Ecological Constraints Assessment Report

32 Speets Road, Oakville NSW 2765

Report prepared by Narla Environmental

for the Sikh Grammar School Australia

September 2024

NARLA
environmental

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Report Certification

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Glossary

Acronym/ Term	Definition
APZ	Asset Protection Zone
BAM	Biodiversity Assessment Methodology
BC Act	New South Wales Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
Biodiversity Values	The composition, structure, and function of ecosystems, including threatened species, populations, and ecological communities, and their habitats.
CEEC	Critically Endangered Ecological Community
DA	Development Application
DAFF	Federal Department of Agriculture, Fisheries, and Forestry (formerly DAWE)
DAWE	Federal Department of Agriculture, Water, and the Environment (now DAFF)
DCCEEW	Federal Department of Climate Change, Energy, the Environment, and Water
Development	The use of land, and the subdivision of land, and the carrying out of a work, and the demolition of a building or work, and the erection of a building, and any other act, matter, or thing referred to in Section 26 that is controlled by an environmental planning instrument but does not include any development of a class or description prescribed by the regulations for the purposes of this definition (Environmental Planning and Assessment Act 1979)
DPE	Department of Planning and Environment (now NDCCEEW)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry, and Environment (became DPE, now NDCCEEW)
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning & Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FFA	Flora and Fauna Assessment
ha	Hectares
HDCP	Hawkesbury Development Control Plan 2023
HLEP	Hawkesbury Local Environmental Plan 2012
km	Kilometre
KPoM	Koala Plan of Management
LGA	Local Government Area

Acronym/ Term	Definition
Locality	A 10km x 10km cell centred on the Subject Property
m	metres
mm	millimetres
Native Vegetation	Any of the following types of plants native to New South Wales: (a) trees (including any sapling or shrub), (b) understorey plants, (c) groundcover (being any type of herbaceous vegetation) and (d) plants occurring in a wetland.
NDCCEEW	NSW Department of Climate Change, Energy, the Environment, and Water (formerly DPE)
NSW	New South Wales
OEH	Office of Environment and Heritage (became DPE, now NDCCEEW)
Proposal	The development, activity, or action being proposed.
SAII	Serious and Irreversible Impact
SEPP	State Environmental Planning Policy
SSDA	State Significant Development Application
Subject Property	32 Speets Road, Oakville NSW 2765 (Lot 501/-/DP1233960)
Threatened species, populations, and ecological communities	Species, populations, and ecological communities specified in Schedules 1 and 2 of the BC Act 2016
TPZ	Tree Protection Zone
VMP	Vegetation Management Plan

1. Introduction

1.1 Project Background

Narla Environmental Pty Ltd (Narla) was engaged by the Sikh Grammar School Australia ('the Proponent') to prepare an Ecological Constraints Assessment (ECA) to determine the biodiversity values, development potential, and ecological constraints at 32 Speets Road, Oakville NSW 2765 (Lot 501/-/DP1233960), hereafter referred to as the 'Subject Property' (**Figure 1**). It is understood that the proponent seeks to develop a new grammar school within the Subject Property and therefore wishes to determine the ecological values on site to enable an environmentally sensitive design.

This report will focus on the whole area of the Subject Property, which is intended to encompass future works associated with the potential development. This area will hereafter be referred to as the 'Subject Site' (**Figure 1**). Within this area, the report will evaluate any biodiversity values and constraints associated with environmental planning instruments, as well as Threatened Ecological Communities (TECs) and threatened species listed under the Biodiversity Conservation Act 2016 (BC Act) and the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act).

1.2 Site Description and Location

The Subject Property is located on the south-eastern side of Speets Road within the suburb of Oakville in the Hawkesbury City Local Government Area (LGA) and covers an area of approximately 2.02ha. Currently, the property is largely cleared and consists of exotic-dominated lawn habitat. It is surrounded by similarly cleared rural residential properties with small pockets of remnant native bushland interspersed throughout. For the purposes of this assessment, the entire Subject Property was assessed as the Subject Site.

1.3 Topography, Geology, and Soil

The Subject Site is largely situated on a west-facing slope. Elevation ranges between approximately 49m above sea level (asl) in the eastern extent and approximately 33m asl in the western extent (Google Earth 2024). The Subject Site is situated across the Lucas Heights and Blacktown Soil Landscapes as indicated on the Soil Landscapes of the Penrith 1:100,000 Sheet (Bannerman and Hazelton 2011).

The Lucas Heights Soil Landscape is characterized by plateau on Hawkesbury Sandstone and Mittagong Formation (sandstone-quartz, shale, siltstone/mudstone, and sandstone-lithic) in the Woronora Plateau, Blue Mountains Plateau, Cumberland Plain, Hornsby Plateau, Macdonald Ranges, and Wanganderry Tablelands. Local relief is between 5 – 40m; altitude is between 10 – 670m; slope gradients are 0 – 10%. Vegetation is typically comprised of partially cleared eucalypt forest and woodland, with shrub and/or grassy understorey, however vegetation varies widely according to geological influence and rainfall (Bannerman and Hazelton 2011).

The Blacktown Soil Landscape is characterised by low hills and rises on Wianamatta Group Shale (shale, sandstone-lithic, and sandstone-quartz) in the Cumberland Plain, Hornsby Plateau, and Picton Hills. Local relief is between 10 – 50m; altitude is between 10 – 202m; slope gradients are 0-9%. Vegetation is typically comprised of extensively cleared woodland (Bannerman and Hazelton 2011).

1.4 Hydrology

No mapped or unmapped watercourses or waterbodies were identified within the Subject Site (**Figure 1**).

1.5 Scope of Assessment

The objectives of this ECA were to assess all possibly occurring ecological values and constraints associated with future development within the Subject Site pursuant to Part 4 of the Environmental Planning & Assessment Act 1979 (EP&A Act), the BC Act, the EPBC Act, and the local planning provisions of Hawkesbury City Council, including to:

- Undertake background research to determine the likelihood for NSW and/or Commonwealth threatened biota to utilise or occur within the Subject Site during any point of their lifecycles;
- Establish the likelihood of occurrence of migratory species, threatened species, endangered populations, and threatened ecological communities as listed under the BC Act and/or the EPBC Act;
- Identify and map the distribution of vegetation communities within the Subject Site and discuss patch size and condition;
- Record presence and the extent of any Priority Weed infestations that require management by law;
- Determine potential ecological impacts or risks that may result due to the proposed works;
- Recommendation of any controls or additional actions to be taken to protect or improve environmental outcomes of the proposed works;
- Recommend any controls or additional actions to be taken to protect or improve ecological/biodiversity values of the Subject Site;
- Assess the potential ecological impacts associated with development to provide guidance for future development plans.

Figure 1. Location and Components of the Subject Site.

1.6 Relevant Legislation and Policy

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

Table 1. Relevant legislation and policy addressed.

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Action Required
Environmental Planning and Assessment Act 1979 (EP&A Act)	All threatened species, populations, and ecological communities and their habitat that occur or are likely to occur within the Subject Site during a part of their lifecycle.	Yes	This ecological assessment and all subsequent recommendations relevant to the planning process under Part 4.
Biodiversity Conservation Act (BC Act) (New South Wales)	One (1) BC Act listed critically endangered ecological communities were identified within the Subject Site during the site assessment: ▪ Cumberland Plain Woodland in the Sydney Basin Bioregion; No BC Act listed threatened species were identified within the Subject Site during the assessment, however, suitable habitat was identified.	Yes	Any future Development Application or State Significant Development Application may need to be accompanied by a Flora and Fauna Assessment (FFA) or Biodiversity Development Assessment Report (BDAR) with appropriate surveys and offsetting under the Biodiversity Offset Scheme (BOS) if BC protected species are found to utilise the Subject Site or BDAR Waiver (SSDA only) if no impacts to biodiversity are expected as a result of final plans.
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth)	No EPBC Act listed threatened ecological communities were identified within the Subject Site during the site assessment. No EPBC Act listed threatened species were identified within the Subject Site during the assessment, however, suitable habitat was identified.	Yes	An assessment of significance of impact from the proposed works on Matters of National Environmental Significance (MNES) EPBC Act Assessment of Significant Impact Criteria may be required if EPBC protected species are found to utilise the Subject Site.
Biosecurity Act 2015 (Bio Act)	Two (2) Priority Weeds for the Greater Sydney region were identified within the Subject Site: ▪ *Cestrum parqui* (Green Cestrum); and ▪ *Senecio madagascariensis* (Fireweed).	Yes	Priority Weeds must be managed in accordance with the Biosecurity Act.
State Environmental Planning Policy (Biodiversity and	The Subject Property is located in an LGA listed in Schedule 2 of the State Environmental Planning Policy (Koala	Yes	An assessment addressing Chapter 4 of the SEPP is to be included in any impact

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Action Required
Conservation) 2021 – Chapter 4 Koala Habitat Protection 2021	Habitat Protection) 2021 and is larger than one hectare in size, therefore this chapter of the SEPP will apply to any future DA on the property.		assessment submitted as part of a DA or SSDA associated with the Subject Property. Efforts should be made to avoid impacts to native canopy species.
State Environmental Planning Policy (Resilience and Hazards) 2021 – Chapter 2 Coastal Management	The Subject Site does not contain areas mapped as 'Coastal Environmental Area', 'Coastal Use Area', 'Littoral Rainforest', or proximity to either, therefore, Chapter 2 of this SEPP does not apply.	No	None.
Water Management Act 2000	There are no mapped watercourses within the Subject Property.	No	None.
Fisheries Management Act 1994 (FM Act)	No areas of the Subject Property are mapped as containing Key Fish Habitat; therefore, the FM Act does not apply.	No	None.

1.7 Biodiversity Assessment Pathway

1.7.1 Development Applications

The requirements of the BC Act 2016 and Biodiversity Conservation Regulation 2017 are mandatory for all Development Applications (DA) assessed pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) submitted in the Hawkesbury City Council LGA.

The BC Act and its regulations stipulate clearing 'area threshold' values (**Table 2**) that determine whether a development is required to be assessed in accordance with the 'Biodiversity Offset Scheme' (BOS). Minimum entry thresholds for vegetation clearing depend on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan [LEP]) or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

The Subject Property has a minimum lot size of 2ha. Therefore, to avoid triggering the Biodiversity Offset Scheme, the proponent must avoid the clearing/management of native vegetation in excess of 0.5ha per Development Application.

Table 2. Biodiversity Offset Scheme entry thresholds

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.50 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

In addition to the clearing 'area threshold', the Biodiversity Values (BV) Map (NDCCEEW 2024a) identifies land with high biodiversity values that are particularly sensitive to impacts from development and clearing. The map is another of the Biodiversity Offsets Scheme Entry Thresholds which is a trigger for determining whether the Biodiversity Offset Scheme (BOS) applies to a clearing or development proposal. The map has been prepared by the Department of Planning and Environment (DPE) under Part 7 of the Biodiversity Conservation Act 2016 (BC Act).

The Subject Site contains areas identified on the Biodiversity Values Map (**Figure 2**). Any impacts to native vegetation within these areas will automatically trigger the BOS and will require a Biodiversity Development Assessment Report (BDAR) to be submitted along with the DA.

During the site assessment in September 2024, it was determined that the areas within the Subject Site mapped as containing Biodiversity Values (NDCCEEW 2024a) contained largely exotic-dominated groundcovers, and only one (1) canopy *Eucalyptus crebra* (**Plate 1; Plate 2**). As long as impacts to this canopy species are avoided, it is considered unlikely that the production of a BDAR for any future development will be necessary for impact to areas mapped as containing Biodiversity Values.

1.7.2 State Significant Development Application

State Significant Developments (SSDs) are regulated under the Environmental Planning and Assessment Act 1979, which requires proponents to apply to the Minister of Planning for development consent or infrastructure approval, supported by an environmental impact statement (EIS). These applications are also subject to biodiversity assessment requirements under the Biodiversity Conservation Act 2016 (BC Act). The BC Act requires that an SSD application must be accompanied by a biodiversity development assessment report (BDAR) unless the Planning Agency Head (or delegate) and the Environment Agency Head (or delegate) determine that the proposed development is not likely to have any significant impact on biodiversity values, in such cases a BDAR waiver can be provided.

Based on the exotic-dominated nature of the Subject Site and provided the identified native eucalypt species can be avoided during development, a BDAR waiver may be accepted for this development if the project is registered as a State Significant Development.

Figure 2. Biodiversity Values within the Subject Site (NDCCEEW 2024a).

Plate 1. Exotic Vegetation within Biodiversity Values Mapping Areas within the Subject Site.

Plate 2. *Eucalyptus crebra* within Biodiversity Values Mapping Areas within the Subject Site.

1.8 Hawkesbury Local Environmental Plan 2012

1.8.1 Zoning

The Subject Site is zoned as 'RU4: Primary Production Small Lots'. The Hawkesbury LEP requires that the development satisfies the objectives of this zone which are as follows:

- To enable sustainable primary industry and other compatible land uses.
- To encourage and promote diversity and employment opportunities in relation to primary industry enterprises, particularly those that require smaller lots or that are more intensive in nature.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To ensure that development occurs in a way that does not have a significant adverse effect on water catchments, including surface and groundwater quality and flows, land surface conditions, and important ecosystems such as waterways.

1.8.2 Terrestrial Biodiversity

As the Subject Site contains land identified on the Hawkesbury City Council Terrestrial Biodiversity Map (**Figure 3**) the associated objectives and considerations under Part 6.4 of the HELP must be satisfied. This includes:

- (1) The objective of this clause is to maintain terrestrial biodiversity by—
    - (a) protecting native fauna and flora, and
    - (b) protecting the ecological processes necessary for their continued existence, and
    - (c) encouraging the conservation and recovery of native fauna and flora and their habitats.
- (2) This clause applies to land identified as "Significant vegetation" and "Connectivity between significant vegetation" on the Terrestrial Biodiversity Map.
- (3) Before determining a development application for development on land to which this clause applies, the consent authority must consider—
    - (a) whether the development—
        - (i) is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and
        - (ii) is likely to have any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and
        - (iii) has any potential to fragment, disturb or diminish the biodiversity structure, function, and composition of the land, and
        - (iv) is likely to have any adverse impact on the habitat elements providing connectivity on the land.
    - (b) any appropriate measures proposed to avoid, minimise, or mitigate the impacts of the development.
- (4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that—
    - (a) the development is designed, sited, and will be managed to avoid any significant adverse environmental impact, or
    - (b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited, and will be managed to minimise that impact, or
    - (c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

1.9 State Environmental Planning Policy (Biodiversity and Conservation) 2021 - Chapter 4 Koala Habitat Protection 2021

This Chapter aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. As the Hawkesbury City LGA is included in Schedule 2, this SEPP applies to the Subject Property.

This section applies to land to which this Chapter applies if the land—

- Has an area of at least 1 hectare (including adjoining land within the same ownership); and
- Does not have an approved koala plan of management applying to the land.

Before a council may grant consent to a development application for consent to carry out development on the land, the council must assess whether the development is likely to have any impact on koalas or koala habitat. If the council is satisfied that the development is likely to have low or no impact on koalas or koala habitat, the council may grant consent to the development application.

A site assessment was undertaken to determine whether the land contained core koala habitat, which is defined by the SEPP as:

- an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or
- an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.

The Subject Property contained suitable habitat (where 15% or greater of the total number of trees are the regionally relevant species of those listed in Schedule 2 of the SEPP), however no potential signs of koalas or koala occupancy (scratch marks) were observed. There is also one record of koala occupancy 5km from the Subject Property from 2019. As such, an assessment addressing Chapter 4 of the SEPP is to be included in any impact assessment submitted as part of a DA or SSDA associated with the Subject Property.

1.10 Study Limitations

This study was not intended to provide a complete inventory of all flora and fauna species with potential to occur within the Subject Property. The timing of the surveys may not have coincided with emergence times of some species of flora and fauna, such as seasonally flowering herbs, seasonal migratory fauna, or nocturnal fauna.

To account for those species that could not be identified during the field survey, detailed habitat assessments were combined with desktop research and local ecological knowledge to establish an accurate prediction of the potential for such species to occur on or adjacent to the Subject Property.

Figure 3. Terrestrial Biodiversity within the Subject Site (Hawkesbury Council 2012).

2. Methodology

2.1 Desktop Assessment and Literature Review

A thorough literature review of local information relevant to the Hawkesbury City Council area was undertaken. Searches utilising the NSW Wildlife Atlas (BioNet; NDCCEEW 2024b) and the Commonwealth Protected Matters Search Tool (DCCEEW 2024) were conducted to identify all current threatened flora and fauna, as well as migratory fauna records within a 10km x 10km cell search area centred on the Subject Site. These data were used to assist in establishing the presence or likelihood of any ecological values as occurring on or adjacent to the Subject Site and helped inform our Ecologists on what to look for during the site assessment.

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

2.2 Ecological Site Assessment

2.2.1 General Survey

A site assessment was undertaken by experienced Narla Ecologists Phil Maxwell and Kayla Spithoven on Thursday the 5th of September 2024. During the site assessment, the following activities were undertaken:

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

2.2.2 Weather Conditions

Weather conditions recorded at the nearest weather station (Richmond) prior to and during the site assessment are provided in **Table 3** (BOM 2024). The data reveal variable temperatures and no rainfall leading up to the survey. These weather conditions may not have been not conducive to the emergence and flowering of threatened species that could potentially occur within the Subject Site.

Table 3. Weather conditions recorded at Richmond NSW (Station 067105) preceding and during the site assessments (site assessment date in bold).

Survey Date	Day	Minimum Temp. (°C)	Maximum Temp. (°C)	Rainfall (mm)
30/08/2024	Friday	10.2	31.0	0.0
31/08/2024	Saturday	12.7	24.2	0.0
01/09/2024	Sunday	6.8	27.9	0.0
02/09/2024	Monday	6.4	25.3	0.0
03/09/2024	Tuesday	3.2	20.0	0.0
04/09/2024	Wednesday	2.0	23.7	0.0
05/09/2024	**Thursday**	**4.1**	**28.5**	**0.0**

2.3 Mapping and Analysis of Vegetation Communities

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

- eSPADE v2.2 (NDCCEEW 2024d);
- NSW State Vegetation Type Map (DPE 2022); and
- Soil Landscapes of Penrith 1:100,000 Sheet map and report (Bannerman and Hazelton 2011).

3. Native Vegetation

3.1 Historically Mapped Vegetation Communities

The NSW State Vegetation Type Map (DPE 2022) indicated the presence of three (3) vegetation communities within and around the Subject Property (**Figure 4**):

- Cumberland Red Gum Riverflat Forest;
- Cumberland Shale Plains Woodland; and
- Unclassified Vegetation.

3.2 Field Validated Vegetation Communities

The site assessment revealed two (2) vegetation communities within the Subject Site:

- Exotic-dominated Grassland; and
- Cumberland Shale Plains Woodland.

The vegetation communities found within the Subject Site are detailed in **Table 4** and **Table 5,** and displayed in **Figure 5**.

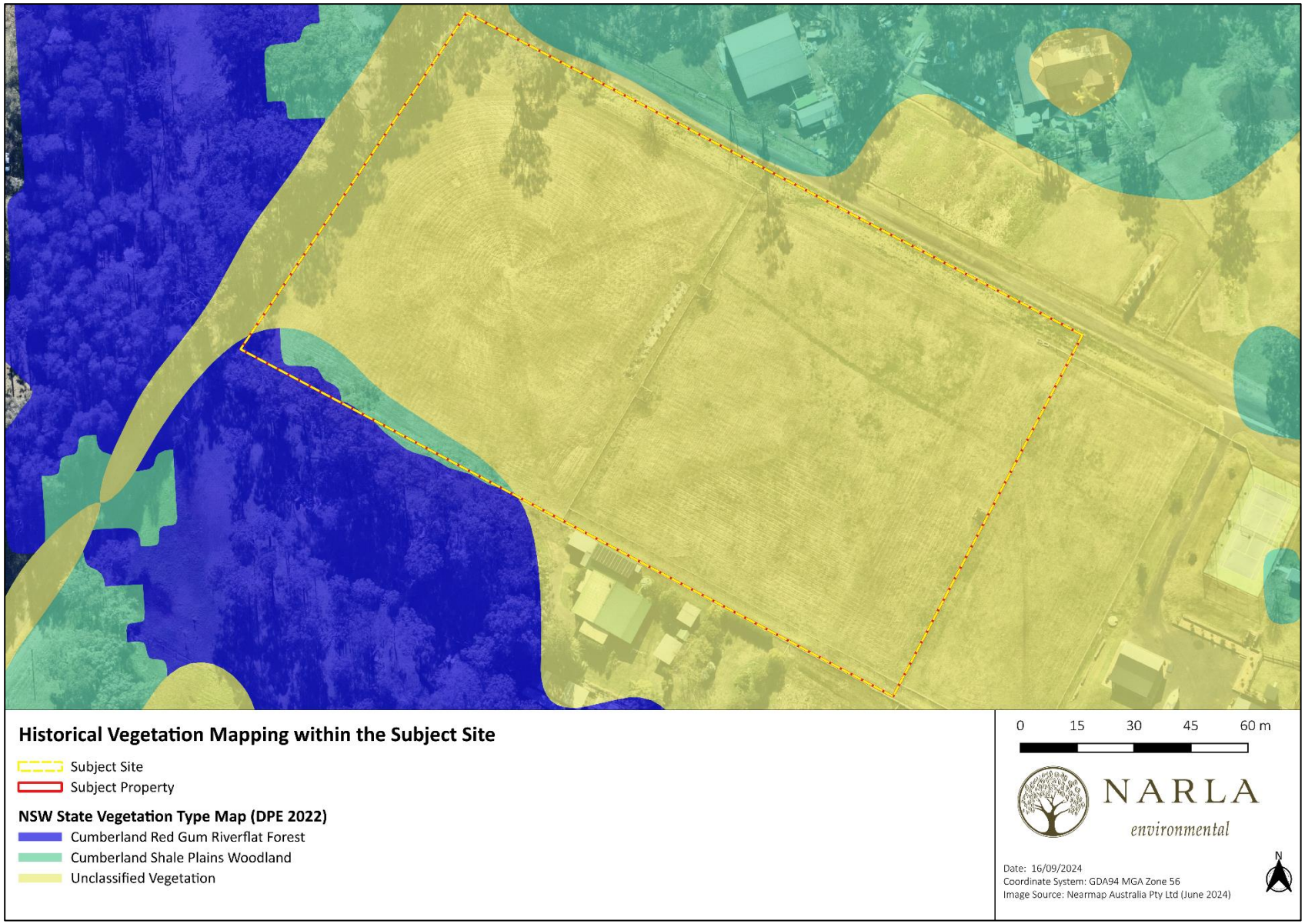

Figure 4. Historical Vegetation Mapping within and around the Subject Property.

Figure 5. Field Mapping of Vegetation Communities within the Subject Site.

Table 4. Description of Exotic-dominated Grassland identified within the Subject Site.

Exotic-dominated Grassland	
	
Extent within Subject Site (approximate)	1.99ha
Description of the Vegetation within the Subject Site	
This vegetation community consisted largely of exotic-dominated groundcovers, with the midstorey and canopy layers almost entirely absent but for sporadic individuals of the exotic species *Ulmus parvifolia*. The groundlayer was comprised of exotic species such as *Cenchrus clandestinus, Trifolium repens, Cynodon dactylon, Sonchus oleraceus, Medicago sativa, Rumex crispus, Hypochaeris glabra, Medicago polymorpha,* and *Cirsium vulgare.* The Priority Weeds *Senecio madagascariensis* and *Cestrum parqui* were also identified within this zone.	
Justification of Vegetation Community	The vegetation within this area consisted entirely of common lawn species and exotic species. As the vegetation could not be assigned to a locally occurring vegetation community it has been classified as Exotic-dominated Grassland.
BC Act Status	Not Listed.
EPBC Act Status	Not Listed.

Table 5. Description of Cumberland Shale Plains Woodland identified within the Subject Site.

Cumberland Shale Plains Woodland	
	
Extent within Subject Site (approximate)	0.03ha
Description of the Vegetation Community (NDCCEEW 2024c)	
A tall sclerophyll open forest or woodland with a sparse mid-stratum of soft-leaved shrubs and small trees with a grassy ground cover on the undulating Wianamatta Group shale plains of western Sydney. The canopy very frequently includes *Eucalyptus tereticornis* and *Eucalyptus moluccana*, with ironbarks (*Eucalyptus crebra* and *Eucalyptus fibrosa*) occasionally present and sometimes prominent in localised areas. 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. Presence of these Acacia species helps to distinguish this PCT from the related PCT 3319 on rises of the southern Cumberland Plain which typically includes *Acacia implexa*. The mid-dense ground layer typically includes grasses, forbs, twiners and hardy small ferns. *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. A northern outlier occurs near Maroota on a small remnant on a narrow shale ridge. While widespread on the main part of the plain, this PCT primarily occurs in small, often disturbed patches within a rural or urban matrix.	
Description of the Vegetation within the Subject Site	
The vegetation within the Subject Site consisted of sporadic native canopy species over an exotic-dominated groundlayer. One (1) mature *Eucalyptus crebra* was present within the canopy layer, and two (2) juvenile *Eucalyptus*	

Cumberland Shale Plains Woodland	
tereticornis individuals were present within the midstorey layer. The groundlayer was comprised of exotic species such as *Cenchrus clandestinus, Trifolium repens, Cynodon dactylon, Sonchus oleracus, Medicago sativa, Rumex crispus, Hypochaeris glabra, Medicago polymorpha,* and *Cirsium vulgare.*	
Justification of Vegetation Community	The determination of this community was based on the IBRA Bioregion, IBRA Sub-region, landscape attributes including soil landscapes and elevation, and the presence, cover and frequency of diagnostic species, namely *Eucalyptus crebra* and *Eucalyptus tereticornis*.
BC Act Status	Cumberland Shale Plains Woodland is associated with the BC Act listed CEEC, Cumberland Plain Woodland in the Sydney Basin Bioregion (see Section 4.1.1).
EPBC Act Status	Cumberland Shale Plains Woodland is associated with the EPBC Act listed CEEC, Cumberland Plain Woodlands and Shale-Gravel Transition Forest. This vegetation community does not meet the criteria for protection under the EPBC Act (see Section 4.1.2).
References	Department of the Environment, Water, Heritage, and the Arts (2010) Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest: A Guide to Identifying and Protecting the Nationally Threatened Ecological Community NSW Threatened Species Scientific Committee (2010) Cumberland Plain Woodland in the Sydney Basin Bioregion - Critically Endangered Ecological Community listing – Final Determination Threatened Species Scientific Committee (2009) Commonwealth Listing Advice on Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest

4. Threatened Entities

4.1 Threatened Ecological Communities

4.1.1 Biodiversity Conservation Act 2016

4.1.1.1 Listing under the BC Act as Cumberland Plain Woodland in the Sydney Basin Bioregion

BC Act Status: Critically Endangered Ecological Community (CEEC).

The vegetation mapped within the Subject Site as Cumberland Shale Plains Woodland conforms to the BC Act listed CEEC, Cumberland Plain Woodland in the Sydney Basin Bioregion, as it contains species indicative of this CEEC, occurs within the associated geology and landscape position, and comes in the form of the described vegetation type. Native species listed within the final determination (NSW Scientific Committee 2010) that occur within the Subject Site include:

- *Eucalyptus crebra;* and
- *Eucalyptus tereticornis.*

4.1.2 Environment Protection and Biodiversity Conservation Act 1999

4.1.2.1 Listing under the EPBC Act as Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest

EPBC Act Status: Critically Endangered Ecological Community (CEEC).

The vegetation within the Subject Site mapped as Cumberland Shale Plains Woodland does not conform to the EPBC Act listed CEEC, Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest, as it does not meet the key diagnostic features for this community (**Table 6**).

Table 6. Key Diagnostic Criteria to identify the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest Ecological Community.

Key Diagnostic Feature	Threshold Met?
Are native tree species present with a minimum projected foliage cover of 10%?	No
If yes, is the patch of the ecological community 0.5ha or greater in size?	No
If yes, of the perennial understorey vegetative cover present, is 50% made up of native species?	No
If not, is the patch 5ha or greater in size?	No
If not, is the patch contiguous with a native vegetation patch 5ha or greater in size?	No
If not, does the patch contain at least one tree per ha that is large (>80cm DBH) or has a hollow?	No
If not, of the perennial understorey vegetative cover present, is 30% made up of native species?	No

4.2 Threatened Flora

Desktop analysis revealed a range of threatened flora as occurring or having the potential to occur on or within a 100km² search area centred on the Subject Site. Targeted surveys were conducted within the Subject Site for all species whose DPE-endorsed survey period coincided with the site assessment. No threatened flora species were identified at the time of the site assessment.

All flora species identified by the Narla Ecologists during the site assessment are detailed in **Appendix A**.

4.3 Threatened Fauna

Details of the fauna habitat recorded within the Subject Site are included in **Table 7.** No threatened fauna were observed during the survey within or surrounding the Subject Site. All fauna species encountered are presented in **Appendix B**.

Table 7. Fauna habitat values identified within the Subject Site.

Habitat Component	Site Values
Coarse woody debris	Absent.
Rock outcrops and bush rock	Absent.
Caves, crevices, and overhangs	Absent.
Culverts, bridges, mine shafts, or abandoned structures	Absent.
Nectar/lerp-bearing Trees	Present. *Eucalyptus crebra* and juvenile *Eucalyptus tereticornis* were identified within the Subject Site. These trees may provide intermittent nectar and/or lerp sources for nomadic nectivores such as Grey-headed Flying-fox.
Nectar-bearing shrubs	Absent.
Large stick nests	Absent.
Sap and gum sources	Present. *Eucalyptus crebra* and juvenile *Eucalyptus tereticornis* were identified within the Subject Property.
She-oak fruit (Glossy Black Cockatoo feed)	Absent.
Seed-bearing trees and shrubs	Present. Exotic seed-bearing shrubs were present within the Subject Property and may provide foraging habitat for the Gang-gang Cockatoo.
Soft-fruit-bearing trees	Absent.
Dense shrubbery and leaf litter	Absent.
Tree hollows	Absent.
Decorticating bark	Decorticating bark was present within the Subject Property which may provide habitat for threatened microbat species.
Wetlands, soaks, and streams	Absent.
Open water bodies	Absent.
Estuarine, beach, mudflats, and rocky foreshores	Absent.

4.4 Migratory Fauna Species

The following EPBC Act listed migratory terrestrial fauna species have been identified with the possibility of occurring within the Subject Site:

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

Whilst none of these species were confirmed within the Subject Site, potential foraging habitat was present.

Figure 6. Narla Survey Effort (September 2024).

5. Recommendations

5.1 Avoidance of Impacts

5.1.1 Threatened Ecological Communities

Future works should avoid impacts to the native eucalypt species *Eucalyptus crebra* and *Eucalyptus tereticornis* mapped within the Subject Site as Cumberland Shale Plains Woodland. These trees are representative of the BC Act listed Critically Endangered Ecological Communities Cumberland Plain Woodland in the Sydney Basin Bioregion. Any impacts to these species may require the production of a BDAR and entering into the Biodiversity Offset Scheme.

5.2 Biodiversity Offset Scheme

5.2.1 Biodiversity Values Map

During the site assessment in September 2024, it was determined that the areas within the Subject Site mapped as containing Biodiversity Values (NDCCEEW 2024a) contained largely exotic-dominated groundcovers, and only one (1) canopy *Eucalyptus crebra*. As long as impacts to this canopy species are avoided, it is considered unlikely that the production of a BDAR for any future development will be necessary.

5.2.2 Clearing Threshold

Should clearing or vegetation management (for bushfire protection) of native vegetation for any future development exceed 0.5ha, offsetting will be required through the retiring of ecosystem and species credits within the BOS. A BDAR will also be required to assess these impacts. However, given the Subject Site's exotic-dominated nature, it is considered unlikely that the clearing threshold will be reached.

6. Biodiversity Values and Constraints Mapping

Narla has mapped the Subject Site into two (2) levels of 'Biodiversity Values and Development Constraints' (**Figure 7**). The interpretation of each zone is detailed in **Table 8**.

This map was produced using information gathered from both desktop assessment of existing/historical mapping and data obtained from fieldwork undertaken by the Narla Ecologists. It is to be used as a guide only and a strong degree of caution must be expressed when interpreting it.

Table 8. Biodiversity values and constraints mapping key.

Zone	Description
Low Constraints Area – Green	This zone is deemed to have high potential for future development with accompaniment of the appropriate environmental assessments and implementation of appropriate restrictions and guidelines. This zone encompasses: ▪ Areas mapped as containing Exotic-dominated Grassland.
High Constraints Area – Red	This zone is deemed to have a low potential for future development without the accompaniment of substantial environmental assessments, impact mitigation strategies (such as BDAR and offsetting): This zone encompasses: ▪ Areas mapped as containing Cumberland Shale Plains Woodland.

Figure 7. Ecological Constraints Mapping within the Subject Site.

7. Conclusion

The Subject Site has been classified into two (2) levels of constraint for potential future development. Most of the Subject Site is considered to be of low constraint owing to its exotic-dominated nature and lack of midstorey or canopy species.

Future works within the Subject Site should aim to minimise impacts to native eucalypt species (high constraint) owing to their importance as the only native species within the Subject Site, and their value in conforming to a Critically Endangered Ecological Community.

Where possible, future landscaping works should aim to incorporate locally native species of the Cumberland Shale Plains Woodland Vegetation Community in order to enhance the biodiversity values within the Subject Property.

8. References

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9. Appendices

Appendix A. Flora species identified within the Subject Property.

Appendix B. Fauna species identified within the Subject Property.

Appendix A. Flora species identified within the Subject Property.

Scientific Name	Canopy	Midstorey	Ground
*Cardamine hirsuta**			X
*Cenchrus clandestinus**			X
*Cerastium glomeratum**			X
*Cestrum parqui***			X
*Cirsium vulgare**			X
Cynodon dactylon			X
*Eleocharis palustris**			X
Eucalyptus crebra	X		
Eucalyptus tereticornis		X	
*Fumaria muralis**			X
*Hypochaeris glabra**			X
*Hypochaeris radicata**			X
*Lolium perenne**			X
*Lysimachia arvensis**			X
*Medicago polymorpha**			X
*Medicago sativa**			X
*Modiola caroliniana**			X
*Plantago lanceolata**			X
*Plantago media**			X
*Raphanus raphanistrum**			X
*Rumex crispus**			X
*Senecio madagascariensis***			X
*Solanum spp.**			X
*Sonchus oleracus**			X
*Stachys arvensis**			X
*Stellaria media**			X
*Taraxacum officinale**			X
*Trifolium repens**			X
*Ulmus parvifolia**		X	
*Veronica persica**			X
*Vicia sativa**			X

** Denotes exotic species.*

***Denotes Priority Weed.*

Appendix B. Fauna species identified within the Subject Property.

Class	Scientific Name	Common Name	Status
Aves	*Acridotheres tristis*	Common Myna	Exotic
	Chenonetta jubata	Australian Wood Duck	Protected
	Corvus coronoides	Australian Raven	
	Cracticus torquatus	Grey Butcherbird	
	Eolophus roseicapilla	Galah	
	Grallina cyanoleuca	Magpie Lark	
	Gymnorhina tibicen	Australian Magpie	
	Hirundo neoxena	Welcome Swallow	
	Malurus cyaneus	Superb Fairy Wren	
	Manorina melanocephala	Noisy Miner	
	Ocyphaps lophotes	Crested Pigeon	
	Platycercus eximius	Eastern Rosella	
	Rhipidura leucophrys	Willie Wagtail	
	Vanellus miles	Masked Lapwing	

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