and Cumberland Plain Woodland in the conservation area, the proposed revegetation works will also improve the area to perimeter ratios for the overall PCT 3320/Cumberland Plain Woodland 'patch'.
	Describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone (s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone.	The occurrence of PCT 3320 within the subject land corresponds to three vegetation zones – canopy only, mown and exotic ground. As per the BAM plot data, the calculated integrity scores are: Canopy Only: The vegetation integrity score is: 23.4 The composition score is: 5.6 The structure score is: 52.4

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
		The function score is: 43.9 Mown: The vegetation integrity score is: 54.6 The composition score is: 35.6 The structure score is: 78.4 The function score is: 58.3 Exotic Ground: The vegetation integrity score is: 54.2 The composition score is: 29.2 The structure score is: 76.2 The function score is: 74.9
5	The assessor may also provide new information that demonstrates that the principle identifying that the TEC is at risk of an SAII is not accurate.	Not applicable.

9.3. Impacts that Require an Offset

9.3.1. Native Vegetation

In accordance with the BAM, the project requires offsets for the clearing of native vegetation as the following criteria is met:

- A vegetation zone that has a vegetation integrity score ≥15 where the PCT is representative of an EEC or CEEC.

The PCT and vegetation zone requiring offsets is documented in **Table 24**. This area is mapped in **Figure 15**. Credit reports are provided in **Appendix C**.

Table 24 Summary of impact to native vegetation requiring an offset

Zone	PCT	PCT Name	MZ	Area (ha)	VI Score Loss	Credits
1	3320	Cumberland Plain Shales Woodland (Canopy Only)	MZ1	0.04	-23.4	1
2	3320	Cumberland Plain Shales Woodland (Mown)	MZ1	0.02	-54.6	1
3	3320	Cumberland Plain Shales Woodland (Exotic Ground)	MZ1	0.05	-54.4	4
			MZ2	0.10	-29.3	

9.3.2. Threatened Species

In accordance with the BAM, the project requires offsets for the clearing of species credit species habitat. The species credit species habitat requiring offsets is documented in **Table 25** and the areas subject to threatened species offsetting is shown in **Figure 15**

Table 25 Summary of impacts to threatened species requiring an offset

Scientific Name	Common Name	Vegetation Zones	Biodiversity Risk Weighting	Area (ha)
Acacia pubescens	Downy Wattle	3320_Exotic Ground	2	0.15

9.4. Impacts that do not Require an Offset

Impacts on planted native vegetation do not require offsets as the planted native vegetation has been assessed utilising the streamlined assessment module for planted native vegetation outlined in Section D.1 of Appendix D of the BAM (see ***Section 4.3.1***). Measures recommended to mitigate impacts on native fauna (including threatened species) are detailed in ***Section 8.7-8.8***.

MZ3 does not require an offset because the vegetation within it is to be totally retained and managed under a VMP, to restore and enhance the Cumberland Plain Woodland within this management zone. MZ3 within the subject land occupies an area of 0.03ha, as shown in **Figure 15**.

9.5. Impacts that do not Require Further Assessment

Impacts to areas identified as exotic vegetation, exotic dominated grassland and cleared land within the subject land do not require further assessment. This occupies 1.6 ha within the subject land and is shown in **Figure 15**.

9.6. Application of the No Net Loss Standard

The BAM sets a standard that will result in no net loss of biodiversity values where the impacts on biodiversity values are avoided, minimised and mitigated, and all residual impacts are offset by retirement of the required number of biodiversity credits.

The ecosystem credit requirement for the project is summarised in **Table 26**, whilst the 'like for like' offsetting options for the ecosystem credits are provided in **Table 27**. The species credit requirement for the project is summarised in **Table 28**.

A credit summary report from the BAM-C has been included in **Appendix C**.

Table 26 Summary of ecosystem credit liability

Zone	Vegetation Zone Name	Sensitivity to Gain	Area (ha)	Credits Required
1	3320_Canopy	High sensitivity to potential gain	0.04	1
2	3320_Mown	High sensitivity to potential gain	0.02	1
3	3320_ExoticGround	High sensitivity to potential gain	0.15	4

Table 27 Like for like offsetting options for PCT 3320

TEC	Containing Hollow-bearing Trees?	In the below IBRA Subregions	Credits
Cumberland Plain Woodland in the Sydney Basin Bioregion. This includes PCTS 3320 and 3319	No	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	1
Cumberland Plain Woodland in the Sydney Basin Bioregion. This includes PCTS 3320 and 3319	Yes	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	1

TEC	Containing Hollow-bearing Trees?	In the below IBRA Subregions	Credits
Cumberland Plain Woodland in the Sydney Basin Bioregion. This includes PCTS 3320 and 3319	Yes	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	4

Table 28 Summary of the species credit liability

Scientific Name	Common Name	Area (ha)	Credits Required
Acacia pubsecens	Downy Wattle	0.15	2

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APPENDIX A :
BAM Compliance Table

Table 29 BAM Compliance

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
Introduction	Information		
	Introduction to the biodiversity assessment including:		
	identification of development/biodiversity stewardship site footprint, including: operational footprint construction footprint indicating clearing associated with temporary construction facilities and infrastructure		Section 1.3.3
	general description of development/biodiversity stewardship site		Section 1.3.4
	sources of information used in the assessment, including reports and spatial data.		Section 1.4, Section 2.1
	Maps and Data		
	Site Map (as described in Section 4.2)		Figure 2
	Location Map (as described in Section 4.2)		Figure 3
	Digital shape files for all maps and spatial data		To be provided in BOAMs or email
Landscape Features	Information		
	Identification of landscape features at the development/biodiversity stewardship site, including:		

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	IBRA bioregions and subregions, NSW landscape region and area (ha)	Subject land area (ha) IBRA bioregions and subregions BioNet NSW Landscapes	Figure 2
	native vegetation extent in the buffer area		Figure 2
	cleared areas	Cleared areas	Figure 3
	evidence to support differences between mapped vegetation extent and aerial imagery		N/A
	rivers and streams classified according to stream order	Rivers, streams and estuaries	Section 3.2.2, Figure 3
	wetlands within, adjacent to and downstream of the site	Wetlands within, adjacent to and downstream of the site	Section 3.2.3. Figure 3
	connectivity features	Connectivity of areas of habitat including areas identified as priority investment areas, flyways for migratory species	Section 3.2.4
	areas of geological significance and soil hazard features	Areas of geological significance and soil hazard features	Section 3.2.5, Section 3.2.8
		Areas of Outstanding Biodiversity Value	Section 3.2.6
	site context components, including: identification of method applied (i.e. linear or site-based) percent native vegetation cover in the landscape (development site and biodiversity stewardship site).	Percent native vegetation cover including: buffer area justification to support differences between aerial imagery used for the assessment and final mapped native vegetation cover.	Section 3.3
	Maps and Data		

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	IBRA bioregions and subregions (as described in Paragraphs 4.2.1.3–4.2.1.4)	IBRA bioregions and subregions	Figures 2 and 3
	NSW landscape regions (as described in Paragraph 4.2.1.5)	BioNet NSW landscapes	Figures 2 and 3
	Rivers and streams (as described in Paragraph 4.2.1.6)	Rivers, streams (using Strahler stream ordering) and estuaries	Figure 3
	Wetlands (as described in Paragraph 4.2.1.7)	Wetlands	Figure 3
	Connectivity of different areas of habitat (as described in Paragraphs 4.2.1.8–4.2.1.11)	Connectivity	Figure 2 and 3
	Areas of geological significance and soil hazard features (as described in Paragraphs 4.2.1.12–4.2.1.15)	Areas of geological significance and soil hazards	Figures 2 and 3
	Native vegetation extent (as described in Subsection 4.3.2)	Native vegetation cover	Figure 3
		Boundary of the subject land	Figure 2
		Areas of Outstanding Biodiversity Value	Not applicable – See Section 3.2.6
Native Vegetation	Information		
	Identify native vegetation extent within the development/biodiversity stewardship site, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery.	Native vegetation cover on subject land and justification to support differences between mapped native vegetation cover and aerial imagery.	Section 4.1 and Figure 8

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Describe PCTs within the development/biodiversity stewardship site, including:	PCTs within the subject land, including:	Section 4.2
	vegetation class	vegetation class	Section 4.2
	vegetation type	vegetation type (i.e. PCT names and ID numbers)	Section 4.2
	area (ha) for each vegetation type	area (ha)	Table 5
	species relied upon for identification of vegetation type and relative abundance	species relied upon for identification of vegetation type and relative abundance	Section 4.2.1.2
	justification of evidence used to identify a PCT (as outlined in Paragraph 5.2.1.12)	evidence and justification of decision pathway used in identification of PCT (e.g. vegetation structure and landscape position/geomorphology).	Table 6, Section 4.2.1.2
	TEC status (as outlined in Paragraphs 5.2.1.14–5.2.1.15)	TEC status	Section 4.4
	estimate of percent cleared value of PCT (as outlined in Paragraph 5.2.1.16)	estimate of percent cleared value of the PCT (available in the BioNet Vegetation Classification)	Section 4.2
	Perform a vegetation integrity assessment of the development/biodiversity stewardship site, including:	Vegetation integrity assessment of the subject land, including:	Section 4.5
	mapping vegetation zones (Subsection 5.3.1)	description of vegetation zones within the subject land with justification for assigning vegetation zones to PCTs area (ha) of each vegetation zone	Section 4.2 and Figure 11

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	patch size (development site and biodiversity stewardship site)	patch size for each vegetation zone	Table 5 and Figures 2 and 3
	assessing vegetation integrity using benchmark data (Subsection 5.3.3)		N/A
	survey effort as described in Subsection 5.3.4 (number of plots)	survey effort	Section 2.3, Table 2
	determining the vegetation integrity score (Appendix 6): composition condition score structure condition score function condition score vegetation integrity score.	composition, structure, function and vegetation integrity condition scores.	Section 4.5, Table 8
		Where use of local data is proposed, identify: source of information for local benchmark data justification of use of local data in preference to database values.	
	Maps and Data		
	Map of native vegetation extent within the development/biodiversity stewardship site (as described in Section 5.1)	Native vegetation extent within the subject land.	Figure 8
	Map of PCTs within the development/biodiversity stewardship site (as described in Section 5.2)	Distribution of PCTs within the subject land.	Figure 9

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Map of plot locations relative to PCTs	Plot locations relative to PCTs including GPS coordinates (GDS zone, eastings, northings and bearings)	Figure 6
	Map of TECs	TECs on the subject land	Figure 10
	Plot field data (MS Excel format)		To be provided in BOAMs or email
	Plot field data sheets	Plot field data and sheets	Collected in Survey123 application so no datasheets available
		Vegetation zones	
	Patch size of intact native vegetation (as described in Subsection 5.3.2)	Patch size of intact native vegetation	Table 5 and Figures 2 and 3
	Table of current vegetation integrity scores for each vegetation zone within the development/biodiversity stewardship site.	Table of vegetation integrity scores for each vegetation zone within the subject land	Table 9
Threatened Species	Information		
	Identify ecosystem credit species associated with PCTs on both the development site and biodiversity stewardship site as outlined in Section 6.2, including:		
	list of species derived	List of predicted ecosystem credit species associated with PCTs on the subject land	Section 5.2
	justification for exclusion of any ecosystem credit species predicted above.	Justification for exclusion of any ecosystem credit species predicted above	Section 5.2.2

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Identify species credit species on both the development site and the biodiversity stewardship site as outlined in Sections 6.3 to 6.5, including:	Identify species credit species on the subject land, including:	
	list of candidate species	list of candidate species assessed	Section 5.3
	justification for inclusions and exclusions based on habitat features	justification for inclusions and exclusions of any species credit species predicted above based on habitat features, or vagrancy	Section 5.3.2
	indication of presence based on targeted survey or expert report	indication of presence based on targeted survey or expert report (see below)	Section 5.4.1 and Section 5.4.2
	details of targeted survey technique, effort, timing and weather	details of targeted survey including technique, effort, timing and weather	Chapter 2
	species polygons	species polygons	Figure 12
	biodiversity risk weighting for the species	biodiversity risk weighting for the species	Table 13
		area of suitable habitat or number of individuals counted	Section 5.4.3
	threatened species survey		Chapter 2
	additional requirements for wind farm developments.		N/A
	Where use of local data is proposed:	Where use of local data is proposed:	N/A
	identify relevant species	identify relevant species or population	N/A
	identify aspect of species data		N/A
	identify source of information for local data	identify source of information for local data	N/A

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	justify use of local data in preference to database values.	justify use of local data in preference to database values.	N/A
	Where expert reports are used in place of targeted survey:	Where expert reports are used in place of targeted survey:	
	identify the relevant species	identify the relevant species or population	N/A
	justify the use of an expert report	justify the use of an expert report	N/A
	indicate and justify the likelihood of presence of the species and information considered in making this assessment	flag the likely presence of the species or population and the evidence to support this assessment including all information considered	N/A
	estimate the number of individuals or area of habitat (whichever unit of measurement applies to the species/individual) for the development site or biodiversity stewardship site, including a description of how the estimate was made	estimate the number of individuals or area of suitable habitat, including a description of how the estimates were made (e.g. reference populations, past reports)	N/A
	identify the expert and provide evidence of their expert credentials.	identify the expert and provide evidence of their expert credentials.	N/A
		Identify potential prescribed biodiversity impacts on threatened species.	N/A
	Maps and Data		
	Table of habitats or habitat components and their sensitivity classes	Table of habitats or habitat components and their sensitivity classes.	N/A

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Table detailing the list of species credit species and presence status on site as determined by targeted survey, indicating also where presence was assumed and/or where presence was determined by expert report	Table detailing the list of species credit species; presence on subject land as determined by targeted survey, indicating where presence is assumed or by expert report.	N/A
		Mapped targeted survey locations including GPS coordinates of survey sites.	Figure 6
	Species credit species polygons (as described in Paragraph 6.4.1.33)	Species credit species polygons including GPS locations of any individuals counted.	Figure 12
	Table detailing species and habitat feature/component associated with species and its abundance on site (as described in Paragraph 6.4.1.34)	Table detailing species habitat features associated with the species and its location (GPS coordinates) and abundance on the subject land.	Table 14
	Table detailing biodiversity risk weighting for species on site (as described in Section 6.6)	Table detailing biodiversity risk weighting for species credit species on the subject land.	Table 13
		Map location of prescribed biodiversity impacts on the subject land	Figure 13
	For wind farm developments: maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site	For wind farm developments, maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species and raptor species resident on site.	N/A

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
Avoid and Minimise Impacts	Information		
	Demonstration of efforts to avoid and minimise impact on biodiversity values in accordance with Chapter 8.	Demonstration of efforts to avoid or minimise impacts on native vegetation, threatened species habitat and prescribed impacts during project planning including: 1. locating the project – options considered (including maps and why they were not feasible/suitable) analyses associated with alternative options (e.g. routes, locations, sites within the property, constraints) justification for selecting proposed location 2. designing the project – temporary and permanent ancillary construction and maintenance facilities required for the proposal options for avoiding these features (e.g. alternative locations, engineering solutions, modes of technology, constraints) justification for selecting proposed location measures taken to minimise impacts long-term management of areas avoided.	Chapter 7

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Assessment of direct and indirect impacts unable to be avoided at the development site in accordance with Sections 9.1 and 9.2. The assessment would include but not be limited to: type, frequency, intensity, duration and consequence of impact.	Determination of the impacts on native vegetation and threatened species habitat including: describing impacts of clearing describing the nature, extent, frequency, duration and timing of indirect and prescribed impacts including during construction and operation phases, on adjacent vegetation	Chapter 8
		calculating the change in VI score and habitat suitability	Section 8.2
		describing impacts that are uncertain and their management/mitigation	Section 8.8
		evaluating consequences of indirect and prescribed impacts	Section 8.3 and Section 8.4
		documenting limitations to data, assumptions and predictions.	N/A
	For major projects: details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (Section 9.4).		N/A
	Maps and Data		
	Table of measures to be implemented before, during and after construction to avoid and minimise the	Table of biodiversity mitigation measures to be implemented before, during and after construction to avoid and minimise the	Table 22

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	impacts of the project, including action, outcome, timing and responsibility	impacts of the project, including action, outcome, timing and responsibility. Unique identifiers (e.g. BIO01) should be included for tracking through management plans and compliance auditing.	
		Map of alternative locations or sites within the development site that were considered when locating and designing the project including constraints to the final selection.	N/A
	Map of final project footprint, including construction and operation	Map of the final development site footprint, including demarcation of any prescribed impacts and measures to minimise impacts.	Figure 15
		Showing the areas of biodiversity value on the site map of where impact has been avoided will assist in demonstrating the reasonable measures that the proponent has taken to avoid and minimise impacts.	Figure 15
	Maps demonstrating indirect impact zones where applicable	Map of sites within the subject land likely to be impacted by direct, indirect and prescribed impacts where applicable.	Figure 15
Impact Summary	Information		
		Identification of impacts:	
	Identification and an assessment of the impacts which are potential serious and irreversible impacts, in	on entities at risk of a serious and irreversible impact (SAII), including addressing the	Section 9.2

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	accordance with Subsections 10.2.2 for impacts on CEECs and 10.2.3 for threatened species.	assessment criteria in Subsection 10.2.2 (TECs) and 10.2.3 (species) of the BAM All relevant information required by the consent authority to determine whether the proposed impact is serious and irreversible including: clear documentation of the sources of information where confidence in the information provided is low or of questionable reliability how proposed additional measures will contribute to the recovery of the entity where information is not available, for example where impact thresholds for the entity have not been provided.	
	Identification of impacts requiring offset in accordance with Section 10.3.	requiring offsets	Section 9.3
	Identification of impacts not requiring offset in accordance with Paragraph 10.3.2.2.	not requiring offsets	Section 9.4
	Identification of areas not requiring assessment in accordance with Section 10.4.	not requiring further assessment.	Section 9.5
	Maps and Data		
		Mapped locations:	

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Map showing the location of serious and irreversible impacts	that support an entity at risk of a serious and irreversible impact (SAII)	Figure 14
	Map of impacts requiring offset	where offsets are required	Figure 15
	Map of impacts not requiring offset	where offsets are not required, and	Figure 15
	Map of areas not requiring assessment	where no further assessment is required.	Figure 15
		Maps illustrating the extent of a TEC or species distribution and any other data used to address the assessment criteria for an entity at risk of an SAII.	Figure 14
Impact Summary	Information		

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
		The assessor is required to report on:	
	Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:		
	future vegetation integrity score for each vegetation zone at the development site (Equations 17 and 18 in Appendix 6)		Table 19

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	change in vegetation integrity score (Subsection 9.1.3)		Table 24
		the biodiversity risk weighting (BRW) for each ecosystem and species credit requirement generated	Table 25
	number of required ecosystem credits for the impact of development on each vegetation zone at a development site (Subsection 11.2.3)	the number of ecosystem credits for each PCT/TEC	Table 26
	number of required species credits for each threatened species that is impacted on by development (Subsection 11.2.4).	the number of species credits for each species credit species impacted by the proposal	Table 28
	Maps and Data		
	Table of PCTs requiring offset and the number of ecosystem credits required		Table 22
	Table of threatened species requiring offset and the number of species credits required		N/A
	Submitted proposal in the Credit Calculator	All digital data must be submitted using the Upload Files function in BOAMS: digital shape files for all maps and spatial data completion of all required data fields in BOAMS and the BAM-C. Finalised case in the BAM-C (can be returned to assessor for editing).	To be submitted in BOAMs

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
Biodiversity Credit Report	Information		
	Credit classes for ecosystem credits and species credits at the development site.	biodiversity credit report from the BAM-C, which defines the number and class of ecosystem and species credits from the proposed impact.	Appendix C
	Maps and Data		
	Table of credit class and matching credit profile		Table 26, Table 27 and Table 28

APPENDIX B :
Flora List

Table 30 Flora species recorded within the study area

Scientific Name	Common Name	Exotic
Acacia decurrens	Black Wattle	
Acacia implexa	Hickory Wattle	
Allocasuarina littoralis	Black She-Oak	
Anredera cordifolia	Madeira Vine	*
Araujia sericifera	Moth Vine	*
Arctotheca calendula	Capeweed	*
Aristida vagans	Threeawn Speargrass	
Arthropodium sp. South-east Highlands		
Asparagus aethiopicus	Asparagus Fern	*
Asparagus asparagoides	Bridal Creeper	*
Bidens pilosa	Cobbler's Pegs	*
Bothriochloa decipiens var. decipiens	Pitted Bluegrass	
Brassica fruticulosa	Twiggy Turnip	*
Briza maxima	Quaking Grass	*
Briza minor	Shivery Grass	*
Briza subaristata		*
Bromus catharticus	Praire Grass	*
Brunoniella australis	Blue Trumpet	
Bursaria spinosa	Native Blackthorn	
Caesia parviflora var. parviflora		
Capsella bursa-pastoris	Shepherd's Purse	*
Cardamine hirsuta	Common Bittercress	*
Cenchrus clandestinus	Kikuyu Grass	*
Cerastium glomeratum	Mouse-ear Chickweed	*
Cheilanthes sieberi subsp. sieberi	Rock Fern	
Cirsium vulgare	Spear Thistle	*
Clematis glycinoides	Headache Vine	
Conyza bonariensis	Flaxleaf Fleabane	*
Conyza sumatrensis	Tall fleabane	*
Cotula australis	Common Cotula	
Crassula sieberiana	Australian Stonecrop	
Cynodon dactylon var. dactylon	Common Couch	
Cyperus eragrostis	Umbrella Sedge	*
Cyperus gracilis	Slender Flat-sedge	

Scientific Name	Common Name	Exotic
Davidsonia johnsonii	Smooth Davidson's Plum	
Daviesia ulicifolia	Gorse Bitter Pea	
Dianella caerulea var. caerulea		
Dianella caerulea var. producta		
Dianella longifolia	Blueberry Lily	
Dichondra repens	Kidney Weed	
Digitaria parviflora	Small-flowered Finger Grass	
Ehrharta erecta	Panic Veldtgrass	*
Ehrharta longiflora	Annual Veldtgrass	*
Einadia trigonos	Fishweed	
Entolasia marginata	Bordered Panic	
Eragrostis curvula	African Lovegrass	*
Eragrostis leptostachya	Paddock Lovegrass	
Eucalyptus amplifolia subsp. amplifolia		
Eucalyptus crebra	Narrow-leaved Ironbark	
Eucalyptus moluccana	Grey Box	
Eucalyptus tereticornis	Forest Red Gum	
Exocarpos cupressiformis	Cherry Ballart	
Fumaria muralis	Wall Fumitory	*
Gahnia aspera	Rough Saw-sedge	
Gamochaeta americana	Purple Cudweed	*
Glycine clandestina	Twining glycine	
Glycine microphylla	Small-leaf Glycine	
Glycine tabacina	Variable Glycine	
Gomphrena celosioides	Gomphrena Weed	*
Hardenbergia violacea	False Sarsaparilla	
Hibbertia aspera	Rough Guinea Flower	
Hypochaeris radicata	Catsear	*
Indigofera australis	Australian Indigo	
Lactuca serriola	Prickly Lettuce	*
Lepidosperma laterale	Variable Sword-sedge	
Leucopogon juniperinus	Prickly Beard-heath	
Lobelia purpurascens	whiteroot	
Lolium perenne	Perennial Ryegrass	*
Lomandra filiformis subsp. coriacea	Wattle Matt-rush	

Scientific Name	Common Name	Exotic
Lomandra filiformis subsp. filiformis		
Lomandra multiflora subsp. multiflora	Many-flowered Mat-rush	
Lotus uliginosus	Birds-foot Trefoil	*
Lysimachia arvensis	Scarlet Pimpernel	*
Malva parviflora	Small-flowered Mallow	*
Medicago minima	Woolly Burr Medic	*
Medicago polymorpha	Burr Medic	*
Megathyrsus maximus		*
Melaleuca nodosa		
Microlaena stipoides var. stipoides	Weeping Grass	
Modiola caroliniana	Red-flowered Mallow	*
Notelaea longifolia f. longifolia		
Nothoscordum gracile	Onion Weed	*
Ochna serrulata	Mickey Mouse Plant	*
Olea europaea subsp. cuspidata	African Olive	*
Olearia viscidula	Wallaby Weed	
Oxalis perennans		
Ozothamnus diosmifolius	White Dogwood	
Paronychia brasiliana	Chilean Whitlow Wort, Brazilian Whitlow	*
Parsonsia straminea	Common Silkpod	
Paspalidium distans		
Paspalum dilatatum	Paspalum	*
Plantago lanceolata	Lamb's Tongues	*
Poa annua	Winter Grass	*
Poranthera microphylla	Small Poranthera	
Ranunculus sceleratus	Celery Buttercup	*
Rytidosperma racemosum	Wallaby Grass	
Senecio madagascariensis	Fireweed	*
Setaria parviflora		*
Sida rhombifolia	Paddy's Lucerne	*
Solanum nigrum	Black-berry Nightshade	*
Solanum prinophyllum	Forest Nightshade	
Solanum sisymbriifolium		*
Soliva sessilis	Bindyi	*
Sonchus asper	Prickly Sowthistle	*

Scientific Name	Common Name	Exotic
Sonchus oleraceus	Common Sowthistle	*
Sporobolus africanus	Parramatta Grass	*
Stachys arvensis	Stagger Weed	*
Stellaria media	Common Chickweed	*
Taraxacum officinale	Dandelion	*
Themeda triandra		
Trifolium repens	White Clover	*
Verbena bonariensis	Purpletop	*
Vernonia cinerea var. cinerea		*
Veronica arvensis	Wall Speedwell	*
Veronica plebeia	Trailing Speedwell	
Vulpia bromoides	Squirrel Tail Fesque	*
Wahlenbergia communis	Tufted Bluebell	
Wahlenbergia gracilis	Sprawling Bluebell	
Zieria smithii	Sandfly Zieria	

APPENDIX C :
BAM Credit Reports

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00053158/BAAS19052/24/00053159		28/10/2024
Assessor Name	Report Created	BAM Data version *
Cecilia Eriksson Pinatacan	19/12/2024	Current classification (live - default) (80)
Assessor Number	BAM Case Status	Date Finalised
BAAS19052	Finalised	19/12/2024
Assessment Revision	BOS entry trigger	Assessment Type
0	BOS Threshold: Biodiversity Values Map	Part 4 Developments (Small Area)

* 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 SAII	Ecosystem credits
Cumberland Shale Plains Woodland												
1	3320_ExoticGround	Cumberland Plain Woodland in the Sydney Basin Bioregion	54.2	31.2	0.18	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	4

2	3320_Canopy	Cumberland Plain Woodland in the Sydney Basin Bioregion	23.4	23.4	0.04	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1
3	3320_Mown	Cumberland Plain Woodland in the Sydney Basin Bioregion	54.6	36.4	0.03	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1
											Subtotal	**6**
											Total	**6**

Species credits for threatened species

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 SAII	Species credits
Acacia pubescens / Downy Wattle (Flora)									
3320_ExoticGround	31.2	31.2	0.15	Rate of decline	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	2
								Subtotal	**2**

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00053158/BAAS19052/24/00053159

Proposal Name

BAM data last updated *
28/10/2024

Assessor Name
Cecilia Eriksson Pinatacan

Assessor Number
BAAS19052

BAM Data version *
Current classification (live - default) (80)

Proponent Names

Report Created
19/12/2024

BAM Case Status
Finalised

Assessment Revision
0

BOS entry trigger
BOS Threshold: Biodiversity Values Map

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
19/12/2024

* 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.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Cumberland Plain Woodland in the Sydney Basin Bioregion	Critically Endangered Ecological Community	3320-Cumberland Shale Plains Woodland

Species
Nil

BAM Biodiversity Credit Report (Like for like)

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3320-Cumberland Shale Plains Woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	0.3	5	1	6

BAM Biodiversity Credit Report (Like for like)

3320-Cumberland Shale Plains Woodland	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 3319, 3320	-	3320_ExoticGround	Yes	4	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 3319, 3320	-	3320_Canopy	No	1	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 3319, 3320	-	3320_Mown	Yes	1	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Acacia pubescens / Downy Wattle	**3320_ExoticGround**	0.2	2.00

BAM Biodiversity Credit Report (Like for like)

Credit Retirement Options

Like-for-like credit retirement options

Acacia pubescens / Downy Wattle	Spp	IBRA subregion
	Acacia pubescens / Downy Wattle	Any in NSW

FIGURES

Stage No.	No. of Superlots Lots	No. of Residential Lots	No. of Public/Drainage Reserve Lots	Stage Area (m²)
Stage 1	0	16	0	6030
Stage 2	0	11	0	4690
Stage 3	10	135	2	61674
Stage 4	2	19	1	15108
Stage 5	9	96	0	35176
Stage 6	9	105	1	40385
Commercial	1	0	0	33340

WARNING
BEWARE OF UNDERGROUND SERVICES
The location of underground services are approximate only and their exact position should be proven on site.
No guarantee is given that all existing services are shown.
Locate all underground services before commencement of works.
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REV	DESCRIPTION	DATE	DRN	APP
E	STAGE 4 & 5 BOUNDARY MODIFIED	13.06.24	S.G.	S.G.
D	LAYOUT MODIFIED	23.09.24	S.G.	S.G.
C	STAGE 1 BOUNDARIES	31.01.24	S.G.	S.G.
B	STAGE 1 LARTI UPDATED	22.01.24	S.G.	S.G.
A	ISSUED FOR INFORMATION	19.12.23	S.G.	S.G.
G	REVISED STAGING ADDITION OF COMMERCIAL AREA	29.08.24	AK	S.G.
F	REVISED STAGING ADDITION OF STAGE 6	26.08.24	AK	S.G.

mirvac

SCALE 1:2000 AT A1 SIZE

Designed S. GRAY
Date 19.01.2024
Drawn D. HILL
Approved N/A
Date N/A
DA Number N/A

Beveridge Williams
Development & Infrastructure Consultants
32 Islander Street
Campbelltown, NSW 2560
ph: 02 4626 5055
www.beveridgewilliams.com.au

Project Details: WSU MILPERRA
2 BULLECOURT AVE, MILPERRA
CANTERBURY-BANKSTOWN COUNCIL

Drawing Title: STAGING PLAN

Sheet 01 of 01
Scale 1:2000 @ A1
Project Number 2301879 | Reference 302 | Drawing No. 010 | Revision G

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Figure 1. The WSU Milperra Campus redevelopment masterplan

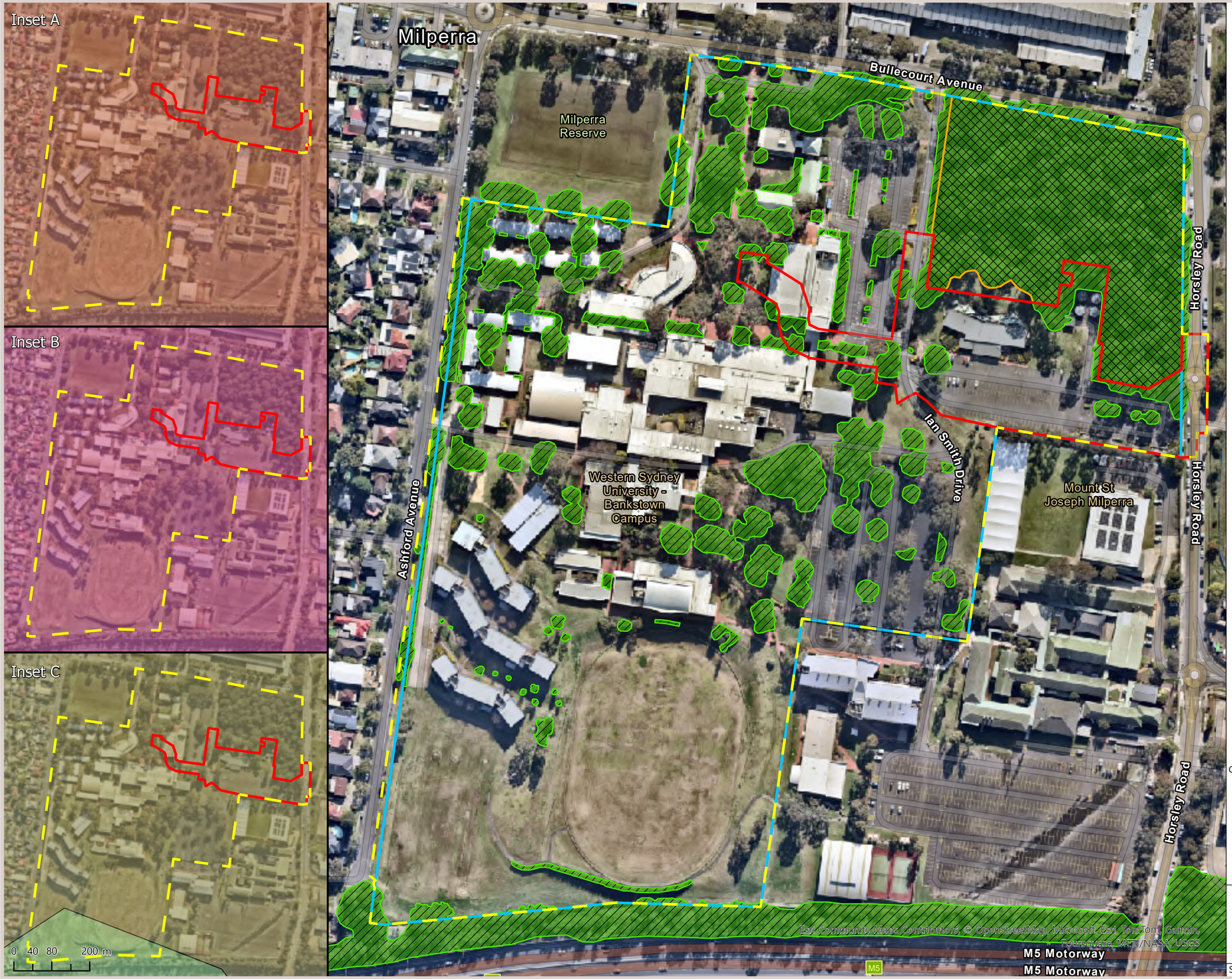

Figure 2. Site map

Inset A

Inset B

Inset C

0 200 400 900 m

Legend

- Subject Land
- Study Area
- Assessment Area (1500 m)
- Native Vegetation Cover
- Patch Size Class: >100 ha
- Riparian Corridor
- Local Wetlands and Waterbodies

Watercourses

- 1st Order Stream
- 2nd Order Stream

Inset A: IBRA Region

- Sydney Basin

Inset B: IBRA Subregion

- Cumberland
- Sydney Cataract

Inset C: Mitchell Landscape

- Ashfield Plains
- Georges River Alluvial Plain
- Woronora Plateau

Image Source: Nearmap © (2024) Dated: 22/07/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services
Interim Biogeographic Regionalisation for
Australia (IBRA), Version 7 (Regions, Subregions)
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NSW (Mitchell) Landscapes - version 3.1
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the Environment and Water 2016
State Environmental Planning Policy
(Resilience and Hazards) 2021
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Department of Planning, Housing and
Infrastructure 2022

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Spatial Reference: GDA 1994 MGA Zone 56

0 100 200 400 600 800 m

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Figure 3. Location map

SERVICE OFFSET TABLE

Location	ND - Water		Water		Electricity		Telecommunication	
	Side	Offset (m)	Side	Offset (m)	Side	Offset (m)	Side	Offset (m)
ROAD 2	S	2.60	S	2.90	N	0.95*	N	1.75*
ROAD 2	E	2.60	E	2.90	W	0.95*	W	1.75
ROAD 6	W	2.60	W	2.90	E	0.95*	E	1.75

NOTE: STREET TREES ARE TO BE PLANTED IN THE CENTRE OF ALL NATURE STRIPS
*ELECTRICAL & COMMS ALIGNMENTS & OFFSETS ARE INDICATIVE ONLY. REFER TO ELECTRICAL & COMMS PLANS FOR DETAILS.

LEGEND - LAYOUT PLAN

- STORMWATER DRAIN, PIT & PROPERTY INLET
- SWALE DRAIN
- SEWER & MAINTENANCE STRUCTURES
- HOUSE DRAIN
- SERVICE CONDUITS
- TACTILE PAVERS (INDICATIVE ONLY)
- ELECTRICITY (UNDERGROUND)
- ELECTRICITY (OVERHEAD)
- OPTIC FIBRE
- TELECOMMUNICATIONS
- GAS
- WATER
- RECYCLED WATER
- EXISTING ELECTRICITY (UNDERGROUND)
- EXISTING ELECTRICITY (OVERHEAD)
- EXISTING GAS
- EXISTING OPTIC FIBRE
- EXISTING TELECOMMUNICATIONS
- EXISTING WATER
- EXISTING RECYCLED WATER
- EXISTING STORMWATER DRAIN
- EXISTING SEWER
- EXISTING HOUSE DRAIN
- EXISTING SWALE DRAIN
- EXISTING SURFACE LEVEL
- FINISHED BUILDING LINE LEVEL
- FINISHED RIDGE LINE LEVEL
- TOP OF RETAINING WALL
- BOTTOM OF RETAINING WALL
- RIDGE LINE
- RETAINING WALL
- 4 WIRE ROPE SAFETY GUARD RAIL
- ZERO LOT LINES
- PAVEMENT TREATMENT
- STRUCTURAL FILL > 200mm DEEP
- EX. STRUCTURAL FILL > 200mm DEEP
- DIRECTION OF FALL
- OVERLAND FLOW
- ALLOTMENT TO BE GRADED EVENLY IN DIRECTION OF FALL TO LEVELS INDICATED
- CONCRETE EDGE STRIP WITH SUBSOIL DRAIN
- "NO ROAD" SIGN & BARRIER
- LIMIT OF WORKS
- EXISTING TREE SUBJECT TO REMOVAL REPLACEMENT STRATEGY AS PER ARBORIST REPORT
- EXISTING TREE TO BE RETAINED
- PERMANENT SURVEY MARK
- TEMPORARY BENCH MARK
- PROPOSED DRIVEWAY
- TREE PROTECTION ZONE (TPZ)
- PROPOSED POROUS PAVEMENT LOCATIONS SUBJECT TO DETAILED DESIGN AND COUNCIL APPROVAL

ROAD 8 · LANE 5 · FUTURE STAGE 5 · FUTURE STAGE 6 · CONSERVATION AREA · CHILDCARE CENTRE · MOUNT ST JOSEPH'S HIGH SCHOOL · EXISTING STAGE 4 · ROAD 2 · ROAD 6 · ROAD 9 · HORSLEY ROAD

EXISTING HV ELECTRICAL TO BE MAINTAINED DURING CONSTRUCTION WORKS
INSTALL TEMPORARY TURNING AREA WITH REFLECTORISED GUIDEPOSTS AT 1.5m C/C AND "ROAD CLOSED" SIGN WITH CHEVRON
REFER TO ARCHITECT PLANS FOR CHILDCARE DESIGN
PROPOSED RETAINING WALL. REFER TO ARCHITECTURAL PLANS FOR DESIGN AND EXTENTS.
EXISTING WATER TANKS TO BE REMOVED
HIGH POINT
EXISTING DRAINAGE PIPES TO BE REMOVED
MAXIMUM 1 IN 4 TEMPORARY INTERFACE BATTER TO EXISTING (TYP.)
135m² SEDIMENT BASIN
SOLID 150mm DIA. UPVC PIPE
SWALE DRAIN TO FALL AT 0.5% TO BASIN
MAX 1 IN 3 BATTERS
DISCHARGE CONTROL PIT
SOLID 150mm DIA. UPVC PIPE GRADED AT 1% TO DAYLIGHT
EXISTING FOOTPATH TO MATCH INTO PROPOSED ROAD 2 SHARED PATH WITH NO STEP. EXISTING FOOTPATH LEVELS TO BE CONFIRMED.
LOCALIZED LOW POINT
EXISTING HYDRANTS TO BE REMOVED
SAW CUT AND PROVIDE A TRANSVERSE AND LONGITUDINAL JOINT
EXISTING ASPHALT AND KERB FROM REDUNDANT ACCESS TO BE REMOVED
EXISTING ASPHALT AND KERB TO BE REMOVED & REPLACED WITH FULL DEPTH PAVEMENT TO SUIT NEW INTERSECTION DESIGN
EXISTING CONCRETE BARRIER TO BE REMOVED
EXISTING CONCRETE ISLANDS AND LINEMARKING TO BE REMOVED
EXISTING SERVICES AND PITS TO BE DEEPENED OR REMOVED TO SUIT INTRODUCTION OF NEW INTERSECTION DESIGN
PROVIDE 375Ø PIT BLOCKOUT
PROVIDE 300mm CONCRETE EDGE STRIP AND INSTALL "ROAD CLOSED" (GI-25) SIGN WITH CHEVRON (GI-5)
17.2m
FOOTPATH TO BE RETAINED. REFER TO ARCHITECTURAL PLANS
PROPOSED FOOTPATH
SAW CUT AND PROVIDE A TRANSVERSE AND LONGITUDINAL JOINT

ISSUED FOR D.A

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REV	DESCRIPTION	DATE	DRN	APP
B	ISSUED FOR DA	12.12.24	B.R	S.F
A	ISSUED FOR INFORMATION	06.12.24	B.R	S.F

mirvac

SCALE 1:500 AT A1 SIZE

Designed S.FERGUSON · Date 06.12.24 · Drawn B.RAU · Approved S.GRAY · Date 06.12.24 · Job Number

Beveridge Williams
Development & Infrastructure Consultants
Level 4, LPC House, Suite 4.03, 3 Fordham way, Cham Park NSW 2570 · ph: 02 46205000 · www.beveridgewilliams.com.au

Project Details: WSU MILPERRA, LOT 2 IN DP1291584
2 BULLECOURT AVE, MILPERRA
CHILD CARE CENTRE

Drawing Title: LAYOUT & LOT BENCHING PLAN

Sheet 06 of 21
Scale 1:500 @ A1
Project Number 2301879 · Reference 315 · Drawing No. 010 · Revision B

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Figure 4. Layout of Stage 2

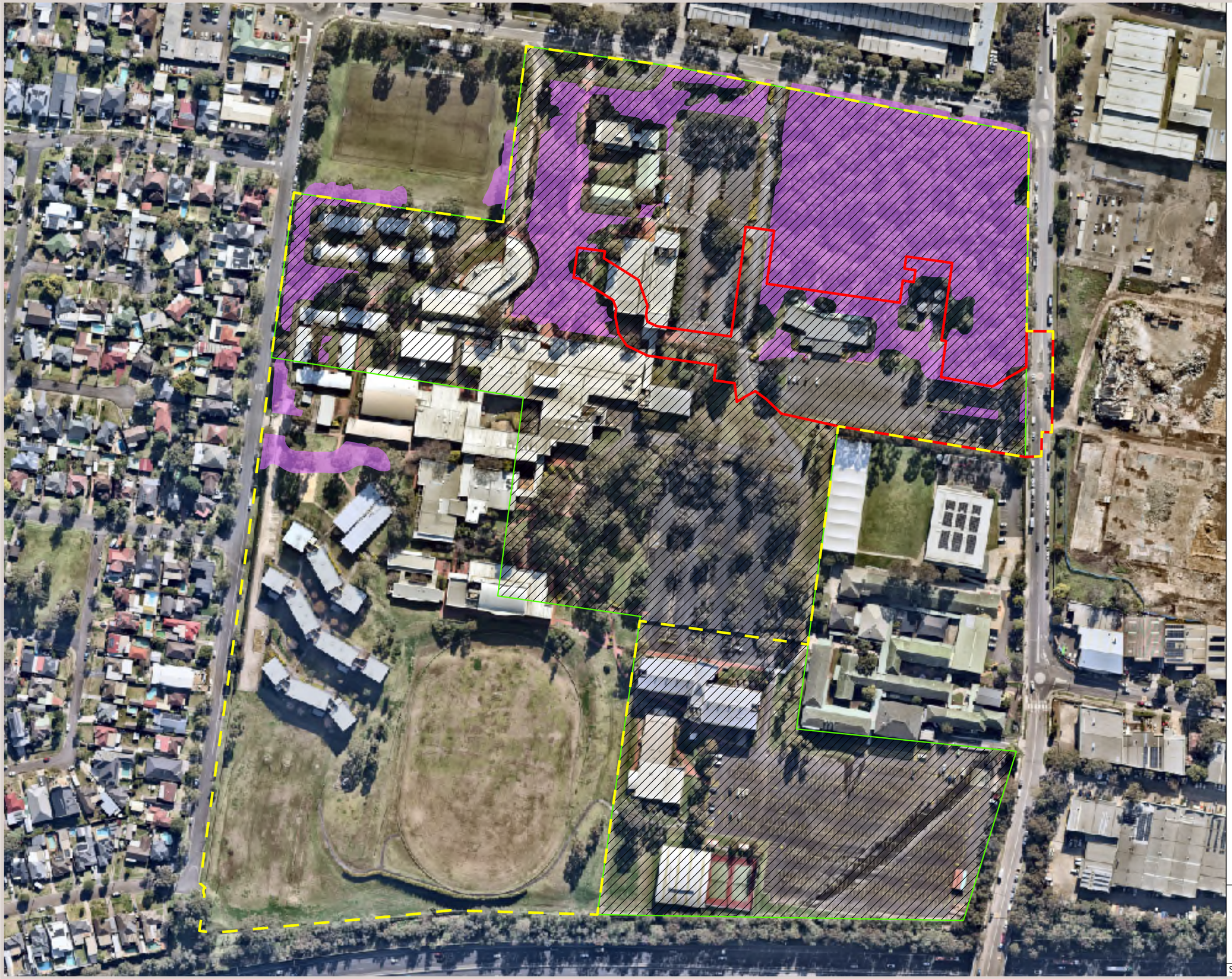

Figure 5. Biodiversity Values Map and Canterbury-Bankstown LEP 'Biodiversity' mapping

Legend

- Subject Land
- Study Area
- BAM Plot Locations

Plant Community Type

- PCT 3320 (Intact)
- PCT 3320 (Canopy Only)
- PCT 3320 (Mown)
- PCT 3320 (Exotic Ground)
- PCT 4025 (Canopy Only)

Other Vegetation Types

- Planted Native Vegetation
- Exotic Vegetation
- Exotic Dominated Grassland
- Cleared Land

Image Source: Nearmap © (2024) Dated: 22/7/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services

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Spatial Reference: GDA 1994 MGA Zone 56

0 20 40 80 120 160 m

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Figure 6. Field survey locations

Legend

Subject Land

Study Area

Habitat Feature Category

Hollow-bearing Tree

Nest

Rocks

Image Source: Nearmap © (2024) Dated: 22/7/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services

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Spatial Reference: GDA 1994 MGA Zone 56

0 20 40 80 120 160 m

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Figure 7. Habitat features within the Study Area

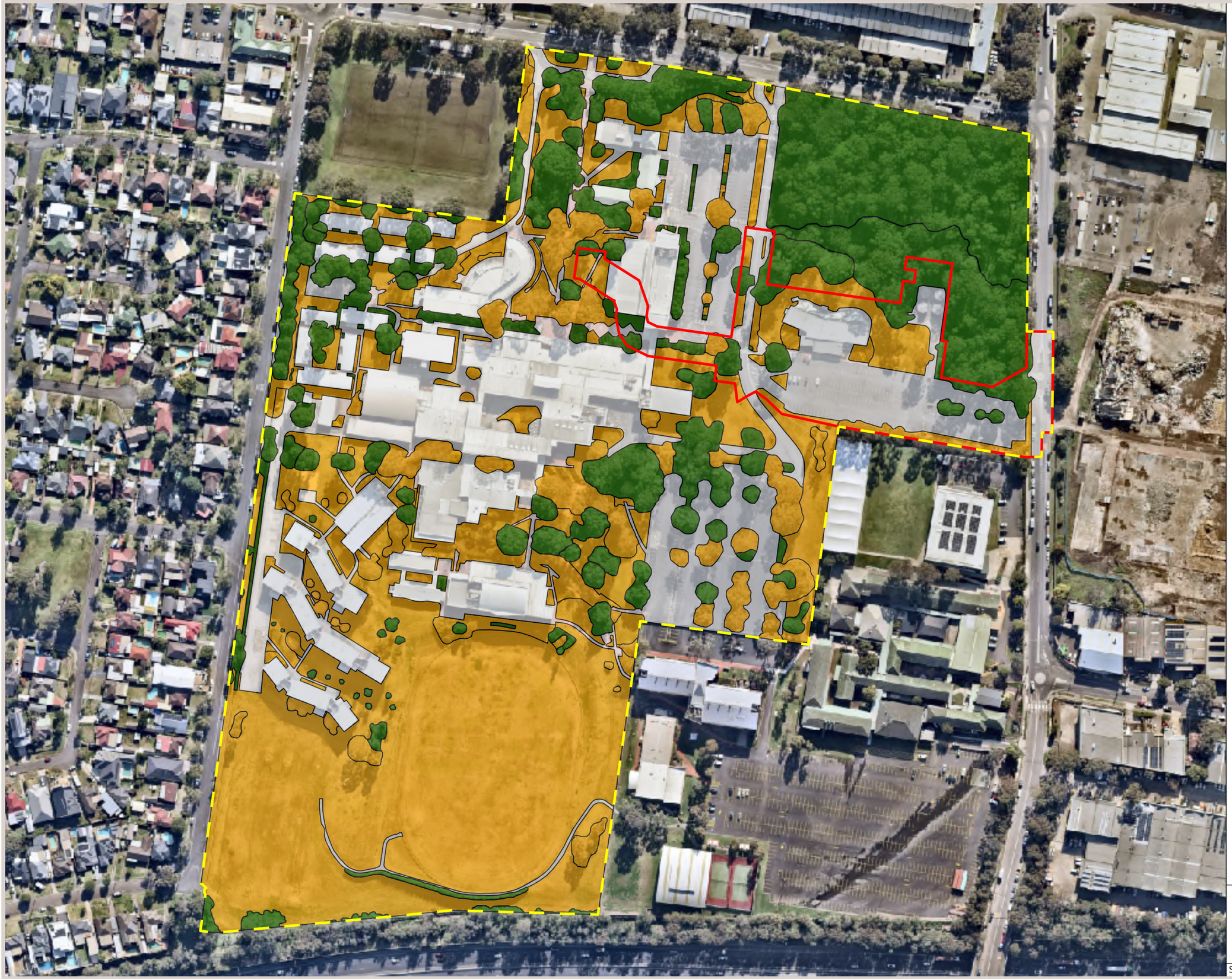

Figure 8. Native vegetation extent

Figure 9. Plant Community Types

Legend

- Subject Land
- Study Area

Threatened Ecological Community

- Cumberland Plain Woodland in the Sydney Basin Bioregion
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Image Source: Nearmap © (2024) Dated: 22/7/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services NSW Department of Customer Services

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Spatial Reference: GDA 1994 MGA Zone 56

0 20 40 80 120 160 m

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Figure 10. Threatened Ecological Communities

Figure 11. Vegetation zones

Figure 12. Species credit species polygon

Legend

- Subject Land
- Study Area

Prescribed Impact

- Non-native Vegetation
- Vehicle Strike
- Habitat Connectivity

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Data Source: Sixmaps Clip & Ship, DCS Spatial Services
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0 20 40 80 120 160 m

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Figure 13. Prescribed impacts

Figure 14. Serious and Irreversible impacts

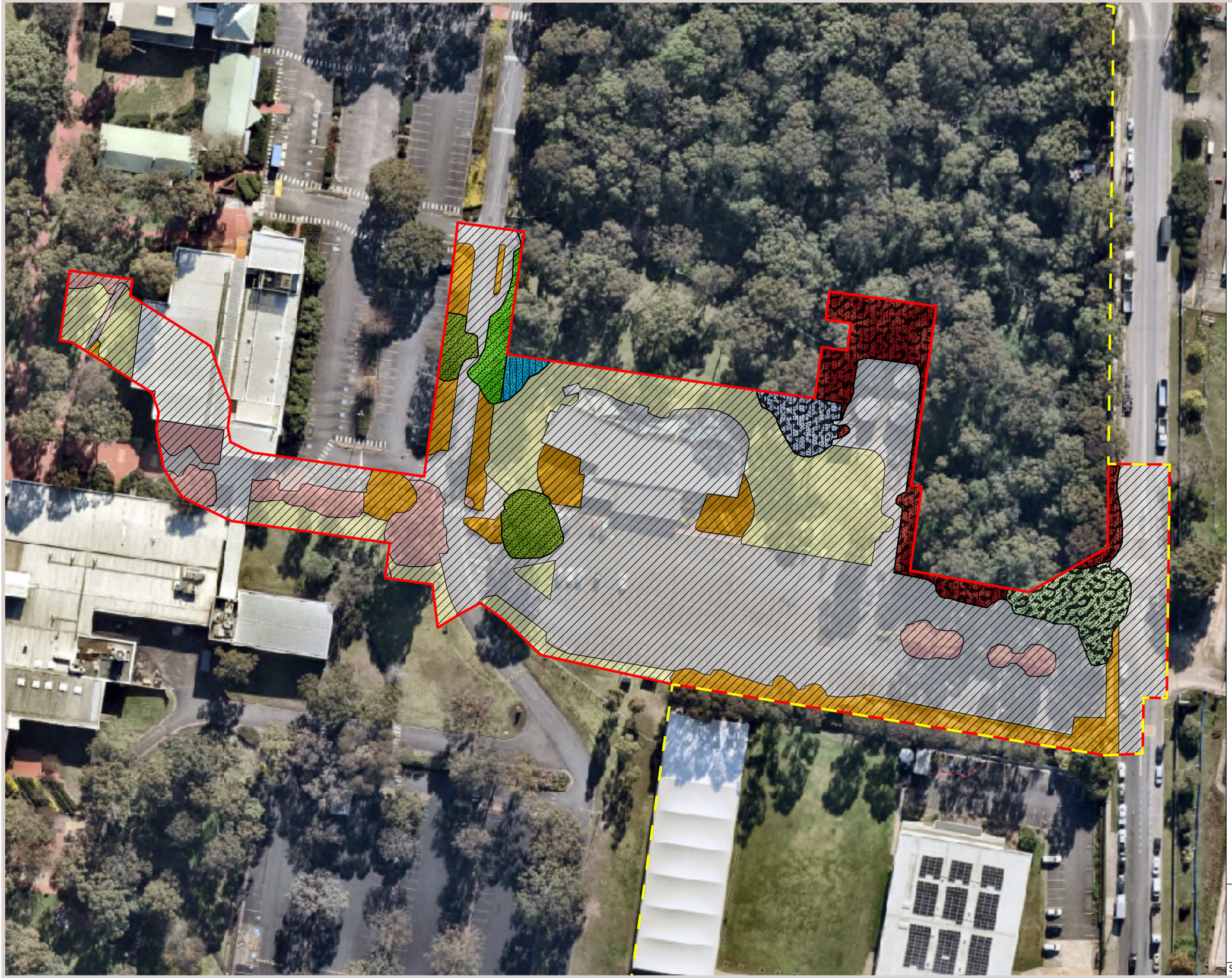

Figure 15. Thresholds for assessment