

Pendle Hill High School Biodiversity Development Assessment Report

Cornock Avenue Toongabbie NSW 2146

NCA21R1920

16 March 2021





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1 INTRODUCTION

1.1 SCOPE

Kleinfelder Australia Pty Ltd (Kleinfelder) was engaged by TSA on behalf of the NSW Department of Education to prepare a Biodiversity Development Assessment Report (BDAR) to support a State Significant Development Application (SSDA) for the proposed Pendle Hill Highschool development located at Cornock Avenue, Toongabbie (Lot 101/DP1141329). The proposed development will comprise a new administration, reception and general learning facilities building, a multi-media workshop and learning studio space, lecture facilities, and a purpose-built learning resource centre (library). The layout of the proposed development is shown in **Figure 1**.

This assessment has been undertaken in accordance with the NSW Biodiversity Assessment Method (BAM) Streamlined Assessment Module (Department of Planning, Infrastructure and Environment [DPIE] 2020f) under the *Biodiversity Conservation Act 2016* (NSW) (BC Act).

The following terms are used throughout this report to describe particular geographical areas:

- **Study Area** – Cornock Avenue, Toongabbie (Lot 101/DP1141329) (6.6 hectares [ha]) (**Figure 1**).
- **Development Site** - The area within the Study Area to be directly impacted by the proposed Project (0.48 ha)
- **Locality** - Land within a 5-kilometre (km) radius of the Study Area.

This report identifies flora, fauna threatened species present, or likely to occur within the Study Area based on species and/or habitats detected during field surveys and threatened flora and fauna records from the locality. An assessment of the likely impacts on identified threatened species, habitat features and vegetation communities as a result of the development proposal is also undertaken.

1.2 LOCAL CONTEXT

The Study Area is located within the suburb of Toongabbie within the Parramatta Council Local Government Area (LGA). The site is situated within a well-established residential area approximately 5km west of Parramatta CBD.

The site is bound by residential development and Favell Street to the north; Binalong Road to the east; residential development, Knox Street and Cornock Avenue to the south; and residential development and Bungaree Road to the west (**Figure 2**).

1.3 PROPOSED DEVELOPMENT

The proposed Pendle Hill Highschool development includes the following:

- Construction of a new three-storey courtyard building on Binalong Road comprising two (2) three-storey wings under a connected roof which will accommodate a library, staff unit, lecture theatre, multimedia and senior learning spaces, administration unit and student amenities;
- External transport infrastructure upgrade works;
- New covered walkways and upgraded landscaping; and



- New hard stand areas for bicycle parking.

Disturbance within the Development Site will impact an area of approximately 0.38 ha of exotic grassland (managed), 0.08 ha of planted native vegetation and 0.02 ha of existing infrastructure. Disturbance will involve the removal of all vegetation from these areas. Limb removal of some trees may be required for building protection.

1.3.1 Secretary's Environmental Assessment Requirements (SEARs)

The Planning Secretary's Environmental Assessment Requirements (SEARs) issued on 26 October 2020 details the specific matters to be considered in the Environmental Impact Statement (EIS).

Item 11 of the SEARs specifies the following requirements in relation to consideration of Biodiversity:

- *Provide a Biodiversity Development Assessment Report (BDAR) that assesses the biodiversity impacts of the proposed development in accordance with the requirements of the Biodiversity Conservation Act 2016, Biodiversity Conservation Regulation 2017 and Biodiversity Assessment Method, except where a BDAR waiver has been issued in relation to the development or the development is located on biodiversity certified land.*
- *Where a BDAR is not required because a BDAR waiver has been issued in relation to the development, provide:*
 - *a copy of the BDAR waiver and demonstrate that the proposed development is consistent with that covered in BDAR waiver.*
 - *an assessment of flora and fauna impacts where significant vegetation or flora and fauna values would be affected by the proposed development.*
- *Where a BDAR is not required because the proposed development is located on biodiversity certified land:*
 - *demonstrate that the proposed development is located on biodiversity certified land and provide details of relevant order(s) conferring biodiversity certification to the land and any associated maps.*
 - *identify if the site is affected by, or the proposed development impacts upon, any relevant biodiversity measures set out in an order conferring biodiversity certification to the land and provide details of any relevant consistency reviews considered in the preparation of planning controls affecting the site.*
 - *identify if the site contains mapped existing or protected native vegetation and demonstrate that the proposed development is consistent with the provisions that apply to the mapped areas.*
 - *an assessment of flora and fauna impacts where significant vegetation or flora and fauna values would be affected by the proposed development.*

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- Study Area (Lot 101 DP 1141329)
- Development Site
- Primary Road
- Arterial Road
- Sub-arterial Road
- Local Road
- Dedicated Bus Way
- Access Way
- Watercourse



DATE DRAWN: 2021/02/09 22:12 Version 1

DATA SOURCE:
NSW DFSI - 2020
Nearmap - 2021

NSW Department of Education
Biodiversity Development Assessment Report
Pendle Hill High School
Cornock Avenue, Toongabbie NSW
Lot 101 DP 1141329

1

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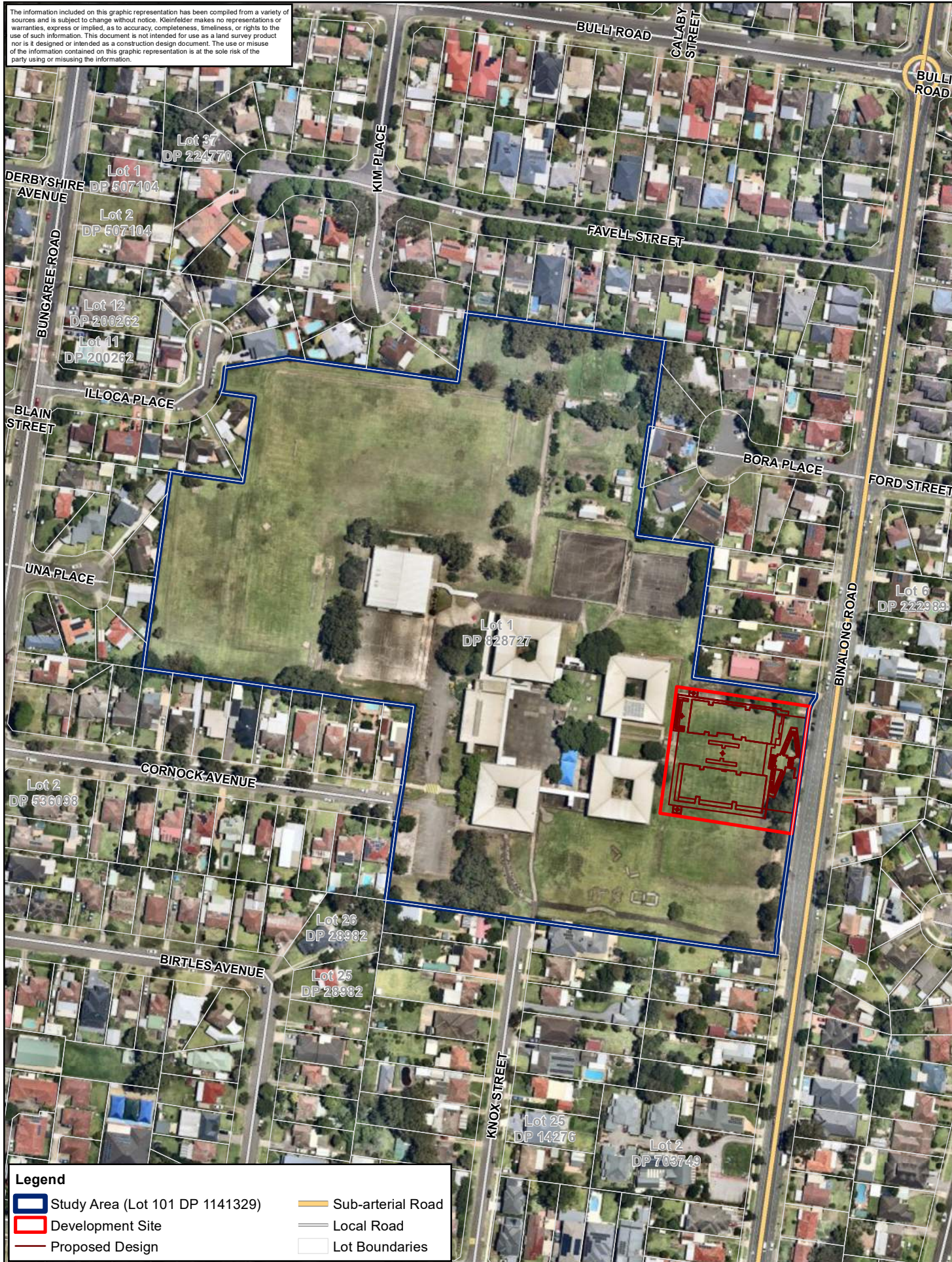


FIGURE:

2



1.4 INFORMATION SOURCES

The following sources of information were used in to appropriately inform the Biodiversity Assessment Report:

- The NSW DPIE, BioNet Atlas (DPIE 2020a) for previous records of threatened species, populations and ecological communities within 5 km radius of the Development Site.
- The Commonwealth Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) (DAWE 2020a) for Matters of National Environmental Significance (MNES) including predicted threatened species, populations and ecological communities.
- The NSW DPIE, BioNet Vegetation Classification Database (DPIE 2020b) for identification and allocation of Plant Community Types (PCTs) to vegetation zones on site.
- The NSW DPIE, BioNet Threatened Biodiversity Data Collection (DPIE 2020c), Threatened Species Profiles (DPIE 2020d) and Final Determinations (DPIE 2020e) for information on threatened species, populations, and ecological communities.

1.5 LEGISLATIVE CONTEXT

This assessment was undertaken in accordance with and/or in consideration of the following Acts and Policies:

- **Commonwealth:**
 - *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- **NSW:**
 - Biodiversity Assessment Method (BAM) (DPIE 2020f).
 - *Biodiversity Conservation Act 2016* (NSW) (BC Act).
 - *Biodiversity Conservation Regulation 2017* (NSW) (BC Regulation).
 - *Biosecurity Act 2015* (NSW).
 - *Coastal Management Act 2016*.
 - *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).
 - *Local Land Services Act 2013* (NSW) (LLS Act).
 - *State Environmental Planning Policy (Koala Habitat Protection) 2019* (NSW) (Koala SEPP).
 - *State Environmental Planning Policy (Coastal Management) 2018* (NSW) (SEPP Coastal Management).
 - *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017* (NSW).
 - *Water Management Act 2000* (NSW) (WM Act).
- **Local:**
 - Parramatta Local Environmental Plan 2011
 - Port Stephens Development Control Plan 2011

1.5.1 *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

Under the EPBC Act, an approval is required for actions that are likely to have a significant impact on MNES. An action includes a project, development, undertaking, activity or series of activities. When a person proposes to take an action they believe may need approval under the EPBC Act, they must refer the proposal to the Australian Government Minister for the Environment. The Act identifies nine MNES:



- World Heritage properties.
- National heritage places.
- Wetlands of international importance (Ramsar Convention).
- Listed threatened species and communities.
- Migratory species listed under international agreements.
- Great Barrier Reef Marine Park.
- Commonwealth marine areas.
- Nuclear actions; and
- Water resources in respect to CSG and large coal mines.

While this BDAR is not required to address MNES, the proponent is required to address the EPBC Act as part of their development application to Council.

Refer to **Section 5** for a summary of the impact assessment.

1.5.2 Biodiversity Conservation Act 2016 (NSW)

1.5.2.1 Biodiversity Assessment Pathway

The Project has been assessed in accordance with the BAM (DPIE 2020a). Gilbert Whyte (Assessor Number BAAS18041) is the Biodiversity Accredited Assessor for the project.

Section 2.2 of the BAM (DPIE 2020a) summarises the streamlined assessment modules that may be used by an assessor. These streamlined assessment modules may be used where the proposed development impacts on:

- A. Scattered trees (Appendix B of the BAM).
- B. A small area (Appendix C of the BAM).
- C. Planted native vegetation, where the planted native vegetation was planted for purposes such as street trees and other roadside plantings, windbreaks, landscaping in parks and gardens, and revegetation for environmental rehabilitation (Appendix D of the BAM).

Appendices B, C and D of the BAM set out the circumstances where each of the streamlined assessment modules can be used to assess a proposal and the specific assessment requirements. Streamlined assessment modules cannot be used to assess clearing within areas mapped by the NSW Biodiversity Values Map.

The decision-making key in Appendix D of the BAM (DPIE 2020a) was utilised to determine that the Streamlined Assessment Module – Planted Native Vegetation can be used to assess the proposed development. This is based on the following:

- The planted native vegetation to be impacted for the proposed development cannot be reasonably assigned to a PCT known to occur in the Sub IBRA Region.
- The planted vegetation has not been planted for the purposes of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9 (2).
- The planted native vegetation is not comprised of individuals of a threatened species or other native species planted/translocated for the purposes of providing threatened species habitat.
- The planted native vegetation is planted for aesthetic purposes (i.e. landscaping).

Further justifications of the use of the planted tree module are presented in **Table 2**.



1.5.3 Koala SEPP 2020

The Koala SEPP 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.

Where a Koala Plan of Management (KPoM) applies to the land, Clause 8 of the Koala SEPP applies to the development. The proposed development must be consistent with the approved KPoM that applies to the land.

There is currently no KPoM for the Parramatta LGA, which is not included in Schedule 1 of the Koala SEPP 2020 therefore the SEPP does not apply to this development.

1.5.4 Biosecurity Act 2015 (NSW)

Under the *Biosecurity Act 2015* (NSW) all plants are regulated with a general biosecurity duty “to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.” Under the Act, a biosecurity impact “is an adverse effect on the economy, environment, or the community that arises, or has the potential to arise, from a biosecurity matter.” This legislation is addressed in **Section 5**.

1.5.5 Coastal Management Act 2016

The *Coastal Management Act 2016* replaces the *Coastal Protection Act 1979* and establishes a strategic framework and objectives for managing coastal issues in NSW. The Act promotes a focus on ecologically sustainable development in relation to the ‘coastal zone’ as defined by the Act comprising of four coastal management areas:

- Coastal wetlands and littoral rainforests area – areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by SEPP 14 and SEPP 26
- Coastal vulnerability area – areas subject to coastal hazards such as coastal erosion and tidal inundation
- Coastal environment area – areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included
- Coastal use area – land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

The Coastal Management SEPP (commenced on 3 April 2018) updates and consolidates into one integrated policy: SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection), including clause 5.5. of the Standard Instrument – Principal Local Environmental Plan. These policies are now repealed.

The Coastal Management SEPP gives effect to the objectives of the *Coastal Management Act 2016* from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone. It defines the four coastal management areas in the Act through detailed mapping and specifies assessment criteria that are tailored for each coastal management area. Councils and other consent authorities must apply these criteria when assessing proposals for development that fall within one or more of the mapped areas.



The four coastal management areas are:

- **Coastal wetlands and littoral rainforests area** – areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by SEPP 14 and SEPP 26.
- **Coastal vulnerability area** – areas subject to coastal hazards such as coastal erosion and tidal inundation.
- **Coastal environment area** – areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included.
- **Coastal use area** – land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

No Areas of Coastal Wetland, mapped under the Coastal Management SEPP, occur within the Study Area. The closest mapped area of Coastal Wetlands occurs 5km to the South East of the Study Area.

1.5.6 Water Management Act 2000

Controlled activities carried out in, on or under waterfront land are regulated by the Water Management Act (WM Act). 'Waterfront land' is defined as the bed of any river, lake or estuary, and the land within 40 m of the river banks, lake shore or estuary mean high water mark. A first order stream flows through the centre of the Study Area and over 40 m to the east of the Development Site. As such, the Project has avoided impacts to the waterbody and the vegetated riparian zone along the western bank of the waterbody. The Project therefore does not constitute a 'controlled activity' as per the WM Act.



2 LANDSCAPE CONTEXT

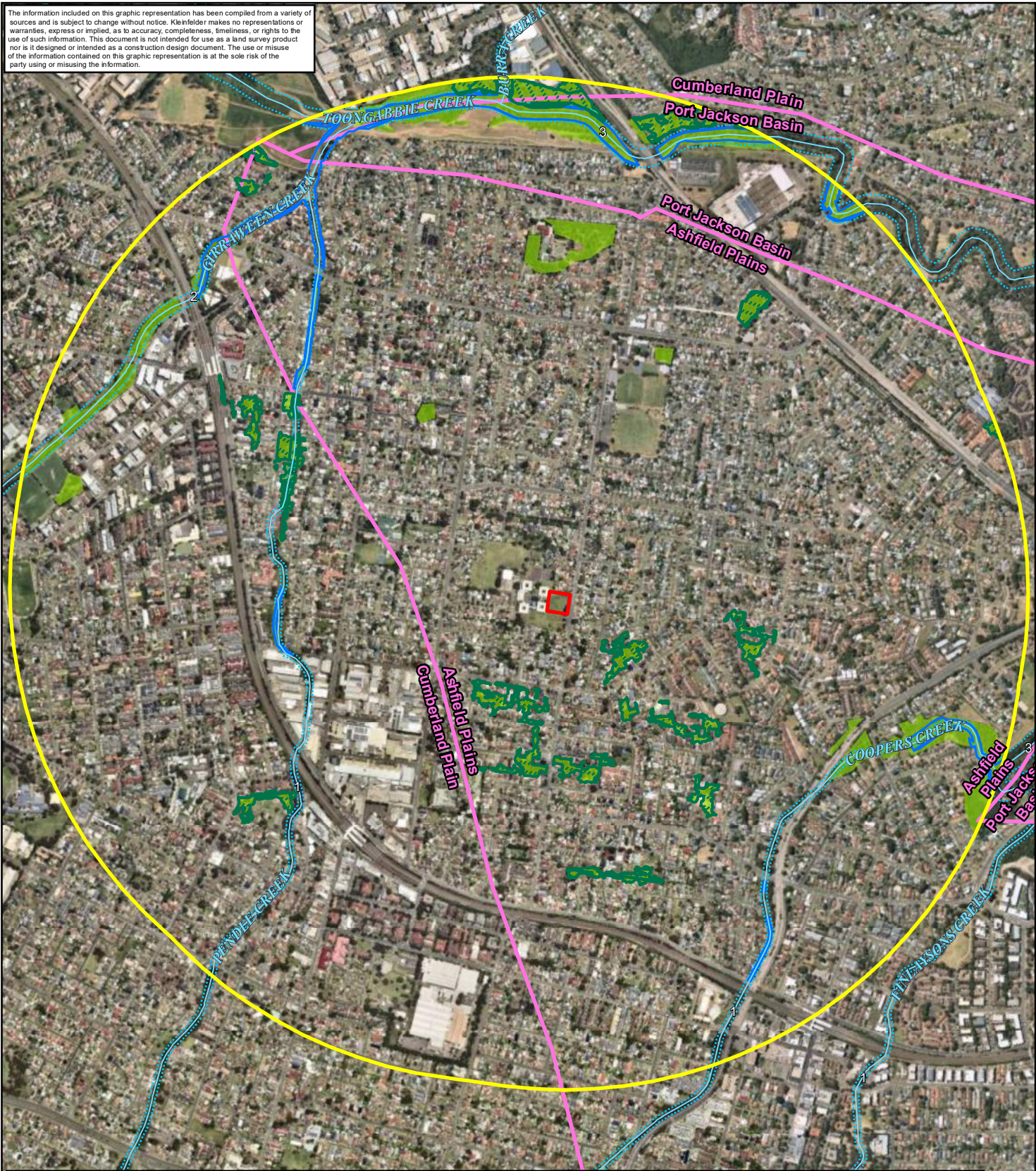
2.1 LANDSCAPE FEATURES

The landscape features detailed in Section 3 of the BAM (DPIE 2020f) and applicable to the Development Site are described in **Table 1**. These landscape features are also shown on **Figure 3**.

Table 1: Landscape Features relevant to the Development Site.

Landscape Feature	Development Site
IBRA Region	NSW Sydney - The Development Site occurs centrally within the Sydney Basin Bioregion.
IBRA Sub Region	Cumberland - The Development Site occurs within the Cumberland IBRA Sub Region.
Local Government Area (LGA)	Parramatta Council Local Government Area
Mitchell Landscapes	Ashfield Plains (Department of Environment and Climate Change [DECC], 2002; Mitchell 2002) Undulating hills and valleys on horizontal Triassic shale and siltstone, occasional quartz sandstones especially near the margin of the Port Jackson landscape. General elevation 0 to 45m, local relief <20m. Coastal extension of the Cumberland Plain landscape. Red and brown texture-contrast soils on crests grading to yellow harsh texture-contrast soils in valleys. Open forest of broad-leaved ironbark (<i>Eucalyptus fibrosa</i> ssp. <i>fibrosa</i>), grey box (<i>Eucalyptus moluccana</i>), with tea-tree (<i>Leptospermum</i> sp.) along creeks and forests of turpentine (<i>Syncarpia glomulifera</i>), red mahogany (<i>Eucalyptus resinifera</i>), grey gum (<i>Eucalyptus punctata</i>), Sydney blue gum (<i>Eucalyptus saligna</i>) and blackbutt (<i>Eucalyptus pilularis</i>) with a grassy understorey of kangaroo grass (<i>Themeda triandra</i>) on moister sites.
Rivers, streams and estuaries	Mapped watercourses occur 900m to the West (Pendle Creek) and 1.2km to the East (Coopers Creek). The Study Area is outside of the Riparian Buffer for this waterbody (Figure 3). No other streams, rivers or estuaries are within proximity to the Study Area.
Wetlands	The Study Area is not in proximity to any Wetlands of Importance or RAMSAR wetlands. The closest wetland is 5km to the South East.
Connectivity of different areas of habitat	The Study Area is not connected to any larger areas of vegetation as it is isolated by roads and residential dwellings (Figure 3).
Areas of geological significance and soil hazard features	The Study Area is not located with an area identified as having any particular geological significance. No mapping was identified that would indicate the site contains any soil hazard features.
Areas of outstanding biodiversity value	There are no areas of outstanding biodiversity value mapped within the Development Site or Study Area.
Geology and Soils	Blacktown (9030bt) - This Soil Landscape occurs on gently undulating rises on Wianamatta Group shales. Local relief to 30 m, slopes usually >5%. Broad rounded crests and ridges with gently inclined slopes. Cleared Eucalypt woodland and tall open-forest (dry sclerophyll forest).

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Legend

Development Site
 Landscape Assessment - 1500m Buffer
 Landscape Assessment - Native Vegetation

Biodiversity Values (v11)

Protected Riparian Land
 Threatened species or communities with potential for serious and irreversible impacts

IBRA Sub-region Boundary (V7) - entire map view is within Sydney Basin Region: Cumberland Sub-region
 Mitchell Landscapes Boundary (V3)
 Watercourse (Labelled with stream order)
 Riparian Buffers

00.10.20.40.60.81 Bright People. Right Solutions. www.kleinfelder.com	PROJECT REFERENCE: 20213532 DATE DRAWN: 2021/02/10 14:06Version 1 DRAWN BY: GJoyce DATA SOURCE: NSW DFSI - 2020 NSW EOH - 2020 Nearmap - 2021	Landscape Context NSW Department of Education Biodiversity Development Assessment Report Pendle Hill High School Cornock Avenue, Toongabbie NSW Lot 101 DP 1141329	FIGURE: 3
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3 NATIVE VEGETATION

3.1 METHODOLOGY

Native vegetation at the Development Site was assessed in accordance with Section 4 of the BAM (DPIE 2020f).

3.1.1 *Field Survey*

Flora and Fauna field surveys were conducted by qualified ecologists on 5 February 2021. These surveys were undertaken to determine the existing vegetation communities and flora species present and the likelihood of occurrence of threatened ecological communities.

3.1.2 *Data Review*

The identification of vegetation communities was based on dominant species present in the upper stratum, mid stratum and ground stratum. The species associations recorded in the Study Area were compared to descriptions of vegetation communities in the surrounding area and were found not to conform to any vegetation community.

3.1.3 *Vegetation Mapping Surveys*

Vegetation Mapping and Surveys

Detailed vegetation surveys were conducted across the Study Area on the 5 February 2021. Areas of vegetation to be impacted by the development were mapped. Each individual tree was marked on a handheld GPS and details of each tree such as species, diameter at breast height (DBH), presence of hollows, fauna occupancy was recorded.

Plant Community Type Determination

Each vegetation community identified within the Study Area was assigned to the closest equivalent PCT from those listed in the BioNet Vegetation Classification database (DPIE 2020b). The closest equivalent PCT for each vegetation community was determined through a comparison of the floristic descriptions of PCTs in the database with the plot / transect data collected from the site. In addition to floristic and structural similarity, the landscape position, soil type and other diagnostic features of the vegetation communities on the site were compared to the descriptions in the database to determine the most suitable PCT. Threatened ecological communities (TECs) as defined in NSW and Commonwealth legislation were also identified if present.

Floristic Identification and Nomenclature

Floristic identification and nomenclature is based on classification by Royal Botanic Gardens and Domain Trust, Sydney, published on PlantNET (the NSW Plant Information Network System <http://plantnet.rbgsyd.nsw.gov.au>). For use in the BAM Calculator, native species were assigned to growth forms as per their classification in BioNet, and High Threat Weeds were classified as per the list published by The Biodiversity Conservation Division (BCD, formerly known as the Office of Environment and Heritage or OEH).



Table 2 Appendix D (BAM 2020) Streamlined Assessment Module – Planted Native Vegetation Decision Key

Decision Key Criteria	Answer	Justification
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? (i). Yes - The planted native vegetation must be allocated to the best-fit PCT and the BAM must be applied. (ii). No - Go to 2.	No	A PCT could not be allocated to the vegetation onsite with the assemblage of species present within the development footprint. (See Plate 1-2)
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 b. the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat? (i). Yes - The planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM. (ii) No - Go to 3.	No	The planted vegetation present onsite does not constitute rehabilitation or regeneration of a plant community type.
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)? (i). Yes - The planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM. (ii) No - Go to 4.	No	One threatened species was found (<i>Eucalyptus nicholii</i>) but is not within the Development Site and is commonly known to be a planted species. Habitat for the species is also limited to the Northern Tablelands region and is not known to occur naturally within the Cumberland Sub region.



Decision Key Criteria	Answer	Justification
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? (i). Yes - Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied). (ii) No - Go to 5.	No	One threatened species was found (<i>Eucalyptus nicholii</i>) but is not within the Development Site and is commonly known to be a planted species. Habitat is also limited to the Northern Tablelands region and is not known to occur naturally within the Cumberland Sub region.
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? (i). Yes - Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied). (ii) No - Go to 6.	Yes	The native vegetation present onsite has been planted for aesthetic purposes (i.e. landscaping).
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)? (i). Yes - Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied). (ii) No - There may be other types of occurrences of planted native vegetation that do not easily fit into the decision-making key above. Assessors should contact the BAM Support mailbox at bam.support@environment.nsw.gov.au for further advice on using the BAM to assess other types of occurrences of planted native vegetation.	N/A	N/A

In accordance with Table 28 of the BAM (DPIE, 2020a) impacts to the Planted Native/Exotic Woody Vegetation have been considered in the context of potential habitat for threatened species throughout this report. The removal of this vegetation from the Development Site does not generate ecosystem credits.



Plate 1 **Photograph of planted native vegetation within the Development Site.**



Plate 2 **Photograph of planted native vegetation and manage exotic grasslands within the Development Site.**



3.2 RESULTS

3.2.1 Flora

The native vegetation mapping of the Sydney Metropolitan area version 3.0 (2016) did not map any vegetation communities as occurring across the Study Area. Field surveys determined that the vegetation is a mix of native and exotic planted vegetation, gardens and lawns. Under the streamlined assessment for planted vegetation, all native vegetation within the Development Site is considered planted. This vegetation does not represent any native Plant Community Types (PCTs) (**Figure 4**).

The exotic grassland (managed) mainly consisted of *Cynodon dactylon* (Green Couch) and several other exotic species including *Gamochaeta calviceps* (Cudweed), *Taraxacum officinale* (Dandelion), *Paronychia brasiliiana* (Chilean Whitlow) and *Eragrostis curvula* (African Lovegrass). The planted native woody vegetation consisted of *Eucalyptus tereticornis* (Forest Red Gum), *Corymbia maculata* (Spotted Gum), *Callistemon viminalis* (Weeping Bottlebrush), *Corymbia citriodora* (Lemon-scented Gum), *Lophostemon confertus* (Brush Box) and *Grevillia robusta* (Silky Oak). Exotic planted trees within the Study Area included *Jacaranda mimosifolia* (Jacaranda).

Disturbance within the Development Site consists of 0.08 ha of planted native vegetation and 0.38 ha exotic grassland (managed).

A vegetation map is provided in (**Figure 4**) and site photographs are provided in **Appendix 5**.

3.2.2 Fauna

A hollow bearing tree and nest surveys were conducted within the Development Site. No hollow bearing trees or nests were found.

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Legend

 Study Area (Lot 101 DP 1141329)

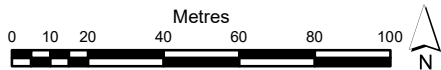
 Development Site

Vegetation Mapping

 Planted Native Vegetation/Gardens

 Exotic Grassland (Managed)

 Existing Infrastructure



PROJECT REFERENCE: 20213532

DATE DRAWN: 2021/02/10 16:15 Version 1

DRAWN BY: G.Joyce

DATA SOURCE:
NSW DFSI - 2020
Nearmap - 2021

Vegetation Mapping

NSW Department of Education
Biodiversity Development Assessment Report
Pendle Hill High School
Cornock Avenue, Toongabbie NSW
Lot 101 DP 1141329

FIGURE:

4



4 THREATENED SPECIES

Flora and fauna field surveys were conducted by Kleinfelder on 5 February 2021. These surveys were undertaken to determine the likelihood of occurrence of threatened flora and fauna species within the Development Site. The survey effort is shown in **Figure 5**.

The flora and fauna survey methods were designed to satisfy standards established by the Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (DEC 2004). A reduced survey effort was considered adequate given that the vegetation assessment revealed that the Development Site contains minimal biodiversity values and habitat features for threatened species.

4.1 ASSESSING HABITAT SUITABILITY

To inform the assessment of suitable habitat for threatened species and populations within the Study Area, a database search of the NSW DPIE BioNet Atlas (DPIE 2020a) and the Commonwealth DAWE Protected Matters Search Tool (PMST) (DAWE 2020a) were conducted. Results of the database search and 'likelihood of occurrence' assessment are provided in **Appendix A**.

A total of 86 threatened species and communities have previously been recorded or are modelled to occur within a 5 km radius of the Study Area (**Appendix 1**) (DAWE 2020; Department of Planning, Industry and Environment 2020). These include 11 Threatened Ecological Communities, 33 plant, four amphibian, 21 bird, 14 mammal, one reptile and two gastropod species. Additionally, there were eight migratory only bird species modelled to occur within a 5 km radius of the Study Area.

4.1.1 Flora

Habitat for threatened flora species was generally absent within the Study Area. A single threatened species *Eucalyptus nicholii* (Narrow-leaved Peppermint) was surveyed to be within the Study Area but outside the Development Site (**Figure 6**). *E. nicholii* is commonly known to be a planted species and habitat is also limited to the Northern Tablelands region and is not known to occur naturally within the Cumberland Sub region.

4.1.2 Fauna

4.1.2.1 Habitat Assessment

The assessment of fauna habitat undertaken across the Development Site was conducted during the field surveys conducted by Kleinfelder on the 5 February 2021. A map of the vegetation assessed within the Study Area is provided in **Figure 4**.

Fauna habitat values observed during inspections of the Development Site were recorded. Attributes considered important to fauna include hollow-bearing trees, nests, caves, fallen timber/hollow logs, abundance of nectar and fruit resources, water bodies, vegetation cover and structural complexity, fallen timber, leaf litter and connectivity to surrounding vegetation (corridors). Suitability of habitat for threatened fauna species occurring in the locality was also assessed during the survey.

The Study Area has been historically cleared and managed as lawns and gardens in the school grounds. The tree species may provide marginal foraging and nesting habitat for bird species, but no habitat exists for arboreal fauna/hollow dependent species due to the lack of hollows.



No key terrestrial habitat features such as rocks or logs were detected within the Development Site. Small amounts of leaf litter were found such as mulch, which was applied to the managed gardens.

4.1.2.2 Habitat Tree Survey

A survey of trees within the Development Site was undertaken to locate hollow-bearing trees, dead standing stags and trees containing nests. The location of habitat trees was recorded using a handheld GPS unit and the type of feature it contained was recorded. For trees with hollows, the number and size of hollows was recorded. Hollow size was classified as either small (< 8 cm diameter), medium (8 – 20 cm diameter) or large (> 20 cm diameter) based on the size of the hollow entrance.

No hollow-bearing trees were identified within the Subject Site; therefore, no roosting or breeding habitat for hollow dependent fauna species occurs.

4.1.3 Flora Surveys

The site inspection involved random meanders over the Subject Site. These meanders were used to compile a list of flora species present within the Subject Site as well as targeted searches for threatened flora known to occur within the locality and potentially in the Study Area. All plant species observed during meander surveys were recorded.

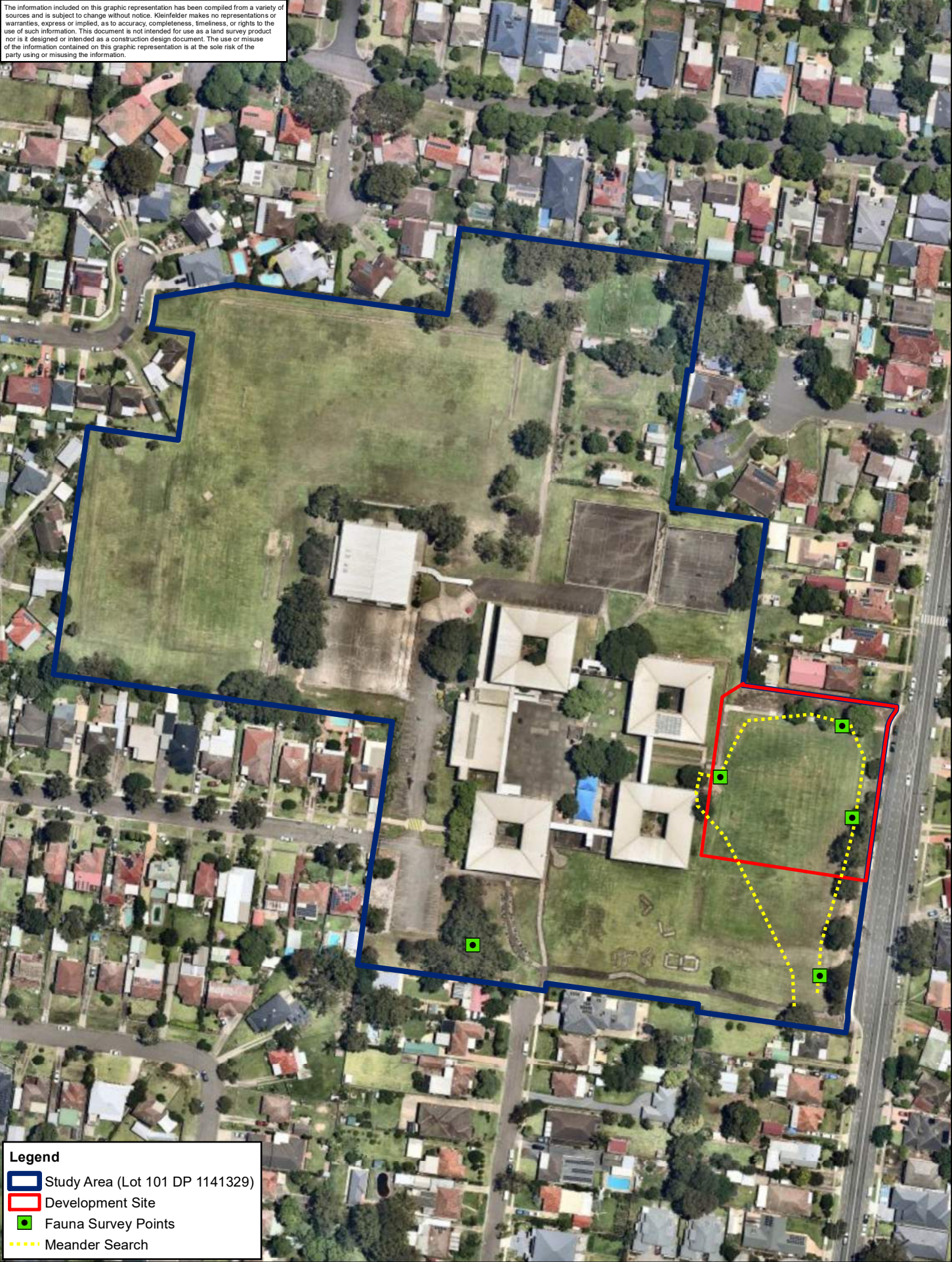
4.1.4 Fauna Surveys

4.1.3.1 Diurnal Survey

During the diurnal fauna survey, any vertebrate fauna detected via sighting or calls were recorded. This included:

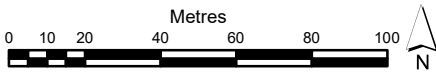
- Searching through any microhabitat that may be available in each Section of Subject Site for fauna that may use litter for cover.
- Diurnal bird surveys were conducted during the site visit all bird species were noted whilst onsite.
- No nocturnal surveys were required due to the lack of hollows/habitat present onsite.

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Legend

-  Study Area (Lot 101 DP 1141329)
-  Development Site
-  Fauna Survey Points
-  Meander Search



PROJECT REFERENCE: 20213532

DATE DRAWN: 2021/02/10 16:56 Version 1

DRAWN BY: G.Joyce

DATA SOURCE:
NSW DFSI - 2020
Nearmap - 2021

Survey Effort

NSW Department of Education
Biodiversity Development Assessment Report
Pendle Hill High School
Cornock Avenue, Toongabbie NSW
Lot 101 DP 1141329

FIGURE:

5



4.1.4 Flora Survey Results

A total of 39 flora species were identified during field surveys in the three vegetation strata (**Appendix 2**). The data from the flora survey would be used to update **Appendix 1**, with one additional threatened species detected outside the subject site (**Figure 6**). Twenty flora species were native (two not endemic to region) and 19 species were considered weed species. Native plant species were comprised of the following growth forms:

- 4 forb species;
- 2 grass and grass-like species;
- 1 rush species; and
- 13 tree species.

A complete list of the flora species identified within the Study Area is provided in (**Appendix 2**).

4.1.5 Fauna Survey Results

The fauna survey (**Appendix 3**) was used to update **Appendix 1**. During the field survey, no threatened species were recorded in the Study Area. Nine common (non-listed) bird species were observed.

No Species Credit Species (Breeding Habitat) or Ecosystem Credit Species (Foraging Habitat) individuals were surveyed to be present on the subject site.

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Legend

Study Area (Lot 101 DP 1141329)

Development Site

Eucalyptus nicholii (Narrow-leaved Peppermint)

Vegetation Mapping

Planted Native Vegetation/Gardens

Exotic Grassland (Managed)

Existing Infrastructure

PROJECT REFERENCE: 20213532

DATE DRAWN: 2021/02/10 16:59 Version 1

DRAWN BY: G.Joyce

DATA SOURCE:

NSW DFSI - 2020

Nearmap - 2021

Threatened Species

NSW Department of Education

Biodiversity Development Assessment Report

Pendle Hill High School

Cornock Avenue, Toongabbie NSW

Lot 101 DP 1141329

FIGURE:

6

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5 IMPACT ASSESSMENT

5.1 ASSESSMENT OF IMPACTS

No prescribed impacts as defined under Part 7.2 of the BC Act are expected as a result of the proposed development.

5.1.1 Impacts on Threatened Species

As described in the BAM Section 8.1 (DPIE 2020a).

5.1.1.1 Direct Impacts – Threatened Flora Species

One threatened Flora species was found to occur within the Study Area (outside the Development Site) *Eucalyptus nicholii* (Narrow-leaved Black Peppermint) although this species is not from the region and is commonly known to be a planted species within the area.

No other threatened flora species were observed or modelled to occur within the Study Area or are likely to occur within the Development Site (**Appendix 1**). The Study Area contains only planted native vegetation and exotic grassland (managed) and is unlikely to provide habitat for any potentially occurring threatened flora species.

5.1.1.2 Direct Impact – Threatened Fauna species

Birds

One bird species was determined to have a moderate likelihood of occurrence in the Study Area (**Appendix 1**). This was:

- Little Lorikeet (*Glossopsitta pusilla*) (vulnerable) not observed in the Study Area.

The above species was not observed in the Study during the fauna survey. Approximately 0.08 ha of marginal habitat for these species, in the form of planted native vegetation, would be modified as a result of the proposed development. The proposed development is unlikely to have a significant impact on any individuals potentially occurring in the Study Area, as the area to be modified is relatively small, and comprises isolated planted native vegetation and exotic grassland (managed).

Mammals

Two mammal species were determined to have a moderate likelihood of occurrence in the Study Area (Appendix 1). These were:

- Grey-headed Flying-fox (*Pteropus poliocephalus*) (vulnerable), potential foraging habitat present but not observed in the Study Area.
- Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*) (vulnerable) potential foraging habitat present with no roosting habitat.

There is marginal foraging habitat for the two mammal species but no roosting or breeding habitat within the Study Area. The potential impact on native fauna from the modification of vegetation within the construction areas is expected to be negligible given vegetation disturbance would be limited to the removal of planted native vegetation and exotic grassland (managed). No large trees containing hollows are present within the Development Site therefore no stags or hollow-bearing trees would be removed.



The proposed development will not result in any habitat fragmentation or loss of connectivity at the local level which may hinder arboreal mammals from moving across the Study Area. The site has been historically cleared of native vegetation. The vegetation within the Development Site comprises only planted native vegetation and exotic grassland (managed).

Given the highly mobile nature of these species and minor scale of the development, it is unlikely that direct impacts would lead to a significant decline or local extinction of threatened mammals within the locality.

Amphibians, Reptiles, Gastropods and Insects

All amphibians, reptiles, gastropods, or insects returned by the database searches (**Appendix 1**) were considered to have a nil or low likelihood of occurrence in the Study Area and would not be impacted by the development.

5.1.2 Indirect Impacts

The Project has the potential to cause the following indirect impacts on land adjacent to the Development Site during construction:

- Increased levels of dust during construction.
- Increased levels of noise.
- Increased levels of light; however, the majority of operations are expected to be during the day, so increased light levels would be minimal.
- Erosion and sedimentation.
- Transfer of weeds and pathogens.

Mitigation measures outlined in Section 5.2 would minimise and avoid potential indirect impacts associated with the proposed development.

5.2 AVOIDING AND MINIMISING IMPACTS

5.2.1 Avoid and Minimising Impacts on Native Vegetation and Habitat

The proponent has reviewed various options regarding the location and layout of the Project. The proposed Development Site has been selected to limit clearing native vegetation. Areas of intact vegetation, current land use, location of approved developments, location of existing (or approved) roads and services and land zoning were all considered when selecting the location of the proposed development. Only disturbance to exotic grassland (managed) and planted native vegetation have been proposed for the location of the development. As such the use of this site was considered the best option to minimise environmental impacts.



5.2.2 Avoid and Minimise Impacts on Prescribed Biodiversity Impacts

The following are prescribed impacts which need to be considered as per section 8.3 of the BAM (DPIE 2020a).

5.2.2.1 Impact of development on the habitat of threatened species or ecological communities associated with significant geological features, human made structure or non-native vegetation.

No significant geological features, human made structures or non-native vegetation associated with threatened species habitat or ecological communities occur within the Study Area.

5.2.2.2 Impacts of the development on the connectivity of different habitat which facilitates movement of threatened species

The vegetation within the Study Area is not a key area for regional connectivity and does not represent an important local wildlife corridor; therefore, the proposed development would not increase fragmentation on a local scale. The proposed development will not impact any corridors or significantly increase fragmentation in the area.

5.2.2.3 Impact of the development on the movement of threatened species that maintains their life cycle

Impacts on vegetation as a result of the proposed development is confined to removal of planted native vegetation in the form of street trees and removal of exotic grassland (managed). Removal of such vegetation is not expected to be important to the movement of threatened species through the locality, nor are these habitats presumed to be necessary to maintain their life cycle.

5.2.2.4 Impacts of the development on water quality, bodies and hydrological processes that sustain threatened species or ecological communities.

The site contains no rivers, streams, estuaries or is within any buffer zones of the before mentioned.

5.2.2.5 Impact of wind turbine strikes on protected animals

Not applicable to the current application.

5.2.2.6 Impacts of vehicle strikes on threatened species or on animals that are part of a TEC

Vehicle and machinery movements are necessary during the construction phase of the Project. The site has an existing cleared area which allow access within the Study Area. Measures to minimise any potential impacts would be through the implementation of reduced vehicle speeds within and around the site.



5.2.3 Proposed Mitigation Measures

The final disturbance footprint for the proposed development is provided in **Figure 2**. A summary of mitigation and management measures for the project are outlined in **Table 3**.

Table 3 Mitigation and management measures for the proposed development

Impact	Action and Outcome	Responsibility	Timing
Direct impact / prescribed impact			
Clearing of native vegetation	- The area of disturbance should be kept to the minimum required. - Where practicable, canopy-layer vegetation within the maintenance areas should be pruned/lopped and any unnecessary clearing or tree removal should be avoided. - Clearly delineate the boundaries of the Development Site to ensure no accidental incursions within retained vegetation. - Identify and clearly mark 'No-Go Zones' (retained vegetation and site boundary). - Ensure vehicle and equipment parking areas and stockpile areas are identified and sited to avoid areas containing ecological value wherever practicable. - All personnel onsite to be made aware of the sensitivity of the surrounding environmental features (e.g. threatened fauna identified onsite).	Construction site manager	Prior to and during vegetation clearing.
Vehicle collision with fauna	- Speed limits within the Development Site will be limited to 40 km/hr. This limit should be clearly signed at all entry points to site. - Limit vehicle entry into Development Site where possible.	Construction site manager	During construction and operation
Displacement of resident fauna during clearing works	Directional clearing shall be undertaken whereby clearing will progress from the most disturbed parts of the site, working outwards towards retained vegetation, to encourage fauna to move into these areas.	Construction site manager	During vegetation clearing
Indirect Impact			
Transfer of weeds and pathogens to and from site.	- All plant, machinery and equipment to be used for vegetation clearing should be washed down before entering and leaving the site to prevent the spread and establishment of weeds, or fungal pathogens. - Restriction to designated roads (out of 'No-Go' zones). - All exotic vegetation removed from the Development Site to be disposed of off-site. - Weed infestations should be controlled as required during and following construction works. Priority should be given to the control of the following species:	Construction site manager	During vegetation clearing and construction
Accidental incursions during clearing	- Identify and clearly mark 'No-Go Zones' (retained vegetation and site boundary). - All personnel onsite to be made aware of the sensitivity of the surrounding environmental features (e.g. Planted native vegetation to be retained).	Construction site manager	During vegetation clearing and construction



Impact	Action and Outcome	Responsibility	Timing
Increase in dust and noise during clearing works	- Limit exposure of bare ground during clearing. - Reduce machinery noise where possible during clearing. - Dust suppression measures such as water to be utilised, as necessary.	Construction site manager	During vegetation clearing and construction
Increase in light pollution	Limit construction to daylight hours to limit light pollution on nocturnal fauna.	Construction site manager	During vegetation clearing and construction
Erosion and sedimentation	Erosion and sedimentation mitigation measures to be put in place prior to commencement of tree clearing works to prevent sedimentation into retained vegetation (e.g. bunds or sediment fencing).	Construction site manager	Prior to commencement of works.
Waste	- Waste management procedures to be identified prior to commencement of works. - Spill Response Procedures to be in place and spill kits to be present during clearing works. - All general waste to be removed from site.	Construction site manager	Prior to and during tree clearing.

5.3 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

5.3.1 Assessment Requirements

The EPBC Act requires that developments or undertakings that are likely to have a significant impact on MNES be referred for a determination as to whether they are a controlled action which requires approval under the EPBC Act (Section 1.5.1). Of the nine MNES listed under the Act, those considered relevant to the Study Area are potential impacts on listed threatened species or communities and potential impacts on migratory species listed under international agreements. The results of a search of the relevant threatened species database and an assessment of the likelihood of occurrence of threatened and migratory species is provided in **Appendix A**. Three Fauna Species were assessed to have a Moderate likelihood of occurrence within the Study Area these include one threatened species Grey-headed Flying-fox (*Pteropus poliocephalus*) and two Migratory species Pacific Swift (*Apus pacificus*) and White-throated Needletail (*Hirundapus caudacutus*).

Approximately 0.08 ha of marginal habitat for these species, in the form of planted native vegetation, would be modified as a result of the proposed development. The proposed development is unlikely to have a significant impact on any individuals potentially occurring in the Study Area, as the area to be modified is relatively small, and comprises isolated planted native vegetation and exotic grassland (managed).

It was determined that impacts to MNES are unlikely. An EPBC referral to the Commonwealth Minister for the Environment is not recommended.



6 IMPACT SUMMARY

The proposed Pendle Hill Highschool development at Cornock Avenue, Toongabbie comprises of a new administration, reception and general learning facilities building, a multi-media workshop and learning studio space, lecture facilities, and a purpose-built learning resource centre (library).

The proposed development would involve the removal of approximately 0.08 ha of planted native vegetation and 0.38 of exotic grassland (managed). This vegetation provides potential foraging habitat for three threatened fauna species; however, the habitat is not considered to be important to the long-term viability of populations of any of these species in the locality.

The proposed development is unlikely to have a significant impact on any threatened species, as the area to be modified is very small, and comprises isolated native planted vegetation or exotic grassland (managed). Any local populations of these species which may exist are likely to continue to persist should the proposed development be conducted.

Potential direct and indirect impacts associated with the proposed development would be avoided and/or minimised through implementation of mitigation and management measures outlined in **Section 5.2.3**.

No species or ecological communities identified as being vulnerable to Serious and Irreversible Impacts (SAILs) were identified within the Development Site.



7 REFERENCES

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APPENDIX A THREATENED SPECIES DATABASE SEARCH





THREATENED SPECIES DATABASE SEARCH

A list of threatened species, populations and ecological communities that have been reported or modelled to occur from within a five-kilometre radius of the Study Area was obtained from the following databases:

- NSW Department of Planning, Industry and Environment (DPIE) BioNet Atlas: (<http://www.bionet.nsw.gov.au/>).
- Protected matter database search tool (<https://www.environment.gov.au/epbc/protected-matters-search-tool>)

An assessment was then made of the likelihood of the threatened species, populations, and / or ecological communities reported or modelled to occur in the locality occurring within the Study Area or using the habitat within the Study Area as an essential part of a foraging range.

The table below summarises the likelihood of threatened species and EPBC Act listed migratory species occurring within the Study Area based on the habitat requirements of each species. A brief definition of the likelihood of occurrence criteria is provided below:

- Known – species identified within the site during surveys.
- High – species known from the area (DPIE Wildlife Atlas records), suitable habitat (such as roosting and foraging habitat) present within the site.
- Moderate – species may be known from the area, potential habitat is present within the site.
- Low – species not known from the area and/or marginal habitat is present within the site.
- Nil – habitat requirements not met for this species within the site.

Note: Marine species identified within the desktop assessment i.e. marine bird species, have been excluded from the list based on obvious habitat constraints. However, indirect impacts on these species and ecological communities have been considered.



Table A1 'Likelihood of Occurrence' table

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
Flora								
1.	<i>Acacia bynoeana</i> Bynoe's Wattle	E	V	5	PMST, BioNet	Bynoe's wattle is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches.	Low	No suitable habitat within the Development Site.
2.	<i>Acacia pubescens</i> Dwony Wattle	V	V	3	PMST, NSW Atlas	Concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland.	Low	No suitable habitat within the Development Site.
3.	<i>Allocasuarina galreicola</i>	E	E	-	PMST	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Grows in Castlereagh woodland on lateritic soil. Found in open woodland with Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla and Melaleuca decora.	Low	No suitable habitat within the Development Site.
4.	<i>Asterolasia elegans</i>	E	E	-	PMST	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest.	Nil	No suitable habitat within the Development Site.
5.	<i>Caladenia tessellate</i> Thick-lipped Spider-orchid	E	V	-	PMST	The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.	Nil	No suitable habitat within the Development Site.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
6.	<i>Cryptostylis hunteriana</i> Leafless Tongue Orchid	V	V	-	PMST	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (<i>Eucalyptus sclerophylla</i>), Silvertop Ash (<i>E. sieberi</i>), Red Bloodwood (<i>Corymbia gummifera</i>) and Black Sheoak (<i>Allocasuarina littoralis</i>); appears to prefer open areas in the understorey of this community.	Nil	No suitable habitat within the Development Site.
7.	<i>Darwinia biflora</i>	V	V	-	PMST	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas. Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Associated overstorey species include Eucalyptus haemastoma, Corymbia gummifera and/or E. squamosa. The vegetation structure is usually woodland, open forest or scrub-heath.	Nil	No suitable habitat within the Development Site.
8.	<i>Epacris purpurascens</i> var. <i>purpurascens</i>	V	-	25	NSW Atlas	Recorded from Gosford in the north, to Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. Found in a range of habitat types, most of which have a strong shale soil influence.	Nil	No suitable habitat within the Development Site.
9.	<i>Eucalyptus camfieldii</i> Camfield's Stringybark	V	V	-	PMST	Localised and scattered distribution includes sites at Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai, Wattamolla and a few other sites in Royal National Park. Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges.	-	No suitable habitat within the Development Site.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
10.	<i>Eucalyptus sp. Cattai</i>	CE	CE	-	PMST	Occurs in The Hills Local Government Area, with known populations occurring within the area bounded by Kellyville - Maraylya – Glenorie. Occurs as a rare emergent tree in scrub, heath and low woodland on sandy soils, usually as isolated individuals or occasionally in small clustered groups. The sites at which it occurs are generally flat and on ridge tops.	Nil	No suitable habitat within the Development Site.
11.	<i>Eucalyptus nicholii</i>	V	V	-	Survey	This species is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield, being most common in central portions of its range. Found largely on private property and roadsides, and occasionally in conservation reserves. Planted as urban trees, windbreaks and corridors. Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock.	Known	Found outside the Study Area as a planted tree.
12.	<i>Genoplesium baueri</i> Yellow Gnat-orchid	E	E	-	PMST	The species has been recorded from locations between Ulladulla and Port Stephens. Currently the species is known from just over 200 plants across 13 sites. The species has been recorded at locations now likely to be within the following conservation reserves: Berowra Valley Regional Park, Royal National Park and Lane Cove National Park. May occur in the Woronora, O'Hares, Metropolitan and Warragamba Catchments. Grows in dry sclerophyll forest and moss gardens over sandstone.	Nil	No suitable habitat within the Development Site.
13.	<i>Haloragodendron lucasii</i>	E	E	-	PMST	The known locations of this species are confined to a very narrow distribution on the north shore of Sydney. Associated with dry sclerophyll forest. Reported to grow in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland.	Nil	No suitable habitat within the Development Site.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
14.	<i>Isotoma fluviatilis</i> <i>subsp. fluviatilis</i>	-	Extinct	1	NSW Atlas	Currently known from only two adjacent sites on a single private property at Erskine Park in the Penrith LGA. Previous sightings are all from western Sydney, at Homebush and at Agnes Banks. Known to grow in damp places, on the Cumberland Plain, including freshwater wetland, grassland/alluvial woodland and an alluvial woodland/shale plains woodland (Cumberland Plain Woodland) ecotone.	Nil	No suitable habitat within the Development Site.
15.	<i>Lasiopetalum joyceae</i>	V	V		PMST	Has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. Grows in heath on sandstone.	Nil	No suitable habitat within the Development Site.
16.	<i>Melaleuca biconvexa</i> Biconvex Paperbark	V	V	-	PMST	Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. The species is most commonly found in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects, along freshwater watercourses and in association with <i>Eucalyptus saligna</i> (Sydney Bluegum) or <i>Eucalyptus robusta</i> (Swamp Mahogany).	Nil	No suitable habitat within the Development Site.
17.	<i>Melaleuca deanei</i> Deane's Paperbark	V	V		PMST	Deane's Paperbark occurs in two distinct areas, in the Kuring-gai/Berowra and Holsworthy/Wedderburn areas respectively. The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone.	Nil	No suitable habitat within the Development Site.
18.	<i>Persicaria elatior</i> Tall Knotweed	V	V	-	PMST	Tall Knotweed has been recorded in south-eastern NSW (Mt Dromedary (an old record), Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Nil	No suitable habitat within the Development Site.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
19.	<i>Persoonia hirsute</i> Hairy Geebung	E	E	-	PMST	Persoonia hirsute has a scattered distribution around Sydney. The species is distributed from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Nil	No suitable habitat within the Development Site.
20.	<i>Persoonia nutans</i> Nodding Geebung	E	E	-	PMST	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland and some in Cooks River / Castlereagh Ironbark Forests.	Nil	No suitable habitat within the Development Site.
21.	<i>Pimelea curviflora</i> var. curviflora	V	V	6	PMST, NSW Atlas	Confined to the coastal area of the Sydney and Illawarra regions. Populations are known between northern Sydney and Maroota in the north-west. Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park on the Illawarra coastal plain.	Nil	No suitable habitat within the Development Site.
22.	<i>Pimelea spicata</i> Spiked Rice-flower	E	E	98	PMST, NSW Atlas	Once widespread on the Cumberland Plain, the Spiked Rice-flower occurs in two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama). In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils	Nil	No suitable habitat within the Development Site.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
23.	<i>Pomaderris brunnea</i> Rufous pomaderris	E	V	-	PMST	Brown Pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria. Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines	Nil	No suitable habitat within the Development Site.
24.	<i>Pomaderris prunifolia</i>	E	-	3	NSW Atlas	Known from only three sites within the listed local government areas, at Rydalmere, within Rookwood Cemetery and at The Crest of Bankstown.	Nil	No suitable habitat within the Development Site.
25.	<i>Pterostylis gibbose</i> Illawarra Greenhood	E	E	-	PMST	It is apparently extinct in western Sydney which is the area where it was first collected (1803). All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage.	Nil	No suitable habitat within the Development Site.
26.	<i>Pterostylis Saxicola</i> Sydney Plains Greenhood	E	E	2	PMST, NSW Atlas	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. There are very few known populations and they are all very small and isolated. Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where <i>Pterostylis saxicola</i> occurs are sclerophyll forest or woodland on shale/sandstone transition soils or shale soils.	Nil	No suitable habitat within the Development Site.
27.	<i>Pultenaea parviflora</i>	E	V	-	PMST	Endemic to the Cumberland Plain. Core distribution is from Windsor to Penrith and east to Dean Park. Outlier populations are recorded from Kemps Creek and Wilberforce. May be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays.	Nil	No suitable habitat within the Development Site.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
28.	<i>Rhizanthella slateri</i> Eastern Australian Underground Orchid	V	E	-	PMST	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	Nil	No suitable habitat within the Development Site.
29.	<i>Rhodamnia rubescens</i> Scrub Turpentine	CE	-	1	NSW Atlas, PMST	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Nil	No suitable habitat within the Development Site.
30.	<i>Rhodomyrtus psidioides</i> Native Guava	CE	-	-	PMST	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	Nil	No suitable habitat within the Development Site.
31.	<i>Syzygium paniculatum</i> Magenta Lilly Pilly	CE	-	5	PMST, NSW Atlas	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines	Nil	No suitable habitat within the Development Site.
32.	<i>Thesium australe</i> Austral Toadflax	V	V		BAM	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (<i>Themeda australis</i>). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	Nil	No suitable habitat within the Development Site.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
33.	<i>Zieria involucrata</i>	E	V	90	BioNet, PMST	Has a disjunct distribution north and west of Sydney, in the Baulkham Hills, Hawkesbury, Hornsby and Blue Mountains local government areas. Occurs primarily on Hawkesbury sandstone. Also occurs on Narrabeen Group sandstone and on Quaternary alluvium. Found primarily in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest, although some populations extend upslope into drier vegetation. Marginal habitat within Study Area. Was not detected within the Study Area during site assessment.	Nil	No suitable habitat within the Development Site.
Birds								
1.	<i>Anthochaera phrygia</i> Regent Honeyeater	CE	CE	2	PMST, NSW Atlas	Mostly recorded in box-ironbark eucalypt associations. At times of food shortage, the species also uses other woodland types and wet lowland coastal forest dominated by Swamp Mahogany or Spotted Gum.	Low	Marginally suitable habitat within the Development Site. Species not detected during targeted surveys.
2.	<i>Botaurus poiciloptilus</i> Australasian Bittern	E	E	1	PMST, NSW Atlas	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha spp.</i>) and spikerushes (<i>Eleocharis spp.</i>).	Nil	No suitable habitat within the Development Site.
3.	<i>Calidris ferruginea</i> Curlew Sandpiper	E	CE	-	PMST	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	Nil	No suitable habitat within the Development Site.
4.	<i>Daphoenositta chrysoptera</i> Varied Sittella	V	-	1	NSW Atlas	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Low	Marginal suitable habitat within the Development Site. Species not detected during targeted surveys.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
5.	<i>Falco hypoleucos</i> Grey Falcon	E	V	P	PMST	Medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. The species is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	Nil	No suitable habitat within the Development Site. No records within locality.
6.	<i>Falco subniger</i> Black Falcon	V	-	1	NSW Atlas	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be preferable to the Brown Falcon.	Low	No suitable habitat within the Development Site.
7.	<i>Glossopsitta pusilla</i> Little Lorikeet	V	-	3	NSW Atlas	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in <i>Angophora</i> , <i>Melaleuca</i> and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.	Moderate	Suitable foraging habitat within the Development Site. Marginal nesting habitat present. Species not detected within the Development Site during targeted surveys.
8.	<i>Grantiella picta</i> Painted Honeyeater	V	V	P	PMST	Inhabits <i>Acacia pendula</i> , <i>Acacia harpophylla</i> , Box-Gum Woodlands and Box-Ironbark Forests. Feeds on the fruits of mistletoes growing on woodland eucalyptus and acacia.	Nil	No suitable habitat within the Development Site. No records within locality.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
9.	<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	V	M	1	NSW Atlas	Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest).	Low	Marginal foraging habitat within the Development Site. No nests were detected during habitat assessments within the Development Site. Species not detected during targeted surveys.
10.	<i>Hieraaetus morphnoides</i> Little Eagle	V	-	1	NSW Atlas	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used.	Low	Marginal foraging habitat within the Development Site. No nests were detected during habitat assessments during targeted surveys.
11.	<i>Hirundapas caudacutus</i> White-throated Needletail		M		PMST	Most often seen in eastern Australia before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. These conditions are often used by insects to swarm (eg termites and ants) or tend to lift insects away from the surface which favours sighting of White-throated Needletails as they feed.	Moderate	Broadly suitable habitat within the Development Site. The species may occasionally utilise the aerial habitat above the site as part of a broader range. Species not detected during targeted surveys.
12.	<i>Lathamus discolor</i> Swift Parrot	E	CE, M	16	NSW Atlas, PMST	This migratory species has been recorded on the mainland from a variety of habitat types including dry and wet sclerophyll forest, forested wetlands, coastal swamp forests and heathlands. This species does not breed within mainland Australia.	Low	Marginal foraging habitat within the Development Site. No breeding habitat present within the Development Site. Species not detected during targeted surveys.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
13.	<i>Ninox connivens</i> Barking Owl	V	-	2	NSW Atlas	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile riparian soils.	Low	Marginal suitable habitat within the Development Site. No records within locality.
14.	<i>Ninox strenua</i> Powerful Owl	V	-	47	NSW Atlas	The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine, Black She-oak, Blackwood, Rough-barked Apple, Cherry Ballart and a number of eucalypt species. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.	Low	Marginal foraging habitat within the Development Site. No potential nesting/roosting habitat present.
15.	<i>Numenius madagascariensis</i> Eastern Curlew	-	CE	1	NSW Atlas	The eastern curlew is Australia's largest shorebird and a long-haul flyer. It is easily recognisable, with its long, down-curved bill. The species takes an annual migratory flight to Russia and north-eastern China to breed, arriving back home to Australia in August.	Nil	No suitable habitat within the Development Site.
16.	<i>Petroica boodang</i> Scarlet Robin	V	-	1	NSW Atlas	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	Low	Marginal foraging habitat within the Development Site. Species not detected during targeted surveys.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
17.	<i>Polytelis swainsonii</i> Superb Parrot	V	V	1	NSW Atlas	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west.	Low	Marginal suitable habitat within the Development Site. Species not detected during targeted surveys.
18.	<i>Rostratula australis</i> Australian Painted Snipe	E	E	-	PMST	In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	Nil	No suitable habitat within the Development Site.
19.	<i>Thinornis cucullatus cucullatus</i> Hooded Plover	-	V	-	PMST	The Hooded Plover is endemic to southern Australia and is nowadays found mainly along the coast from south of Jervis Bay, NSW, south through Victoria and Tasmania to the western side of the Eyre Peninsula (South Australia). In south-eastern Australia Hooded Plovers prefer sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting.	Nil	No suitable habitat within the Development Site.
20.	<i>Tyto novaehollandiae</i> Masked Owl	V	-	1	NSW Atlas	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Nil	Marginal foraging suitable habitat within the Development Site.
21.	<i>Tyto tenebricosa</i> Sooty Owl	V	-	1	NSW Atlas	Occupies the easternmost one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands. Territories are occupied permanently. Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	Nil	No suitable habitat within the Development Site.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
Mammals								
1.	<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	V	V	1	PMST, NSW Atlas	Found in well-timbered areas containing gullies. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features.	Nil	No suitable nesting habitat (caves) within the Development Site. Not suitable foraging habitat due to the absence of nesting habitat within the area.
2.	<i>Dasyurus maculatus</i> Spotted-tailed Quoll	V	E	1	NSW Atlas, PMST	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Nil	No suitable habitat within the Development Site due the surrounding residential area. No breeding habitat due to a general lack of any habitat.
3.	<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	V	-	4	NPWS Atlas	Prefers moist habitats, with trees taller than 20 m. Generally, roosts in tree hollows but has also been found under loose bark on trees or in buildings.	Low	Marginal foraging habitat present within the Development Site. No roosting habitat present.
4.	<i>Micronomus norfolkensis</i> Eastern Coastal Free-tailed Bat	V	-	10	NSW Atlas	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures.	Low	Marginal foraging habitat present within the Development Site. No roosting habitat present.
5.	<i>Miniopterus australis</i> Little Bentwing-bat	V	-	1	NSW Atlas. BAM	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings.	Low	Marginal foraging habitat present within the Development Site. No roosting habitat present.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
6.	<i>Miniopterus orianae oceanensis</i> Large Bent-winged Bat	V	-	14	NSW Atlas, BAM	Forages in forested habitats. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings, and other man-made structures.	Low	Marginal foraging habitat present within the Development Site. No roosting habitat present.
7.	<i>Myotis macropus</i> Southern Myotis	V	-	9	NSW Atlas	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Nil	No foraging or roosting habitat present onsite.
8.	<i>Petauroides volans</i> Greater Glider	-	V	-	PMST	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelters during the day in tree hollows.	Nil	No suitable habitat within the Development Site. No records within locality.
9.	<i>Petrogale penicillata</i> Brush-tailed Rock-wallaby	-	E	P	PMST	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north.	Nil	No suitable habitat within the Development Site. No records within locality.
10.	<i>Phascolarctos cinereus</i> Koala	V	V	2	NSW Atlas PMST	Found in a variety of forest types with suitable feed tree species.	Low	Marginal habitat present within the Development Site due to presence of preferred two individual <i>E.tereticornis</i> .



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
11.	<i>Pseudomys novaehollandiae</i> New Holland Mouse	-	V	P	PMST	Inhabits open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	Nil	No suitable habitat within the Development Site. No records within locality.
12.	<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	V	V	635	NSW Atlas, PMST	Occurs across a wide range of habitat types along the eastern seaboard of Australia, depending on food availability. Fruit from myrtaceous trees and rainforest trees form the major components of their diet.	Moderate	Suitable foraging habitat present across the Development Site when Eucalypt species are in flower. No camps detected on site. Species not detected within Development Site during targeted surveys.
13.	<i>Saccolaimus flaviventris</i> Yellow-bellied Sheath-tail-bat	V	-	5	BioNet	Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Roosts in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.	Moderate	Potential foraging habitat present within the Development Site. No roosting habitat present.
14.	<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	V	-	5	NSW Atlas	This species occurs in a variety of habitats including rainforest, dry and wet sclerophyll forest and eucalypt woodland.	Low	Marginal foraging habitat present within the Development Site. No roosting habitat present.

Amphibians

1.	<i>Heleioporus australiacus</i> Giant Burrowing Frog	V	V	P	PMST	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Breeding habitat of this species is generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water.	Nil	No suitable habitat within the Development Site. No records within locality.
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	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
2.	<i>Litoria aurea</i> Green and Golden Bell Frog	E	V	4	NSW Atlas	This species prefers open water bodies, fringed by reeds and other aquatic vegetation for breeding and foraging purposes. Needs fallen logs and debris for shelter and over-wintering purposes.	Nil	No suitable habitat within the Development Site.
3.	<i>Litoria raniformis</i> Southern Bell Frog	E	V		PMST	In NSW the species was once distributed along the Murray and Murrumbidgee Rivers and their tributaries, the southern slopes of the Monaro district and the central southern tablelands as far north as Tarana, near Bathurst. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat.	Nil	No suitable habitat within the Development Site. No records within locality.
4.	<i>Mixophyes balbus</i> Stuttering Frog	E	V	P	PMST	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.	Nil	No suitable habitat within the Development Site. No records within locality.
Reptiles								
1.	<i>Hoplocephalus bungaroides</i> Broad-headed Snake	E	V	-	PMST	The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevices or hollows in large trees within 500m of escarpments in summer.	Nil	No suitable habitat within the Development Site. No records within locality.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
Gastropod								
1.	<i>Pommerhelix duralensis</i> Dural Land Snail	E	E	16	PMST, NSW Atlas	The species is a shale-influenced-habitat specialist, which occurs in low densities along the western and northwest fringes of the Cumberland IBRA subregion on shale-sandstone transitional landscapes. The species has a strong affinity for communities in the interface region between shale-derived and sandstone-derived soils, with forested habitats that have good native cover and woody debris.	Nil	No suitable habitat within the Development Site.
2.	<i>Meridolum corneovirens</i> Cumberland Plain Land Snail	E	-	5	NSW Atlas	Lives in small areas on the Cumberland Plain west of Sydney, from Richmond and Windsor south to Picton and from Liverpool west to the Hawkesbury and Nepean Rivers at the base of the Blue Mountains. Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish.	Nil	No suitable habitat within the Development Site.
Migratory Species								
1.	<i>Apus pacificus</i> Pacific Swift	-	M	1	NSW Atlas	Almost entirely aerial and give spectacular displays of high-speed flying above any habitat, urban or rural. Swifts are most often seen in late summer, nearly always in flocks. They are typically associated with stormy weather when they feed on nuptial swarms of various insects.	Moderate	Potential aerial foraging habitat within the Development Site.
2.	<i>Cuculus optatus</i> Oriental Cuckoo	-	M	-	PMST	Inhabits rainforest margins, monsoon forest, vine scrub, riverine thickets, wet densely canopied Eucalypt forests, paperbark swamp and mangroves.	Nil	No suitable habitat within the Development Site.
3.	<i>Hirundapus caudacutus</i> White-throated Needletail	-	M,V	1	NSW Atlas	Forages in high open spaces over varied habitat types. May aerially forage over the Development Site.	Moderate	Broadly suitable habitat within the Development Site. The species may occasionally utilise the aerial habitat above the site as part of a broader range. Species not detected during targeted surveys.



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
4.	<i>Monarcha melanopsis</i> Black-faced Monarch	-	M	-	PMST	Found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating.	Nil	No suitable habitat within the Development Site.
5.	<i>Monarcha trivirgatus</i> Spectacled Monarch	-	M	-	PMST	Prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	Nil	No suitable habitat within the Development Site.
6.	<i>Motacilla flava</i> Yellow Wagtail	-	M	-	PMST	Typically inhabits inundated fields, saltmarsh and wetlands and occasionally coastal areas.	Nil	No suitable habitat within the Development Site.
7.	<i>Myiagra cyanoleuca</i> Satin Flycatcher	-	M	-	PMST	Found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests.	Nil	No suitable habitat within the Development Site.
8.	<i>Rhipidura rufifrons</i> Rufous Fantail	-	M	-	PMST	Found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground.	Nil	No suitable habitat within the Development Site.
Threatened Ecological Communities								
1.	Blue Gum High Forest in the Sydney Basin Bioregion	CE	CE	-	PMST	It only occurs in small remnants of which the largest is less than 20 hectares. The remnants mainly occur in the Lane Cove, Willoughby, Ku-ring-gai, Hornsby, Baulkham Hills, Ryde and Parramatta local government areas.	Nil	Absent from Development Site.
2.	Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	CE	E		PMST	Occurs in western Sydney and originally extended over about 615 hectares, but now has only 98 hectares remaining intact, mostly near Agnes Banks on the east bank of the Hawkesbury River, in the Penrith local government area.	Nil	Absent from Development Site



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
3.	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community.	-	E	P	PMST	The ecological community is found within the South Eastern Queensland (SEQ), NSW North Coast (NNC), Sydney Basin (SYB) and part of the South East Corner (SEC) IBRA7 bioregions. The canopy layer is dominated by Casuarina glauca (swamp oak, swamp she-oak).	Nil	Absent from Development Site
4.	Coastal Upland Swamps in the Sydney Basin Bioregion	E	E	P	PMST	The Coastal Upland Swamp is endemic to NSW and confined to the Sydney Basin Bioregion. It occurs in the eastern Sydney Basin from the Somersby district in the north to the Robertson district in the south.	Nil	Absent from Development Site
5.	Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	E	CE	P	PMST	Occurs in western Sydney, and the extent of intact remnants is now reduced to 1011 hectares, with the most extensive stands occurring in the Castlereagh and Holsworthy areas. Smaller remnants occur in the Kemps Creek area and in the eastern section of the Cumberland Plain. Good examples can be seen at the Castlereagh and Windsor Downs Nature Reserves.	Nil	Absent from Development Site
6.	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	E	CE	P	PMST	The Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest is endemic to New South Wales, specifically the area in and around western Sydney.	Nil	Absent from Development Site
7.	River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	E	CE	P	PMST	Given its habitat, the community has an important role in maintaining river ecosystems and riverbank stability. Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. Generally occurs below 50 m elevation, but may occur on localised river flats up to 250 m above sea level.	Nil	Absent from Development Site



	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
8.	Shale Sandstone Transition Forest of the Sydney Basin Bioregion	CE	CE	P	PMST	9,950 ha remains intact (22.6% of its original extent) and the bulk of this occurs in the Hawkesbury, Baulkham Hills, Liverpool, Parramatta, Penrith, Campbelltown and Wollondilly local government areas. Good examples can be seen at Gulguer Nature Reserve, in the Wilton area and in the Sackville - Maroota area.	Nil	Absent from Development Site
9.	Subtropical and Temperate Coastal Saltmarsh	-	V	P	PMST	The Subtropical and Temperate Coastal Saltmarsh ecological community occurs within a relatively narrow margin of the Australian coastline, within the subtropical and temperate climatic zones south of 23° latitude. Found in coastal areas under tidal influence.	Nil	Absent from Development Site
10.	Turpentine-Ironbark Forest of the Sydney Basin Bioregion	CE	CE	P	PMST	This subtropical forest occurs on the coastal floodplains of the North Coast of NSW.	Nil	Absent from Development Site
11.	Western Sydney Dry Rainforest and Moist Woodland on Shale	E	CE	P	PMST	Very restricted and occurs most commonly in the far southern section of the Cumberland Plain, in the Razorback Range near Picton. Outlying occurrences have been recorded at Grose Vale and Cattai.	Nil	Absent from Development Site



APPENDIX B FLORA SPECIES LIST





Table B1 Flora Species List

Scientific	Common Name	BAM Growth Form*	Status
Planted Vegetation Area in and immediately adjacent to the Development Site.			
<i>Bidens pilosa</i>	Cobblers Pegs	High Threat	
<i>Bromus catharticus</i>	Prairie Grass	Exotic	
<i>Callistemon viminalis</i>	Weeping Bottlebrush	Tree	
<i>Centella asiatica</i>	Pennywort	Forb	
<i>Chloris gayana</i>	Rhodes Grass	High Threat	
<i>Conyza sumatrensis</i>	Tall Fleabane	Exotic	
<i>Corymbia citriodora</i>	Lemon-scented Gum	Tree	
<i>Corymbia maculata</i>	Spotted Gum	Tree	
<i>Cynodon dactylon</i>	Couch	Grass/Glasslike	
<i>Dichondra repens</i>	Kidney Weed	Forb	
<i>Digitaria sanguinalis</i>	Summer Grass	Exotic	
<i>Eragrostis curvula</i>	African Lovegrass	High Threat	
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	Tree	
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	Tree	Vulnerable (EPBC and BC Act)
<i>Eucalyptus tereticornis</i>	Forest Red Gum	Tree	
<i>Gamochaeta calviceps</i>	Cudweed	Exotic	
<i>Grevillea robusta</i>	Silky Oak	Tree	
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	Forb	
<i>Jacaranda mimosifolia</i>	Jacaranda	Exotic	
<i>Lepidium africanum</i>	Common Peppergrass	Exotic	
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	Rush	
<i>Lophostemon confertus</i>	Brush Box	Tree	
<i>Melaleuca bracteata</i>	Black Tea Tree	Tree	
<i>Paronychia brasiliensis</i>	Chilean Whitlow	Exotic	
<i>Plantago lanceolata</i>	Lamb's Tongues	Exotic	
<i>Poa affinis</i>		Tussock Grass	
<i>Portulaca oleracea</i>	Pigweed	Forb	
<i>Setaria pumila</i>	Pale Pigeon Grass	Exotic	
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic	



Scientific	Common Name	BAM Growth Form*	Status
<i>Sonchus asper</i>	Prickly Sowthistle	Exotic	
<i>Taraxacum officinale</i>	Dandelion	Exotic	
<i>Trifolium repens</i>	White Clover	Exotic	
<i>Verbena bonariensis</i>	Purpletop	Exotic	
Planted Vegetation in the West of the Study Area			
<i>Allocasuarina torulosa</i>	Forest Oak	Tree	
<i>Angophora costata</i>	Smooth-barked Apple	Tree	
<i>Callistemon salignus</i>	Willow Bottlebrush	Tree	
<i>Eucalyptus saligna</i>	Sydney blue gum	Tree	
<i>Eucalyptus sideroxylon</i>	Mugga Ironbark	Tree	
<i>Eucalyptus tereticornis</i>	Forest Red Gum	Tree	
<i>Lophostemon confertus</i>	Brush Box	Tree	
<i>Olea europaea subsp. cuspidata</i>	African Olive	High Threat	
<i>Schefflera actinophylla</i>	Umbrella Tree	High Threat	



APPENDIX C FAUNA SPECIES LIST





Table C1 Fauna Species List

No.	Scientific Name	Common Name	Status		Observation Type*	General Abundance within Development Site**
			BC Act	EPBC Act		
	Birds					
1.	<i>Acridotheres tristis</i>	Common Myna	-	-	VO	C
2.	<i>Cacatua sanguinea</i>	Little Corella	-	-	VO, H	UC
3.	<i>Corvus coronoides</i>	Australian Raven	-	-	H	C
4.	<i>Cracticus tibicen</i>	Australian Magpie	-	-	VO, H	C
5.	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	-	-	VO, H	C
6.	<i>Eolophus roseicapillus</i>	Galah	-	-	VO	UC
7.	<i>Hirundo neoxena</i>	Welcome Swallow			VO	UC
8.	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	-	-	VO	C
9.	<i>Vanellus miles</i>	Masked Lapwing	-	-	H	UC

* Observation Type: VO (Visual Observation), H (Heard whilst on site), E (Evidence recorded inc scats, tracks or markings), C (Caught on Remote Camera), T (Trapped), R (Recorded through the use of call detectors).

** General Abundance: I (Individual record), UC (Uncommon, 2-5 records), C (Common occurrence on site >5 records). Anabat Detections are classed by confidence: Confident (C), Probable (Pr), and Possible (Po)

^ Denotes introduced species.



APPENDIX D SITE PHOTOGRAPHS





Photo 1:
Photo facing South along the Eastern Boundary



Photo 2:
Photo of Jacaranda trees along the Northern Boundary



Photo 3:
Photo of existing building.



Photo 4:
Photo facing South East looking at the Eastern Boundary



Photo 5:
Photo facing South along the Eastern Boundary



Photo 6:
Photo facing North along the Eastern Boundary



Project No: 20213532	SITE PHOTOGRAPHS Pendle Hill High School Cornock Avenue Toongabbie NSW 2146
Date: 15/02/2021	
Suite 3, 240-244 Pacific Highway, Charlestown, NSW 2290	
Phone: +61 2 4949 5200	



Photo 7:
Photo of the Eastern Boundary



Photo 8:
Photo facing North along the Eastern Boundary



Photo 9:
Photo facing West of the exotic grassland (managed)



Photo 10:
Photo of the North East Corner



Photo 11:
Photo facing East of the North East Corner.



Photo 12:
Photo from the centre of the development footprint facing South



Project No: 20213532	SITE PHOTOGRAPHS
Date: 15/02/2021	
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	Pendle Hill High School
	Cornock Avenue Toongabbie NSW 2146



APPENDIX E STAFF CONTRIBUTIONS

The following staff were involved in the compilation of this report.

Table E1 Staff Contributions

Name	Qualification	Title/Experience	Contribution
David Martin	MSc	Ecologist (Botanist)	Flora Surveys
Mark Dean	BEnvSc & Mgt	Ecologist (Zoologist)	Fauna surveys and Report Preparation
Gayle Joyce	BSc (Forestry) (Hons)	GIS Specialist	GIS and figure preparation
Dr. Gilbert Whyte	BSc (PhD) Accredited BAM Assessor	Senior Ecologist	Report Review



APPENDIX F – LICENCING

Kleinfelder employees involved in the current study are licensed or approved under the *Biodiversity Conservation Act 2016* (License Number: SL100730, Expiry: 31 March 2021) and the *Animal Research Act 1985* to harm/trap/release protected native fauna and to pick for identification purposes native flora and to undertake fauna surveys.