Upgrades to Chatswood Public School and Chatswood High School - Biodiversity Development Assessment Report

Architectus on behalf of Department of Education

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Template 2.8.1

Executive Summary

Eco Logical Australia Pty Ltd was engaged by Architectus on behalf of Department of Education to prepare a Biodiversity Development Assessment Report (BDAR) for the proposed Upgrades to Chatswood Public School and Chatswood High School project.

The Department of Education (DoE) propose to upgrade the teaching facilities of both Chatswood Public School and Chatswood High School (referred to as 'the development site'). The proposed redevelopment is a School Infrastructure (SI) project, will be governed by the NSW Government Gateway Review Process, and assessed as State Significant Development (SSD) (application SSD 18_9483) in accordance with both the *State Environmental Planning Policy* (Educational Establishments and Child Care Facilities) 2017 and NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The Secretary's Environmental Assessment Requirements (SEARs) have been issued and require the preparation of a Biodiversity Development Assessment Report under the NSW *Biodiversity Conservation Act 2016* (BC Act).

The combined area of Chatswood Public School and Chatswood High School is 7.31 ha. The proposed development will result in the removal of 0.35 ha native planted vegetation, 0.032 ha remnant native vegetation. A 5 m buffer has been applied around all construction works to account for indirect impacts on planted and remnant vegetation. About 0.05 ha of remnant vegetation may be indirectly affected, and 0.37 ha of planted vegetation may be indirectly affected by the proposed works.

The development site will affect biodiversity values within the development site and as such a BDAR is required to assess the vegetation clearing under the BC Act. This report has been prepared to meet the requirements of the Biodiversity Assessment Method 2016 (BAM) established under Section 6.7 of the NSW BC Act. Requirements of the Willoughby Local Environment Plan 2012 (WLEP) and Development Control Plan (DCP) have also been addressed in this document.

The vegetation within the two sites is highly disturbed with scattered planting of mature native species which have been incorporated into horticultural landscaped gardens. A large extent of native vegetation in varying condition is located at the southern portion of the current Chatswood High School site. This area has been zoned as E2 environmental corridor and no works are proposed within this area. This patch of vegetation has been mapped as PCT 1237 Sydney *Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.* A second patch of PCT 1237 was mapped along the western perimeter and will be affected by the proposed works. This patch is contiguous with the southern patch of PCT 1237. PCT 1237 corresponds with *Blue Gum High Forest in the Sydney Basin Bioregions* and is listed as part of the critically endangered ecological community listed under the NSW BC Act and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This patch of bushland has also been mapped on the Biodiversity Values Map. Blue Gum High Forest is also listed as a Serious and Irreversible Impact (SAII) entity. Consideration of SAII entities have been assessed as part of this BDAR.

The remaining vegetation within the development site has been planted using native indigenous canopy species. Under the BAM all vegetation native to NSW must be assigned a Plant Community Type (PCT). Where native vegetation has been planted and does not clearly conform to any PCT, a 'best-fit' PCT must be assigned. Based on previous vegetation mapping (OEH 2016), soil profile and field validation of

remnant vegetation retained within the development site the planted native vegetation conforms to PCT 1237_planted. Although components of PCT 1237 correspond to Blue Gum High Forest listed under the BC and EPBC Acts, this planted patch of vegetation does not correspond to a threatened ecological community (TEC).

Two planted threatened *Syzygium paniculatum* (Magenta Lilly Pilly), which are listed as endangered under the BC Act and vulnerable under the EPBC Act, were recorded within the development site. This species is associated with PCT 1237; however, it is also a widely cultivated species. The two specimens located within the development site are located in landscaped gardens which are disconnected from remnant vegetation. However, under the BAM, planted threatened species still require assessment. The proposed works will result in the removal of one of the specimens and retain the other specimen. This species is considered a candidate species credit species and an impact assessment has been prepared under the EPBC Act.

No threatened fauna species were recorded on or within the development site. There is potential that highly mobile threatened species may utilise the vegetation for foraging resources on occasion, such as the *Pteropus poliocephalus* (Grey-headed Flying-fox). Consideration has been given to these highly mobile species during the preparation of this BDAR.

Measures taken to avoid, minimise and mitigate impacts to the vegetation and species habitat present within the development site and methodologies to minimise impacts during construction and operation of the development have been included in this BDAR.

The number of credits required to offset the removal of PCT 1237_weedy and PCT 1237_planted natives and one *Syzygium paniculatum* are summarised in the table below.

An assessment of the Commonwealth Significant Impact Criteria was undertaken for *Syzygium paniculatum* and Grey-headed Flying-fox for both these Matters of National Environmental Significance (MNES). The assessments concluded that the project would not have a significant impact on these species.

Ecosystem credits required

Veg zone	PCT # and name	Ancillary code	Vegetation integrity score	Trading group	Direct impact (ha)	Credits required
2	1237 Sydney *Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion*	Weedy	33.4	North Coast Wet Sclerophyll Forests >90% cleared group (Tier2 or higher)	0.032	1
3	1237 Sydney *Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion*	Planted native	25	North Coast Wet Sclerophyll Forests >90% cleared group (Tier2 or higher)	0.35	5
		TOTAL			**0.38**	**6**

Species credits required

Species	Common name	Direct impacts (count)	Trading group	Credits required
Syzygium paniculatum	Magenta Lilly Pilly	1	Any in NSW	2

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
CEEC	Critically Endangered Ecological Community
DAWE	Commonwealth Department of Agriculture, Water and Environment
DCP	Development Control Plan
DoE	Department of Education
DoEE	Commonwealth Department of the Environment and Energy (now DAWE)
DPIE	NSW Department of Planning, Industry and Environment (previously known as NSW Department of Planning and Environment DPE)
DPE	NSW Department of Planning and Environment (now DPIE)
EES	NSW Environment, Energy and Science Group (previously known as NSW Office of Environment and Heritage, OEH)
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FM Act	NSW *Fisheries Management Act 1994*
GIS	Geographic Information System
HBT	Hollow-bearing tree
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	Local Environmental Plan
LGA	Local Government Area
MNES	Matter of National Environmental Significance
NSW	New South Wales
NOW	NSW Office of Water
OEH	NSW Office of Environment and Heritage (now EES)
PCT	Plant Community Type
SEARs	Secretary's Environmental Assessment Requirements
SI	School Infrastructure

Abbreviation	Description
SAII	Serious and Irreversible Impacts
SSD	State Significant Development
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WLEP	Willoughby Local Environmental Plan
WM Act	NSW *Water Management Act 2000*

1. Stage 1: Biodiversity assessment

1.1 Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Belinda Failes, an accredited person (BAAS18159) under the NSW *Biodiversity Conservation Act 2016* (BC Act). The report was peer reviewed by Nicole McVicar (BAAS18077) and Meredith Henderson (BAAS17001) who are also accredited under the BC Act. Definitions of terminology used throughout this report are presented in Appendix A.

1.1.1 General description of the development site

The Department of Education (DoE) propose to upgrade teaching facilities, and new sport and recreation facilities as part of the *Upgrades to Chatswood Public School and Chatswood High School project*. The development is located at two disconnected locations. Site 1 is located at Chatswood High School (24 Centennial Avenue) and Site 2 is the Chatswood Public School (5 Centennial Avenue corner, Pacific Highway) (combined area is referred to as 'the development site') (Figure 1).

The proposed redevelopment is a School Infrastructure (SI) project and will be governed by the NSW Government Gateway Review Process and assessed as State Significant Development (SSD) (application SSD 18_9483) in accordance with both the State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 and *Environmental Planning and Assessment Act 1979* (EP&A Act). The Secretary's Environmental Assessment Requirements (SEARs) have been issued and require the preparation of a Biodiversity Development Assessment Report (BDAR) under the NSW BC Act.

The Chatswood High School is bound by Centennial Avenue to the north, residential development and Oliver Road to the east, Eddy Road in the south and De Villiers Avenue in the west (Figure 1). It is approximately 5.97 ha in size.

The Chatswood Public School is the smaller of the two sites and is approximately 1.34 ha in size and bounded by Pacific Highway in the east, Centennial Avenue in the south, Chatswood OSHC Centre to the west and existing residential development in the north (Figure 1).

Both sites are owned by the DoE and are located within the Willoughby Local Government Area (LGA). Chatswood Public School is zoned R2 Low Density Residential which provides opportunities for residential or educational use with consent as defined in the Willoughby Local Environmental Plan 2012 (WLEP). The majority of the Chatswood High School is zoned SP2 Education Establishment and the south-western corner is zoned E2 Environmental Conservation. The E2 zone aims to conserve environmental values while providing opportunities for environmental facilities and roads.

The development site consists of the following lots:

- Site 1 (Chatswood High School) - Lot 1 in DP 725204, Lots 20 -23 Section 6 DP 2273, Lots 18-21 Section 7DP 2273, Lots 16-20 Section 8 DP2272.
- Site 2 (Chatswood Public School) - Lot 1 in DP 812207, Lot 2 DP 812207 and Lot C DP 346499.

The existing development is concentrated within the centre portion of the Site 1. A large patch of native vegetation is located in the southern and western portion, this is separated from the existing educational buildings by a newly constructed synthetic sporting field. Planted native trees and horticultural gardens are interspersed around the buildings and carpark facilities and a large patch of native planted canopy is present in the northern portion of the site. Site 2 contains patches of landscaped native gardens between the buildings and along the northern boundary.

The vegetation along the southern and western boundary of Site 1 has been mapped on the Biodiversity Values Map (accessed 1 June 2020). The area mapped as E2 zone is currently subject to the weed control of two bushcare groups, the local council community and Chatswood High School group (Figure 1).

This report includes two base maps, the Site Map (Figure 1) and the Location Map (Figure 2).

1.1.2 Development Site footprint

The development site footprint is provided in Figure 1. The proposed development will primarily utilise the existing building footprints and open space where available. The proposed development will involve construction of new buildings. Scattered canopy trees and some landscaping gardens may be affected or removed to accommodate the new development.

The proposed redevelopment of Building R (shown in Figure 1) within the eastern portion of Site 1, has been assessed under a separate development application and impacts of Building R are not included in this SSD assessment. Additionally, the demolition of existing buildings and refurbishment of Buildings A, M, and K will be assessed as Development Without Consent. A detailed description of the separate works packages is provided in the Environmental Impact Statement (DFP 2020). Although the demolition of some of the existing buildings will be assessed under a separate legislative pathway, for the purpose of this BDAR, an assessment of all the biodiversity values have been included in this assessment.

The SSD application will include site preparation, tree removal and construction of six (6) new school buildings. For the purpose of this assessment, site preparation works includes; demolition of Buildings D, H, I and covered outdoor learning areas, bulk earthworks and civil works.

<u>In summary, upgrades to Site 1 and Site 2 will deliver:</u>

- More than 150 new and refurbished innovative learning and teaching spaces
- Increase quality active space currently allocated to primary school and high school students
- Specialist teaching facilities such as science, art and music rooms
- Dedicated performing arts spaces
- New sports facilities and recreational areas
- New libraries and administration facilities.

<u>Site 1</u>

- 123 new and refurbished classrooms (comprising 21 existing and 102 new spaces)
- New administration and staff facilities
- New hall
- Associated site works and landscaping.

Site 2

- 53 new and refurbished homebases (comprising 25 existing and 28 new spaces)
- 4 special program classrooms (music, language etc)
- 3 special support unit classrooms
- Increased quality active play spaces
- Retaining Heritage buildings A and B
- New hall
- New car parking facilities
- Associated site works and landscaping.

1.1.3 Sources of information used

The following data sources were reviewed as part of this report:

- Biodiversity Assessment Method Credit Calculator (BAMC)
- BioNet Vegetation Classification
- BioNet / Atlas of NSW Wildlife 5 km database search (DPIE 2020a) (accessed May 2020)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool 5 km database search (DAWE 2020a)
- The Native Vegetation of the Sydney Metropolitan Area (Office of Environment and Heritage OEH 2016)
- Threatened Species Profiles (DAWE 2020b and DPIE 2020b)
- Biodiversity values map and threshold tool (online tool) (DPIE 2020c) (accessed 26 May 2020)
- Aerial mapping (SIX Maps)
- Additional Geographic Information System (GIS) datasets including soil, topography, geology and drainage
- Environmental Impact Statement Upgrades to Chatswood Public School and Chatswood High School State Significant Development (SSD 9483) (DFP Planning Pty Ltd) (2020)
- Landscape Plan (Oculus 2020)
- Arborist Impact Assessment (ELA 2020)
- Request for Secretary's Environmental Assessment Requirements – Upgrades to Chatswood Public School and Chatswood High School (Johnstaff 2018).
- Niche Environment and Heritage Biodiversity constraints report 2018.

Figure 1: Site Map

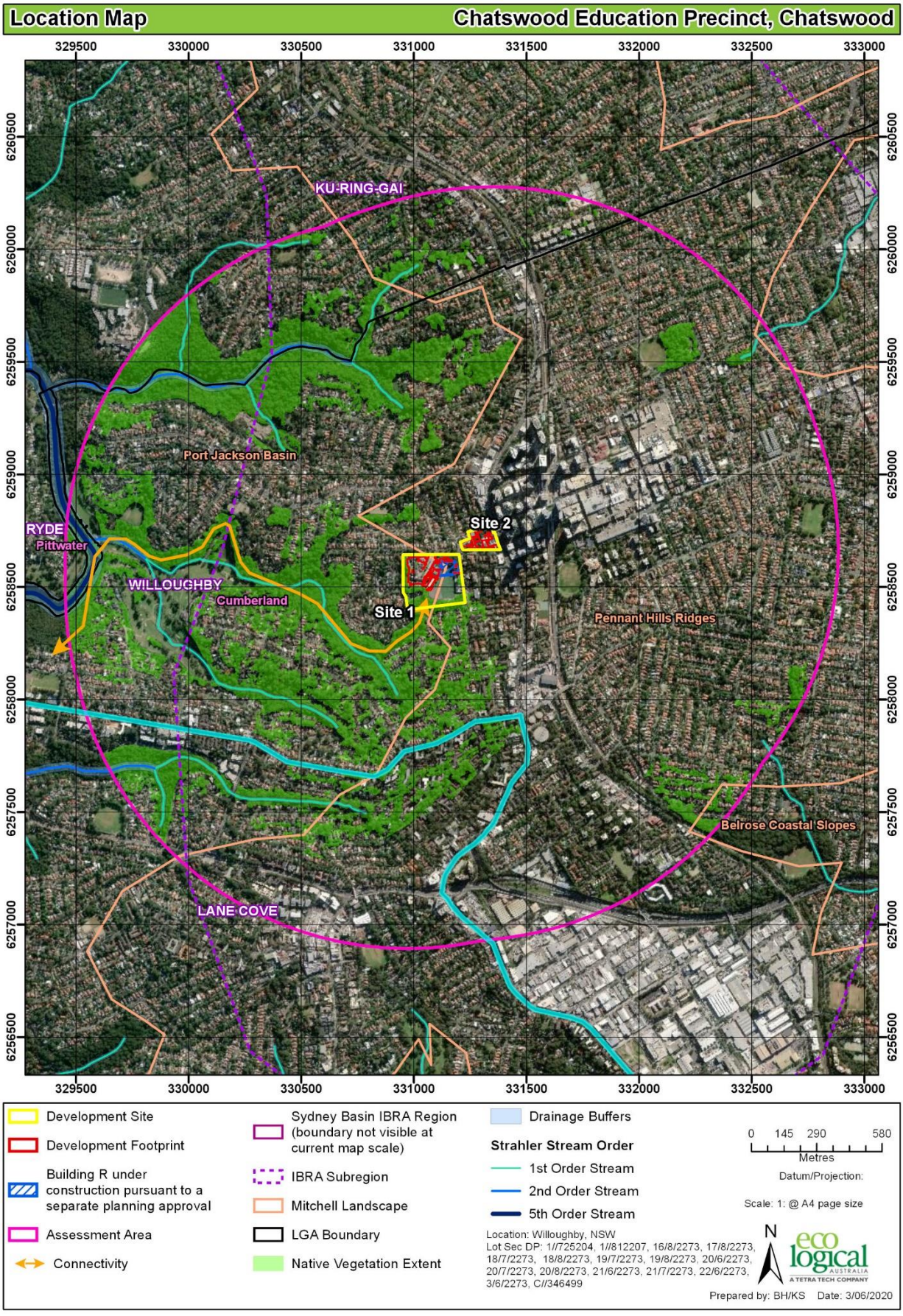

Figure 2: Location Map

1.2 Legislative Context

Table 1: Legislative context

Name	Relevance to the project	Report Section
	Commonwealth	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Matters of National Environmental Significance (MNES) have been identified on or near the development site. Assessments under the Commonwealth Significant Impact Criteria were undertaken for the *Pteropus poliocephalus* (Grey-headed – Flying-fox) and *Syzygium paniculatum* (Magenta Lilly Pilly).	2.6.1
	State	
Biodiversity Conservation Act 2016 (BC Act)	The proposed development requires submission of a BDAR (i.e. this report) under the BC Act.	All
Environmental Planning and Assessment Act 1979 (EP&A Act)	The proposed development requires consent by DPIE under the EP&A Act.	N/A
Fisheries Management Act 1994 (FM Act)	The development does not involve impacts to Key Fish Habitat, does not involve harm to marine vegetation, dredging, reclamation or obstruction of fish passage. A permit or consultation under the FM Act is not required.	N/A
Local Land Services Amendment Act 2016 (LLS Act)	The LLS Act does not apply to this development.	N/A
Water Management Act 2000 (WM Act)	The project does not involve works on waterfront land. A Controlled Activity Approval under s91 of the WM Act is not required.	N/A
Planning Instruments		
State Environmental Planning Policy (SEPP) – (Coastal Management) 2018	The proposed development is not located on land subject this SEPP.	N/A
SEPP (Koala Habitat Protection) 2019	The proposed development is not located on land subject to this SEPP (Koala Habitat Protection) 2019.	N/A
SEPP (Vegetation in Non-Rural Areas) 2017	This SEPP applies to development that does not require development consent. As this project requires consent under the EP&A Act, the Vegetation SEPP is not relevant.	N/A
Willoughby Local Environment Plan 2012 (WLEP)	Site 1 is zoned SP2 and E2 under the WLEP. Site 2 is zoned R2 Low Density Residential under the WLEP. The proposed works require requires development consent for the educational facilities. The development site is mapped as having Class 5 Acid Sulfate Soils under the LEP.	2.6.2
Willoughby Council Development Control Plan (DCP)	The Willoughby DCP has been reviewed for additional biodiversity provisions that may relate to the development site. Clause 9 of the DCP relates to the Preservation of Trees or Vegetation. These matters have been addressed in this report.	2.6.2
Willoughby City Council Urban Bushland Plan of Management 2014	The Willoughby City Council Urban Bushland Plan of Management 2014 establishes clear and consistent management policies across all bushland areas throughout the Willoughby LGA. It is the overarching plan for all bushland in Willoughby and has been prepared under the requirements of the NSW *Local Government Act 1993*. The bushland present within the development site does not have a specific Reserve Action Plan. The nearest bushland reserve is Ferndale Park.	2.6.2

1.3 Landscape Features

1.3.1 IBRA Regions and Subregions

The development site falls within the Sydney Basin IBRA region and Cumberland subregion (Figure 2).

1.3.2 Mitchell Landscapes

The development site falls within the Pennant Hills Ridges and Port Jackson Basin Mitchell Landscapes as outlined in Table 2 (DECC 2002). The Pennant Hills Ridge Mitchell Landscape has been mapped over site 2 and a portion of site 1 (Figure 2). The majority of site 1 is covered by Port Jackson Basin Mitchell Landscapes. However, Pennant Hills Ridges was entered into the Biodiversity Assessment Method Credit Calculator (BAMC) as the site attributes correspond with the Pennant Hills Ridges Mitchell Landscape as described in the table below.

Table 2: Mitchell Landscapes

Mitchell landscape	Description	Area within Development Site (ha)
Pennant Hills Ridges	Rolling to moderately steep hills on Triassic shales and siltstones. Elevation from 10 to 90 m with local relief 60 m. Deep red texture-contrast soils on narrow hillcrests, red and brown to yellow texture-contrast soils on slopes becoming slightly harsher in drainage lines. Vegetation typically tall open forest of *Eucalyptus saligna* and *Syncarpia glomulifera*. Rainforest elements in protected moist gully heads are also present.	3.62
Port Jackson Basin	A diverse landscape of steep cliffs on Triassic quartz sandstone to beaches, estuaries and headlands of tributaries. General elevation from 0 to 80m and relieve 10 to 50 m. Sandstone slopes and cliffs which supports forests and woodlands dominated by *Eucalyptus piperita* (Sydney Peppermint), *Angophora costata* (Smooth-barked Apple) and sheltered gullies dominated by *Syncarpia glomulifera* (Turpentine).	3.69

1.3.3 Rivers and streams

The development site does not contain any rivers and streams which are recorded on Strahler stream order datasets or other GIS hydroline database resources. However, topographic mapping and field validation identified that during periods of high rainfall events, the vegetated southern boundary and the south-western corner of site 1 may act as an 'overland flow path'.

It is possible that due to topography and urban development the movement of water across the landscape has created an unnatural drainage line which flows from east to west and eventually flows into Swaines Creek, located approximately 250 m to the south-west of site 1.

This water flow is considered an 'overland flow path' and does not meet the definition of a 'river' under the *Water Management Act 2000* (WM Act).

The WM Act defines a river as:

- any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved, and

- any tributary, branch or other watercourse into or from which a watercourse referred to in paragraph (a) flows, and
- anything declared by the regulations to be a river.

ELA determined that the unnatural drainage channel along the southern boundary of site 1 does not meet the definition of a 'river' under the WM Act, as it has no defined bed, banks or geomorphic processes. The vegetation is intact and contains species which are not considered to be associated with waterways or are semi-aquatic in nature.

For the purpose of this report, there are no waterbodies within the development site. However, the proposed works within the development site has potential to alter the hydrological processes of the overland flow path. These potential impacts have been addressed in the impact assessment section of this report (see Section 2.2).

1.3.4 Wetlands

The development site does not contain any wetlands.

1.3.5 Connectivity Features

The development site contains the connectivity features outlined in Table 3 and shown in Figure 2. Contiguous connections are present within the development site with vegetation extending from site 1 into adjoining land. The vegetation located to the south of site 1 forms a continuous canopy layer with vegetation to the south-west of the development site within Ferndale Park and continues along a vegetated path until it flows into Swaines Creek in the south-west of the development site. A vegetated buffer adjoins Swaines Creek which eventually flows west to the Lane Cove River and its National Park.

Site 2 contains limited connectivity features although scattered urban trees provide a 'stepping-stone' corridor for highly mobile species across the urban landscape to a riparian corridor in the north-west.

Connectivity to large tracts of habitat is considered suitable for highly mobile urban species such as birds and bats. This includes flyways for migratory birds and bat species moving through the landscape. Connectivity is present for less mobile species (such as reptiles and mammals), particularly for site 1, provided they cross busy urban roads. The vegetative corridors shown in Table 3 were entered into the BAMC.

Table 3: Connectivity features

Connectivity feature name	Feature type
Ferndale Park	vegetation corridor
Swaines Creek riparian corridor	riparian corridor
Lane Cove National Park	National Park

1.3.6 Areas of geological significance and soil hazard features

The development site does not contain areas of geological significance. The development site is mapped as Class 5 Acid Sulfate Soils which are listed as a soil hazard feature.

1.3.7 Site context

1.3.7.1 Method applied

The site-based method has been applied to this development.

1.3.7.2 Percent native vegetation cover in the landscape

The current percent native vegetation cover in the landscape was assessed in a Geographic Information System (GIS) using aerial imagery sourced from SIX Maps using increments of 5%. Areas mapped by OEH (2016) which include mapped vegetation communities and areas mapped as Urban native/exotic were included in the percent native vegetation. Additionally, the percent native vegetation cover in the landscape was examined at a scale of 1:5,000 and some areas mapped by OEH (2016) as Urban exotic/native were identified as native and included in the native vegetation cover. The percent native vegetation cover within the 1,500 m buffer area (917 ha) is 20% (176 ha).

1.3.7.3 Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the development site. The patch size area for Site 1 is 101 ha as it is connected to Lane Cove National Park via the connectivity features provided in Table 3. Site 2 is connected to Site 1 via street trees, so the patch size is also 101 ha.

1.4 Native vegetation

1.4.1 Survey effort

The initial constraints assessment was conducted on 18 January 2018 to identify the vegetation type and condition of the vegetation community in the southern portion of the development site. A total of two full-floristic and vegetation integrity plots were undertaken consistent with BAM (Table 4). No vegetation integrity plots were undertaken for vegetation zone 1. Although this vegetation zone was recorded within the development site (site 1), the proposed development footprint will not affect this vegetation zone (i.e. this vegetation zone was not located within the development footprint). A summary table of the extent of each PCT recorded within site 1 and 2 and the amount of each PCT affected is provided in Table 5 below.

All field data collected at full-floristic and vegetation integrity plots is included in Appendix B.

Table 4: Full floristic and vegetation integrity plots

Veg Zone	PCT ID	PCT Name	Ancillary code	Condition	Area impacted (ha)	Plots required	Plots surveyed
1	1237	Sydney Blue Gum – Blackbutt – Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.	Good	Moderate – Good	0	0*	0*
2	1237	Sydney Blue Gum – Blackbutt – Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.	Weedy	Low	0.03	1	1

Veg Zone	PCT ID	PCT Name	Ancillary code	Condition	Area impacted (ha)	Plots required	Plots surveyed
3	1237	Sydney Blue Gum – Blackbutt – Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.	Planted native	Low	0.35	1	1

*THE PROPOSED WORKS WILL NOT IMPACT UPON VEGETATION ZONE 1, THEREFORE PLOT DATA WAS NOT COLLECTED FOR THIS ZONE.

Table 5: Summary of the PCTs in the development site and the extent of impacts.

PCT and Veg Zone	Direct impacts (ha)		Indirect impacts (ha)	Retained (ha)	TOTAL (ha)
	Construction	Landscaping			
PCT1237 Zone 1_Good	0	0	0	0.58	**0.58**
PCT1237 Zone 2_Weedy	0.005	0.02	0.05	0.75	**0.82**
PCT1237 Zone 3_Planted native	0.13	0.21	0.37	0.56	**1.27**
Exotic	0	0.014	0.007	0.069	**0.09**
Cleared*	0.68	0.92	0.67	1.82	**4.09**
TOTAL	**0.815**	**1.164**	**1.097**	**3.784**	**6.86****

* CLEARED INCLUDES EXISTING BUILDING AND INFRASTURCTURE AND SPORTING FIELDS
** REMAINING 0.46 HA INCLUDES BUILDING R WHICH IS NOT PART OF THIS ASSESSMENT

1.4.2 Plant Community Types present

There was one PCT present in the development site (Table 6, Figure 3). This PCT corresponds to a threatened ecological community (TEC) under the BC Act and EPBC Act (see Section 1.4.3.1 for more detail).

The development site also contains planted native canopy, shrubs and occasional ground cover species which are native to NSW, however, not considered locally indigenous to the PCTs. Under BAM all vegetation native to NSW requires consideration as to the 'best fit' PCT. Based on the soil landscape, elevation, remnant vegetation and remnant regrowth vegetation within the development site, it was determined that the best fit PCT for the planted native vegetation was PCT 1237 (non-TEC). Justifications are provided below.

It is understood that a new version of BAMC which is currently on public exhibition, will provide a PCT dedicated for planted native vegetation, however, this application has yet to be gazetted. As such, ELA has mapped the planted native vegetation as PCT 1237, non-TEC. The BAMC does not allow for the same PCT to be listed as part of a TEC and non-TEC. Two cases were entered into the BAMC for the same SSD application. One case was used to assess vegetation zone 2 PCT 1237 (Appendix E- E1) which is listed as part of the TEC and a second case was used to assess vegetation zone 3 PCT 1237 non-TEC (Appendix E- E2).

Table 6: Plant Community Types and vegetation zones within development site

Veg zone	PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area affected* (ha)	Percent cleared
1	1237	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.	Wet Sclerophyll Forests (Shrubby sub-formation)	North Coast Wet Sclerophyll Forest	0	90%
2	1237	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.	Wet Sclerophyll Forests (Shrubby sub-formation)	North Coast Wet Sclerophyll Forest	0.032	90%
3	1237	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.	Wet Sclerophyll Forests (Shrubby sub-formation)	North Coast Wet Sclerophyll Forest	0.35	90%

* THIS INCLUDES DIRECT IMPACTS FOR CONSTRUCTION AND LANDSCAPING

1.4.2.1 PCT selection justification

A total of one PCT was recorded within the development site. PCT 1237 was recorded within site 1 based on quantitative analysis of floristic data, the soil landscape, elevation and presence of large *Eucalyptus saligna* (Sydney Blue Gum) and other native species recorded in the development site. Previous ecological surveys conducted by OEH (2016) and validated by Niche Environment and Heritage Consulting in 2017 were used to assist in the validation of the vegetation.

The BAM vegetation integrity and floristic data collected in the field were analysed to verify the findings of the site inspection. Two different Microsoft Excel-based tools (Vegetation Analysis Tool Sydney Metro and ELA's internal PCT Quantitative Tool) were used to provide a quantitative assessment of the BAM floristics data and to crossmatch with positive indicator species of established communities as defined by OEH (2016). The Sydney Metro (OEH 2016) vegetation descriptions were then correlated with the relevant PCT in the NSW BioNet Vegetation Classification System database. The results were compared to the source document to ensure that they were appropriate to the region and other factors that limit vegetation types and their distributions. It can be the case that a community matches strongly floristically with a PCT, however does not match well with other characteristics such as structure, landscape position or region. Therefore, these tools assist in the decision-making process, but is not the sole determining factor. Rather the tool assists expert judgement. For this reason, the VIS and OEH (2016) descriptions was given priority in determining the appropriate PCT.

It should be noted that due to the small number of native species recorded within the floristics plot for *PCT 1237_weedy* and *PCT_planted_native* vegetation zone, the analysis of the floristic data did not provide a strong match with any PCT. The closest matches were PCT 1237 and PCT 1849 (Sydney Turpentine Ironbark Forest). However, the plot did not achieve the minimal number of diagnostic species for either community. Of the 21 native species entered in the tool, only ten were identified as diagnostic species for Blue Gum High Forest and 11 for Sydney Turpentine Ironbark Forest. Therefore, a list of opportunistic recorded species within the *PCT 1237_good* vegetation zone was also assessed to

determine the correct PCT. *PCT 1237_good condition* vegetation zone contained a high representation of native species including plantings of diagnostic species of Blue Gum High Forest. The results of the quantitative analysis are provided in Appendix C. The results indicated that PCT 1237 was a good fit.

To further validate the vegetation, the VIS description of PCT 1237 and the final determination for Blue Gum High Forest states that the vegetation community contains a dominant canopy of *Eucalyptus saligna* as the key diagnostic species and the vegetation community is typically associated with soils derived from Wianamatta Shale (OEH 2011). Additionally, the Blue Gum High Forest Final Determination identifies that this vegetation community occurs in the following LGAs: Willoughby, Lane Cove, Ku-ring-gai, Hornsby, Hills, Ryde and Parramatta. The vegetation within the development fits this description. Additionally, the entire development site is located on Glenorie soil landscapes which is associated with Wianamatta Group Ashfield Shale (Chapman and Murphy 1989).

The boundaries between PCT 1237 vegetation zones were delineated based on the composition of native to exotic species recorded in the midstorey and ground layers and evidence of disturbance. Areas of high native species diversity were assigned a 'good' ancillary code, patches where vegetation was dominated by woody and herbaceous weed species were assigned 'weedy' ancillary code.

Scattered patches of planted native vegetation within Site 1 and 2 were also mapped as part of this PCT 1237, however, they were not considered part of the TEC (see justification in Section 1.4.3.1 below). Planted native vegetation was recorded near buildings and within landscaped gardens. Planted vegetation recorded within the development site was previously mapped by OEH (2016) as Urban exotic/native and were not assigned to a native vegetation community. These areas are not connected to patches of native vegetation, such as Blue Gum High Forest, as mapped by OEH (2016).

The field survey identified patches of planted native vegetation contained a highly disturbed soil profile possibly due to construction of the existing buildings and on-going disturbance due to playgrounds, regular mowing routine and presence of hard playing surfaces. Soil appears to have been imported as part of landscaping works or in the northern portion of Site 1, the topsoil appears to have been washed away. The planted vegetation does not contain remnant species and lacked evidence of regeneration of native species.

Planted native vegetation included areas of planted canopy species such as species which are not characteristic of PCT 1237 such as *Lophostemon confertus* (Brush Box), *Eucalyptus microcorys* (Tallowwood) and *Casuarina glauca* (Swamp Oak) and species which may occur in PCT 1237 such as *E. saligna* and *Syncarpia glomulifera*. Landscaped shrubs were used widely throughout the development site including *Callistemon salignus* (Willow Bottlebrush) and *C. viminalis* (Weeping Bottlebrush) and planted patches of *Dianella* sp. and *Lomandra longifolia* (Mat-rush) (Photo 3).

Table 7: PCT selection justification

PCT ID	PCT Name	Selection criteria	Justification
1237	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion	IBRA region, subregion, soil landscape, elevation and presence of canopy species *Eucalyptus saligna* and *E. pilularis* and Glenorie soil landscape	This PCT has been accepted as the best fit PCT for planted native vegetation located in the development site based on the presence

PCT ID	PCT Name	Selection criteria	Justification
			of this PCT within the development site.

1.4.3 Vegetation zones

A description of vegetation zones is provided in Table 8. The locations of vegetation zones are shown in Figure 4. Photos of vegetation zones are shown in Photo 1, Photo 2, Photo 3 and plot photos in Appendix B.

Table 8: Vegetation zones

Veg zone	PCT	Ancillary code	Description
1	1237 - Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion	Good	This vegetation zone was located within the south-western boundary and will not be impacted upon by the proposed works. The vegetation contains large remnant trees, *Eucalyptus saligna, E. pilularis, Angophora floribunda,* scattered shrubs *Pittosporum undulatum* (Sweet Pittosporum), *Breynia oblongifolia* (Coffee Bush) and a variety of *Acacia* species. Ground cover species includes a variety of native grasses, herbs, vines and ferns. There is evidence of revegetation of ground cover and shrub species and weed control works.
2	1237 – Sydney Blue Gum – Blackbutt – Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion	Weedy	This vegetation zone was located along the western boundary and south-eastern corner of the development site. The vegetation contains a mature canopy of *Eucalyptus saligna, E. pilularis* and *Angophora costata* with a dense midstorey of woody weeds including *Ligustrum* species, *Celtis sinensis Lantana camara* and other weeds including *Phyllostachys aurea, Acetosa sagittata* and *Anredera cordifolia*.
3	1237 - Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion	Planted	This vegetation zone includes planted areas of native vegetation. This vegetation zone includes a large patch of open planted Eucalyptus species with a boarder of native ground cover species in the noth of Site 1. Eucalyptus species includes *Eucalyptus saligna*, *E. grandis* (Flooded Gum), *Lophostemon confertus* and *Eucalyptus paniculata* (Grey Ironbark). This zone also includes formal gardens of *Casuarina glauca* and scattered plantings of Callistemon species and dense clusters of native shrubs and ground cover species in Site 2.

Photo 1: Vegetation zone 1: PCT 1237_good (to be retained)

Photo 2: Vegetation zone 2: PCT 1237_weedy

Photo 3: Vegetation zone 3: PCT 1237_planted native (non TEC).

1.4.3.1 Threatened Ecological Communities Justification

The BioNet Vegetation Classification lists PCT 1237 as a component of Blue Gum High Forest which is listed as a critically endangered ecological community (CEEC) under the BC Act. Vegetation zones 1 and 2 are part of Blue Gum High Forest TEC listed under the BC Act (Figure 5). These vegetation zones contained characteristic canopy species, remnant species and are located on soil landscapes which are associated with this TEC.

Patches of certain quality Blue Gum High Forest may be listed under the EPBC Act listed provided they satisfy the following criteria:

- Patch size is greater than 1 ha; AND
  - Canopy cover greater than 10% OR
  - Canopy cover less than 10% and occurs in areas of vegetation in excess of 5 ha.

The patch of Blue Gum High Forest present in the development site is considered one continuous patch, despite the stratification of two different vegetation zones, for the purpose of the BAM integrity plots. The patch of Blue Gum High Forest within the development site is greater than 1 ha in size and contains a canopy cover more than 10%. Therefore, this patch satisfies the EPBC Act criteria.

The remaining vegetation within the development site has been planted. Under the NSW scientific committee final determination (2007), highly modified patches of Blue Gum High Forest may be listed as part of the TEC. However, the native vegetation which has been planted and has been included in the *PCT 1237_native planted* vegetation zone, does not satisfy the listing criteria under the BC and EPBC Act for the following reasons:

- vegetation previously mapped as Urban exotic/native (OEH 2016)
- is not considered connected to patches of native vegetation
- contains a highly modified soil profile
- vegetation has been clearly planted due to artificial nature of vegetation (i.e. planted in rows)
- planted vegetation lacks remnant canopy species and regeneration of native species
- planted vegetation is unlikely to enhance the exchange of genetic material with vegetation in adjacent Blue Gum High Forest due to presence of non-indigenous species and fragmentation of patches from Blue Gum High Forest vegetation
- vegetation contains a mix of locally indigenous and non-indigenous planted species as part of landscaping works (i.e. in raised garden beds) rather than revegetation works which attempts to re-establish a viable ecological community.

Therefore, this vegetation zone does not form part of the Blue Gum High Forest TEC listings under the BC or EPBC Acts.

Table 9: Threatened Ecological Communities within the development site

PCT ID	BC Act			EPBC Act		
	Listing status*	Name	Area (ha)	Listing status*	Name	Area (ha)
1237	CEEC	Blue Gum High Forest	1.4	CEEC	Blue Gum High Forest	1.4

* CEEC – Critically endangered ecological community

Vegetation integrity assessment

A vegetation integrity assessment using the BAMC was undertaken and the results are outlined in Table 10. Vegetation integrity plots were not required for vegetation zone 1 as it is not affected by the development footprint.

It should be noted that the BAMC automatically rounds numbers entered in the calculator. Vegetation zone 2 impact area was rounded up to 0.04 ha in the BAMC and vegetation zone 3 rounded up to 0.4 ha in the BAMC.

Table 10: Vegetation integrity

Veg Zone	PCT ID	Ancillary code	Condition	Impact area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
2	1237	Weedy	Low	0.032	19.7	43.5	43.5	33.4
3	1237	Planted native	Low	0.35	16.5	23.9	39.5	25

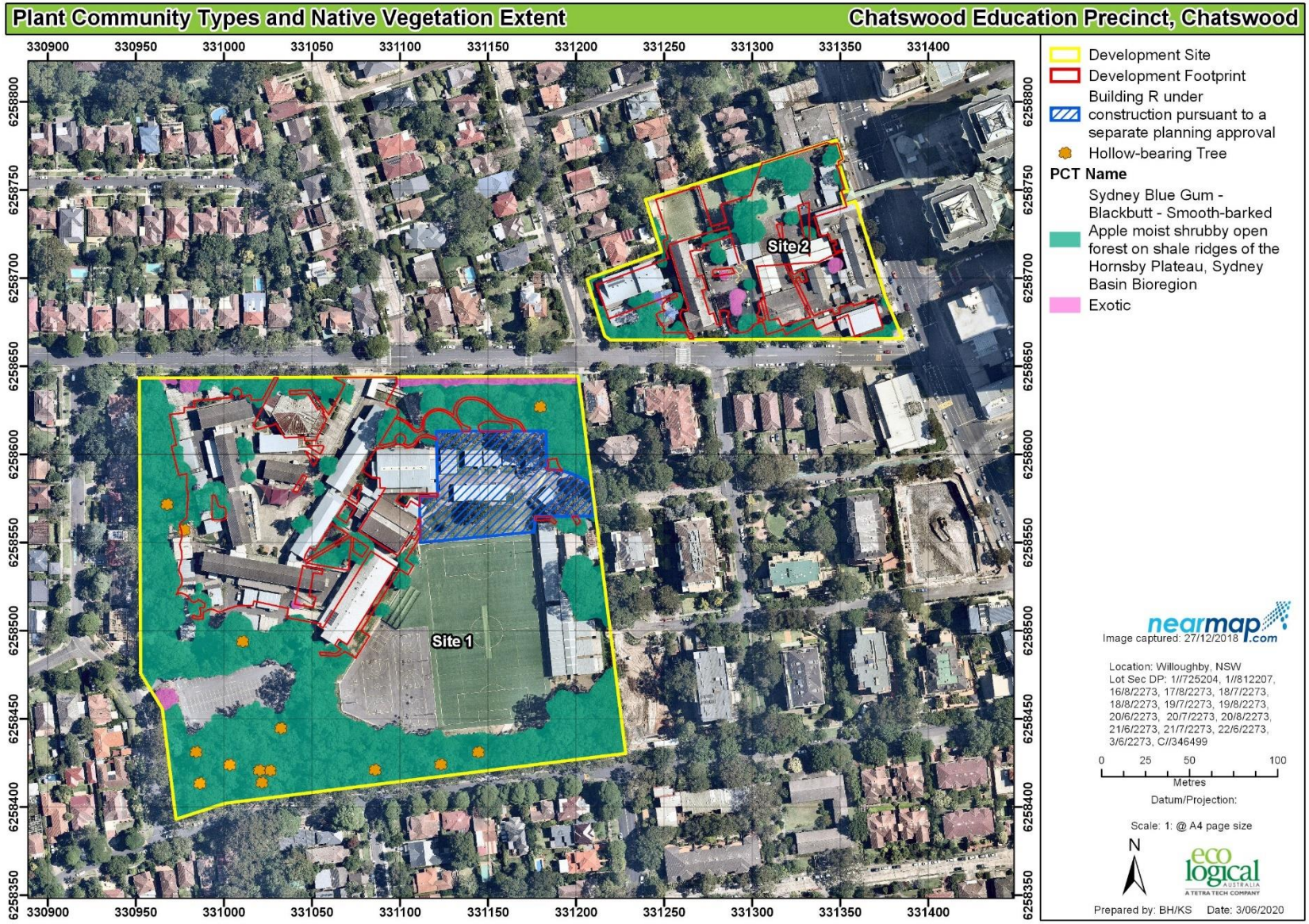

Figure 3: Plant Community Types and native vegetation extent

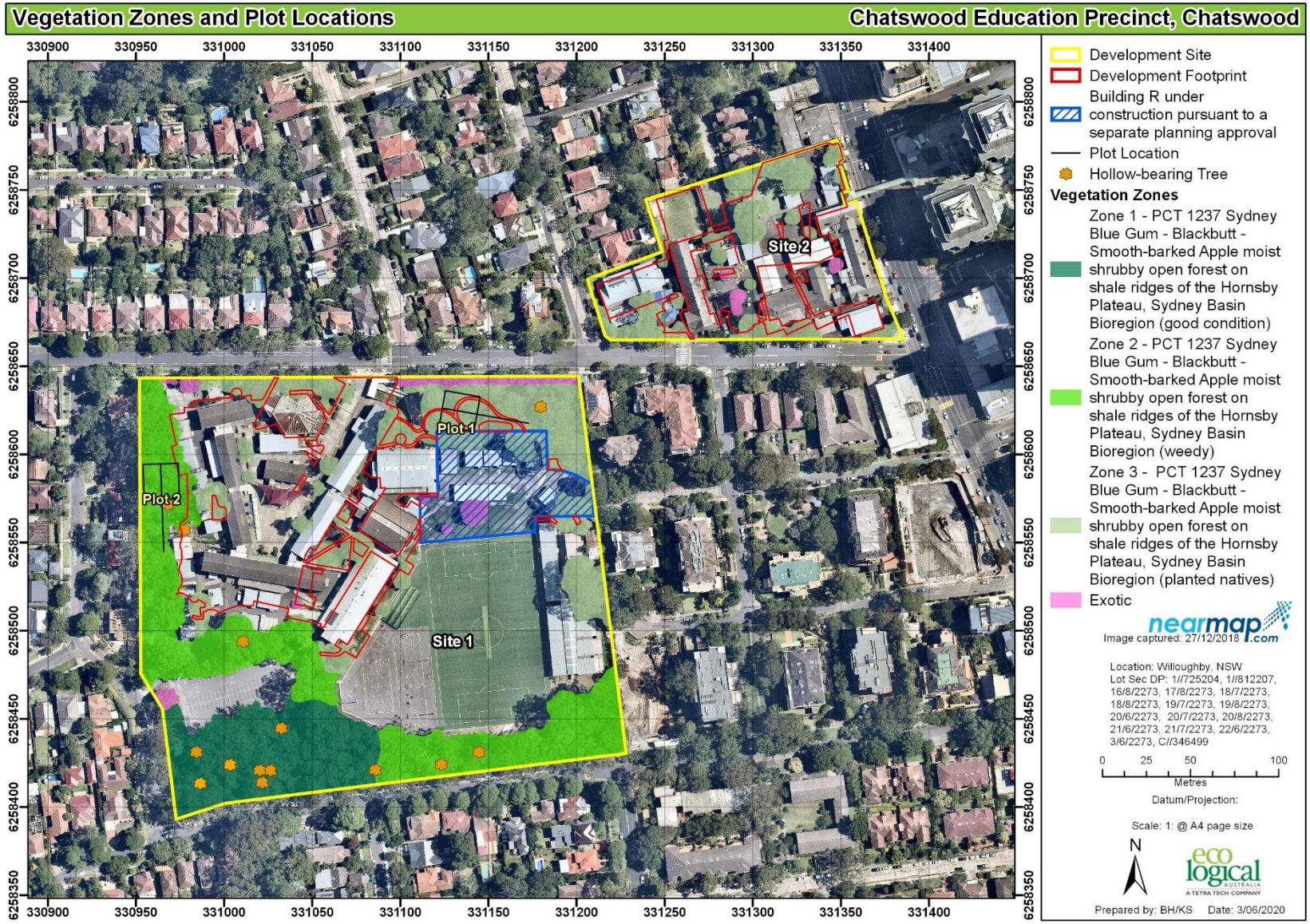

Figure 4: Vegetation zones and plot locations

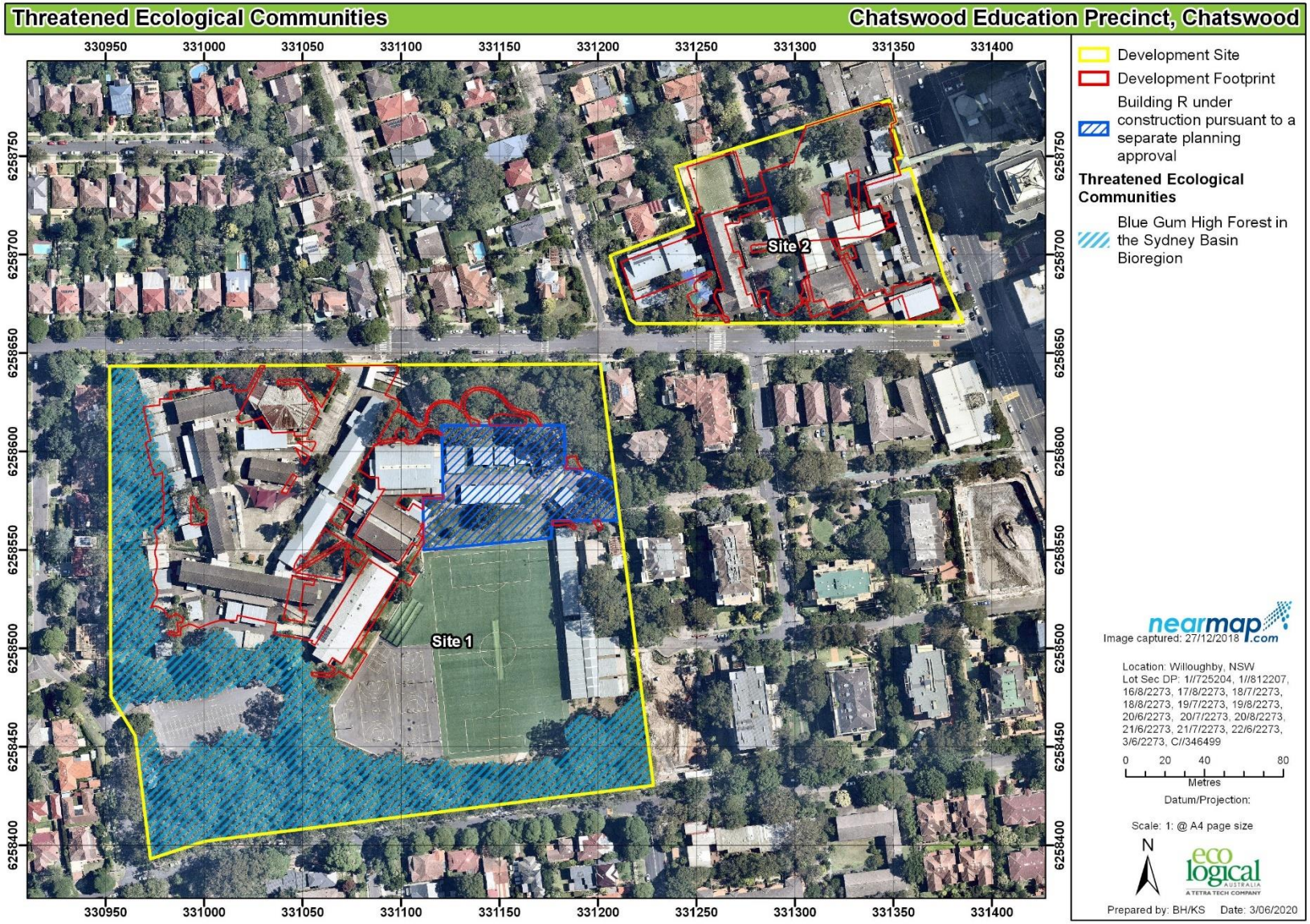

Figure 5: Threatened Ecological Communities

1.5 Threatened Species

1.5.1 Ecosystem credit species

Ecosystem credit species predicted to occur at the development site, their associated habitat constraints, geographic limitations and sensitivity to gain class are included in Table 11.

Table 11: Predicted ecosystem credit species

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Anthochaera phrygia	Regent Honeyeater (Foraging)	N/A	High	CE	CE	**Excluded** Habitat features for this species are not present at this site. The development site does not comprise of key plant species required for foraging. There are four historic BioNet records for this species recorded within a 5 km radius of the development site. Records are from 1932 to 1976.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	N/A	Moderate	V	Not listed	**Included** This species is highly mobile and may occasionally foraging above the development site.
Callocephalon fimbriatum	Gang-gang Cockatoo (Foraging)	N/A	Moderate	V	Not Listed	**Excluded** Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Additionally, the Gang-gang Cockatoo favours old growth forest/woodland attributes, of which the development site does not contain. There are no BioNet records for this species within a 5 km radius of the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Calyptorhynchus lathami	Glossy Black-Cockatoo (Foraging)	Other Presence of *Allocasuarina* and *Casuarina* species	High	V	Not Listed	**Included** The development site contains occasional *Casuarina* and *Allocasuarina* species. This species is highly mobile and may occasionally forage within the intact vegetation (Vegetation zone 1 and 2) within the development site. There are eight BioNet records for this species within a 5 km radius of the development site.
Daphoenositta chrysoptera	Varied Sittella	N/A	Moderate	V	Not Listed	**Included** Habitat present is substantially degraded. However, this species may utilise the vegetation within the southern portion of site 1 on occasion. There are two BioNet records for this species within a 5 km radius of the development site.
Dasyurus maculatus	Spotted-tailed Quoll	N/A	High	V	E	**Included** Habitat features for this species are not well present at this site. This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage in. However, this species may occasionally traverse the site. There are four BioNet records for this species within a 5 km radius of the development site including a record in Roseville in 2002.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	N/A	High	V	Not Listed	**Included** This species was entered into the BAMC as a candidate ecosystem species. This species may forage or roost within the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Glossopsitta pusilla	Little Lorikeet	N/A	High	V	Not Listed	**Included** The development site contains *Eucalyptus* species required for foraging. This species is highly mobile and may occasionally forage within the development site.
Hieraaetus morphnoides	Little Eagle (Foraging)	N/A	Moderate	V	Not Listed	**Included** The development site is degraded. However, this species is highly mobile and may occasionally forage within the development site.
Lathamus discolor	Swift Parrot (Foraging)	N/A	Moderate	E	CE	**Included** This species is highly mobile and may occasionally forage within the development site.
Micronomus norfolkensis	Eastern Freetail-bat	N/A	High	V	Not Listed	**Included** This species may forage or roost within the development site.
Miniopterus australis	Little Bent-winged Bat (Foraging)	N/A	High	V	Not Listed	**Included** This species may forage within the development site.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Foraging)	N/A	High	V	Not Listed	**Included** This species may forage within the development site.
Ninox connivens	Barking Owl (Foraging)	N/A	High	V	Not Listed	**Included** This species may forage within the development site. There are 11 BioNet records for this species within a 5 km radius of the development site.
Ninox strenua	Powerful Owl (Foraging)	N/A	High	V	Not Listed	**Included** This species may forage within the development site. There are 430 BioNet records for this species within a 5 km radius of the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Phascolarctos cinereus	Koala (Foraging)	N/A	High	V	V	**Excluded** Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Habitat was not considered suitable due to the high disturbance and limited feed trees. There are no BioNet records for this species within a 5 km radius of the development site.
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	N/A	High	V	V	**Included** The development site contains *Eucalyptus* species required for foraging. This species is highly mobile and may occasionally forage within the development site.
Ptilinopus superbus	Superb Fruit-Dove	N/A	Moderate	V	Not Listed	**Included** The development site contains fruiting and flowering species required for foraging. This species is highly mobile and may occasionally forage within the development site. There are ten BioNet records for this species within a 5km radius of the development site.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	N/A	High	V	Not Listed	**Included** This species may forage within the development site.
Tyto novaehollandiae	Masked Owl (Foraging)	N/A	High	V	Not Listed	**Included** This species may forage within the development site. There is one BioNet record for this species within a 5 km radius of the development site.

1.5.2 Species credit species

Species credit species predicted to occur at the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class are shown in Table 12.

It should be noted that that a flora species listed under the BC Act and EPBC Act, which has been planted as a horticultural variety was present within the development site.

Two *Syzygium paniculatum* (Magenta Lilly Pilly) were recorded from BioNet database records and validated within Site 1. This species is readily available from local nurseries as a horticultural species. This species is listed as endangered under the BC Act and vulnerable under the EPBC Act. The species natural distribution is in littoral coastal rainforest areas along NSW from Upper Lansdowne to Conjola State Forest. The development site does not include littoral coastal rainforest environments. One *Syzygium paniculatum* tree will be affected by the proposed works, Tree 94 (as identified in the arborist report (ELA 2019). One tree will be retained and was marked as Tree 161 in the arborist report. This species is listed as a candidate species for PCT 1237. This species was included as a species credit species for PCT 1237_planted_native.

Although, is located outside of its natural habitat, and the fact these species have been clearly planted due to the landscaped setting, the BAM requires that this species is considered as part of the assessment.

Table 12: Candidate species credit species

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Anthochaera phrygia	Regent Honeyeater (Breeding)	Other As per mapped areas	High	CE	CE	**Excluded** The development site is not located within the four known key breeding areas. It is not recorded within the Mapped Important Areas in the BOAMS (dated 1 June 2020).
Callocephalon fimbriatum	Gang-gang Cockatoo (Breeding)	Hollow bearing trees Eucalyptus tree species with hollows >9cm	High	V	Not Listed	**Excluded** This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat such as Eucalypt trees with hollows >9cm in diameter and shrubs that are suitable for the species to utilise the site.
Calyptorhynchus lathami	Glossy Black-Cockatoo (Breeding)	Hollow bearing trees Living or dead tree with hollows >15cm diameter and >5m above ground	High	V	Not Listed	**Excluded** This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain larger patches of intact vegetation or trees with large hollows that are suitable for the species to utilise the site.
Cercartetus nanus	Eastern Pygmy-possum	N/A	High	V	Not Listed	**Excluded** Habitat present is substantially degraded such that this species is unlikely to utilise the development site. There is no nesting habitat present or preferred foraging habitat such as *Banksia* sp. are present. Only four individuals have been recorded within 5 km of the development site. Two records are historical records.
Chalinolobus dwyeri	Large-eared Pied Bat	Cliffs Within 2 km of rocky areas containing caves, overhangs, escarpment, outcrops, or	Very High	V	V	**Excluded** Habitat features associated with this species are not present on the development site. There are no suitable breeding habitat such as caves, overhangs, mines or culverts present for the species to utilise the site. Interpretation of aerial and topography maps within a 2 km radius of the site did not identify potential caves or overhangs.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		crevices, or within 2km of old mines or tunnels				Additionally, there are no BioNet records for this species within a 5 km radius of the development site.
Galium australe	Tangled Bedstraw	N/A	High	E	Not listed	**Excluded** Habitat present is substantially degraded such that this flora species is unlikely to occur the development site. There are no BioNet records for this species within a 5 km radius of the development site.
Grammitis stenophylla	Narrow-leaf Finger Fern	N/A	Moderate	E	Not listed	**Excluded** Habitat present is substantially degraded such that this flora species is unlikely to occur the development site. There are no BioNet records for this species within a 5 km radius of the development site.
Hibbertia spanantha	Julian's Hibbertia	N/A	N/A	CE	CE	**Excluded** Habitat present is substantially degraded such that this flora species is unlikely to occur the development site. There are only two BioNet records for this species within a 5 km radius of the development site.
Hieraaetus morphnoides	Little Eagle (Breeding)	Other Nest tree – live (occasionally dead) large tree within vegetation	Moderate	V	Not Listed	**Excluded** This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain suitable breeding habitat. Little Eagles rarely nest in highly urbanised environments and no nests were observed during field surveys. There are only two BioNet records for this species within 5 km of the development site.
Lathamus discolor	Swift Parrot (Breeding)	Other As per mapped areas	Moderate	E	CE	**Excluded** Mapped important areas have not yet been released. This species is known to breed in Tasmania.
Litoria aurea	Green and Golden Bell Frog	Semi-permanent/ephemeral wet areas	High	E	V	**Excluded** Habitat features associated with this species are not present in the development site. The development site does not contain suitable

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		Within 1km of wet areas, Swamps Within 1km of swamps Waterbodies Within 1km of waterbody				waterbodies for this species to utilise the site for breeding, wintering, foraging or sheltering. There is one historic BioNet record from 1977 for this species within 5 km of the development site. There are no other recent records for this species in 5 km radius of the site.
Miniopterus australis	Little Bentwing-bat (Breeding)	Caves Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding	Very High	V	Not Listed	**Excluded** This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat (i.e. caves) that is suitable for the species to utilise the site.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	Caves Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding	Very High	V	Not Listed	**Excluded** This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat such as caves, tunnels, mines or culverts.
Myotis macropus	Southern Myotis	Hollow bearing trees Within 200 m of riparian zone Other Bridges, caves or artificial structures within 200 m of riparian zone	High	V	Not Listed	**Excluded** Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Habitat is isolated and disturbed with a higher likelihood of this species using adjoining vegetation in better condition. Additionally, the nearest mapped drainage line is approximately 200 m away.
Ninox connivens	Barking Owl (Breeding)	Hollow bearing trees	High	V	Not Listed	**Excluded**

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		Living or dead trees with hollows >20cm diameter and > 4m above ground				This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain suitable breeding habitat tree hollows.
Ninox strenua	Powerful Owl (Breeding)	Hollow bearing trees Living or dead trees with hollows >20cm diameter	High	V	Not Listed	**Excluded** This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain suitable breeding habitat i.e. large tree hollows.
Phascolarctos cinereus	Koala (Breeding)	Other Areas identified via survey as important habitat	High	V	V	**Excluded** This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. Habitat present is substantially degraded such that this species is unlikely to utilise the site for breeding. The development site does not contain important habitat for this species.
Pommerhelix duralensis	Dural Woodland Snail	Other Leaf litter and shed bark or within 50m of litter or bare ground Rocky areas Rocks or within 50m of rocks Fallen/standing dead timber including logs Including logs and bark or within 50m of logs or bark	High	E	E	**Excluded** Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Habitat is isolated and disturbed. There are no BioNet records for this species within a 5 km radius of the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Pseudophryne australis	Red-crowned Toadlet	Margins of Cumberland Plain where sandstone outcrops intersect	Moderate	V	Not Listed	**Excluded** Habitat features associated with this species are not present on the development site. The development site does not contain suitable drainage lines for this species to utilise the site.
Pteropus poliocephalus	Grey-headed Flying-fox (Breeding)	Other Breeding camps	High	V	V	**Excluded** This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain any breeding sites (i.e. riparian corridors) that are suitable for the species to utilise.
Rhodamnia rubescens	Scrub Turpentine	N/A	High	CE	Not Listed	**Excluded** Habitat features (i.e. Littoral rainforests) associated with this species are not present on the development site. This species was not recorded during field surveys. There is one BioNet record for this species within a 5 km radius of the development site. The development site is not connected to the vegetation where this species has been previously recorded.
Syzygium paniculatum	Magenta Lily Pilly	N/A	Moderate	E	V	**Included** There are two specimens of species identified within the development site. Although this species is associated with PCT 1237, it has been planted in landscaped gardens and may be a horticultural variety of unknown genetic origin. One specimen will be impacted by the works. The other specimen will be retained.
Tetratheca glandulosa	Tetratheca glandulosa	N/A	High	V	Not Listed	**Excluded** Habitat features (i.e. sandstone ridgetops) associated with this species are not present on the development site. There are eight BioNet records for this species within a 5 km radius of the development. There are no records located near the site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Tyto novaehollandiae	Masked Owl (Breeding)	Hollow bearing trees Living or dead trees with hollows > 20cm diameter	High	V	Not Listed	**Excluded** This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain habitat such as trees with large hollows that are suitable for the species to utilise the site for breeding.

CE = CRITICALLY ENDANGERED; V = VULNERABLE; E =ENDANGERED.

1.5.3 Targeted surveys

Habitat assessments were undertaken during field surveys on 18 January 2018 to determine the likelihood of threatened species occurring within the development site on an intermittent or permanent basis. Survey effort is presented in Figure 6.

Habitat assessments involved a search for important habitat features for threatened fauna species, such as hollow bearing trees, rocky outcrops or deep leaf litter. Assessments also included a search for evidence of fauna foraging or roosting such as chewed cones, sap trees, white wash/pellets and inspections of abandoned buildings for suitable roosting or breeding habitat for threatened microchiropteran bats (microbats). Binoculars were used when required to inspect within high branches in the tree's canopy.

Due to the narrow width and scattered distribution of native vegetation, threatened flora searches using parallel transects were not practical across the entire development site. A combination of parallel transects and random meanders were undertaken during field survey in search of habitat features and candidate species (Figure 6).

1.5.4 Survey results

Fourteen hollow-bearing trees (HBT) were recorded within the development site (Figure 6). Of which, only one HBT was recorded within the development footprint and will be removed as a result of the proposed works.

Existing buildings within the development site were not considered to be suitable roosting or breeding habitat for threatened microbats. Microbat scats and/or markings were not observed in any of these structures.

Two *Syzygium paniculatum* were recorded within the development site. The northern most specimen will be impacted during landscaping works and has been identified in the arborist report (ELA 2020) to be removed. The location of the two *Syzygium paniculatum* and a 30 m buffer has been applied and is provided in Figure 7.

1.5.5 Use of local data

The use of local data is not proposed.

1.5.6 Expert reports

Expert reports have not been used as part of this BDAR.

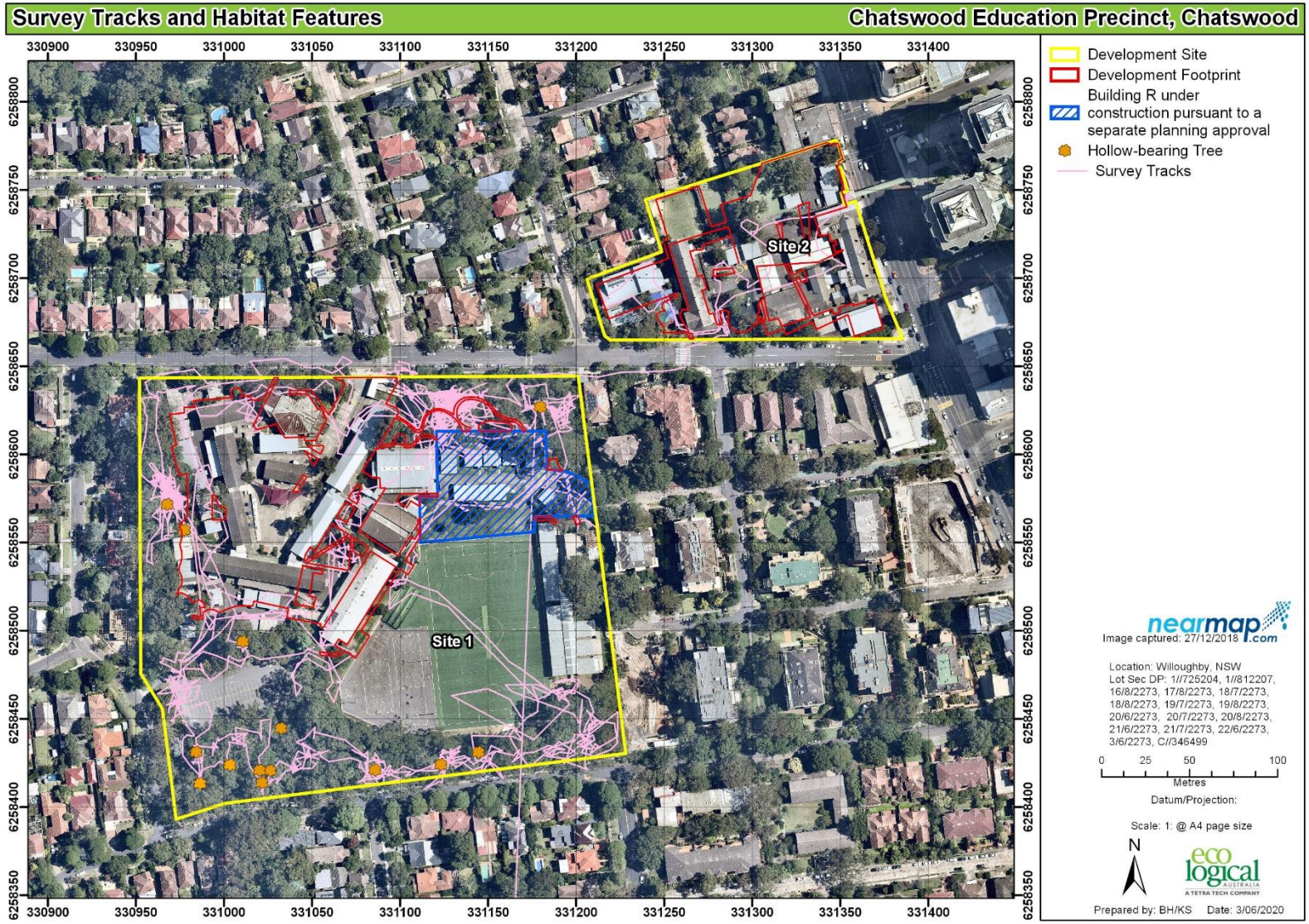

Figure 6: Survey effort and habitat features

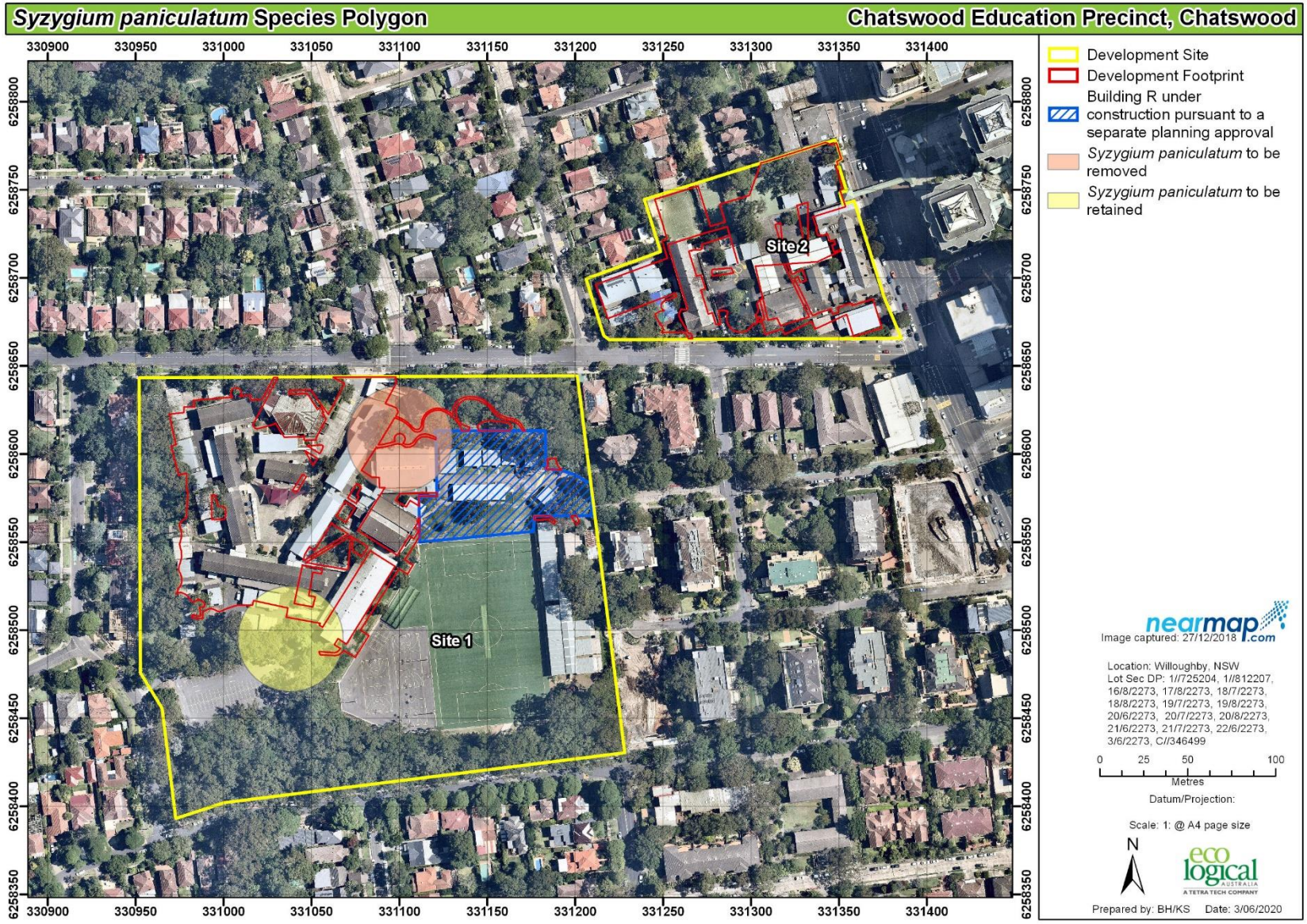

Figure 7: Species polygon (*Syzygium paniculatum*)

2. Stage 2: Impact assessment (biodiversity values)

2.1 Avoiding impacts

2.1.1 Locating a project to avoid and minimise impacts on vegetation and habitat

The development has been located in a way which avoids and minimises impacts as outlined in Table 13.

Table 13: Locating a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed	Justification
Locating the project in areas where there are no biodiversity values	The project (i.e. the proposed development footprint) has utilised existing development areas, cleared lands and planted gardens to minimise impacts on areas with the highest biodiversity values. Areas of biodiversity values have been retained where possible within the development site.	The project has utilised areas with existing development in the development site to reduce impacts to areas of high biodiversity values. While the project will require the removal of a small amount (0.032 ha) of weedy low condition Blue Gum High Forest, areas of high biodiversity value, (i.e. good condition Blue Gum High Forest) has been retained in the south and west of site 1 for conservation. Additionally, the project has ensured that one hollow-bearing tree (HBT) will be impacted and 13 HBTs will be retained. The project has located the development in areas of low biodiversity and only minor 0.032 ha of weedy condition Blue Gum High Forest will be impacted.
Locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition	The project has been located to utilise areas where native vegetation and threatened species habitat is in the poorest condition.	The project has been located to utilise areas in the north of the development site comprised of existing buildings, cleared lands and lower condition vegetation. This placement minimises removal of vegetation from the south of the development site which contains higher quality remnant vegetation and potential threatened species habitat.
Locating the project in areas that avoid habitat for species and vegetation in high threat categories (e.g. an EEC or CEEC), indicated by the biodiversity risk weighting for a species	The project has been located to avoid removal of vegetation in high threat categories.	The project has concentrated the impacts on vegetation which are not listed as part of a TEC. The majority of the vegetation within the development site to be removed does not conform to a TEC. A significant proportion of the vegetation retained in the development site does contain vegetation mapped as part of a TEC. The development site has utilised areas of lower biodiversity value where possible. Areas of lower biodiversity value includes planted native and cleared areas. Only minor amount of vegetation in high threat categories (EEC or CEEC) will be removed. A small amount (0.032 ha) of PCT 1237 (Blue Gum High Forest) in weedy-low condition will be removed. This is part of a larger patch which includes a large portion of PCT 1237 in good condition.

Approach	How addressed	Justification
Locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained	The project has been located to enable connectivity across the local area.	The project has been located to maintain all current connectivity between areas of vegetation. This will enable continued connectivity across the landscape for mobile fauna species and movement of genetic material

2.1.2 Designing a project to avoid and minimise impacts on vegetation and habitat

The development has been designed in a way which avoids and minimises impacts as outlined in Table 14.

Table 14: Designing a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed	Justification
Reducing the clearing footprint of the project	The project has been designed to reduce the clearing footprint of the project.	The placement of the development site footprint has been strategically designed to avoid high biodiversity value areas and utilises mainly cleared or built lands and planted vegetation.
Locating ancillary facilities in areas where there are no biodiversity values	Ancillary features have been located in areas where there are no biodiversity values.	Ancillary features will be located at the northern side of the development site in predominantly cleared areas with limited biodiversity value, avoiding the native vegetation along the southern extent of the development site. The existing carpark and sporting fields will act as part of the asset protection zone and therefore, removal of vegetation for asset protection is not required. Additionally, temporary ancillary features required during construction (such as stockpiles) will be located in open spaces and will not require the removal of native vegetation and biodiversity values.
Locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower vegetation integrity score)	Ancillary features have been located in areas where native vegetation is in the poorest condition.	Ancillary features will be located at the northern portion of the development site in predominantly built or cleared lands or in areas where native vegetation has been planted. Native planted vegetation contains a lower vegetation integrity score than the remnant vegetation located in the south of the development site.
Locating ancillary facilities in areas that avoid habitat for species and vegetation in high threat status categories (e.g. an EEC or CEEC)	Ancillary features have been located in areas that avoid habitat for species and vegetation in high threat categories.	The majority of the development site contains planted native vegetation which does not support vegetation in high threat categories (e.g. EEC or

Approach	How addressed	Justification
		CEEC). The development site contains substantial amount of cleared lands which will be utilised for temporary ancillary facilities and will not impact upon high threat category vegetation.
Providing structures to enable species and genetic material to move across barriers or hostile gaps	The development has been designed to maintain a vegetated corridor enabling movement of species and genetic material.	The project has been designed to retain quality vegetation in the south and west of the development site. The development site has been designed so that it does not impact on corridors. Existing vegetated corridors will be maintained with connectivity in all directions, allowing for the continued movement of species and genetic material across the landscape. Given that no corridors will be impacted, additional structures are not necessary.
Making provision for the demarcation, ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on the development site.	Vegetation in the east of the development site will be retained, enhanced and maintained.	Vegetation to be retained in the development site (to the south and west of the development site), will be enhanced and maintained as part of weed removal works and revegetation with characteristics species of PCT 1237.
Efforts to avoid and minimise impacts through design must be documented and justified	The project has been designed to reduce the clearing footprint of the project.	The placement of the development site footprint has been strategically designed to avoid high biodiversity value areas and utilises mainly cleared lands and degraded vegetation.

2.1.3 Prescribed biodiversity impacts

The list of potential prescribed biodiversity impacts as per the BAM is provided below:

- Occurrences of karst, caves, crevices and cliffs - none occur within the development site
- Occurrences of rock - no rock outcrops or scattered rocks occur within the development site
- Occurrences of human made structures and non-native vegetation – **Yes, see below**.
- Hydrological processes that sustain and interact with the rivers, streams and wetlands - none occur within the development site.
- Proposed development for a wind farm and used by species as a flyway or migration route - the project does not involve any wind farm development.

The development site contains human made structures. Vegetation (native and non-native) is located within the development site. The proposed development involves the exotic vegetation including *Celtis sinensis* and *Olea africana* which are listed as priority weeds and *Araucaria columnaris, Prunus sp.* and *Cupressus sp.*. Additional information regarding consideration of human made structures is provided

below. Non-native vegetation was identified and assessed for any potential to provide habitat for threatened flora and fauna species, including presence of HBTs.

As the development site is located in a heavily urbanised area almost the entire development site contains human made structures. During the literature review, consideration was given to buildings or structures that could potentially be utilised as a roosting resource by microchiropteran bats (microbats). Most of the buildings are multi-storey with a corrugated iron flat roof which are not particularly suitable for microbats. Additionally, the majority of the buildings have been constructed in the last 20 years with limited opportunities to provide suitable cavities for microbats.

The development site has the prescribed biodiversity impacts as outlined in Table 15.

Table 15: Prescribed biodiversity impacts

Prescribed biodiversity impact	Description in relation to the development site	Threatened species or ecological communities affected
Impacts of development on the habitat of threatened species or ecological communities associated with: • **karst, caves, crevices, cliffs and other geological features of significance, or** • **rocks, or** • **human made structures, or** • **non-native vegetation**	The development site contains a number of existing buildings. A brief visual ground inspection of the roof cavities did not identify potential entrance/exit holes into the cavity of the existing buildings. The development site contains non-native vegetation.	Potential roosting habitat for threatened microbat *Saccolaimus flaviventris* (Yellow-bellied Sheath-tail Bat) and *Falsistrellus tasmaniensis* (Eastern False Pipistrelle), *Miniopterus australis* (Little Bentwing-bat) and *Miniopterus orianae oceanensis* (Large Bent Winged Bat). There are only two BioNet records for each of the Eastern False-Pipistrelle and Yellow-bellied Sheath-tail Bat, seven records for Little Bentwing-bat and 51 records for Eastern Bentwing-bat). Non-native vegetation did not contain HBTs and are not prolific flowering species suitable for foraging for threatened species such as *Pteropus poliocephalus* (Grey-headed Flying Fox) or Potential foraging habitat for *Glossopsitta pusilla* (Little Lorikeet).
Impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation	The development site will remove non-native vegetation. These species are not flowering or nectar producing suitable for threatened species. The development site contains native vegetation for common urban arboreal mammals (possums) which provides foraging opportunities for threatened nocturnal bird species. The development will result in a reduction in the extent of foraging habitat and reduction in availability of their prey items.	Potential foraging habitat for other threatened microbat species above native vegetation canopy. Potential foraging habitat (native flora species) for *Pteropus poliocephalus* (Grey-headed Flying Fox). Potential foraging habitat for *Ninox strenua* (Powerful Owl). Potential foraging habitat on native flora species for *Glossopsitta pusilla* (Little Lorikeet).
Impacts of development on the connectivity of different areas of habitat of threatened species that	The proposed development will require the removal of planted native	Reduction in extent of potential foraging habitat for Grey-headed Flying Fox.

Prescribed biodiversity impact	Description in relation to the development site	Threatened species or ecological communities affected
facilitates the movement of those species across their range	vegetation from within the development site. The development will result in a minor reduction in the extent of existing planted native vegetation within the development site which provides stepping stone habitat between urban fragmented patches of vegetation.	Reduction in extent of potential habitat for Powerful Owl and Little Lorikeet. Reduction in extent of foraging habitat for other threatened microbats.
Impacts of development on movement of threatened species that maintains their lifecycle	The proposed development will result in reduction of vegetation within the development site and marginal loss of connectivity for mobile threatened species.	Grey-headed Flying Fox, Powerful Owl, Little Lorikeet and microbat species.
Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining)	The proposed works is located upslope of the intermittent drainage line and may result in a decline of water quality.	The drainage line does not support water dependent threatened species or water dependent ecological communities. Blue Gum High Forest TEC is located upslope of an intermittent drainage line and is not depend upon hydrological flows.

2.1.3.1 Locating a project to avoid and minimise prescribed biodiversity impacts

The development has been located in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 16.

Table 16: Locating a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed	Justification
Locating the envelope of surface works to avoid direct impacts on the habitat features	Habitat features including HBTs, foraging habitat for Grey-headed Flying Fox, Powerful Owl and threatened microbats within the development site will be removed	The development has avoided impacts to large tracts of vegetation in the south which includes nectar producing native canopy species for Grey-headed Flying Fox, foraging habitat for Powerful Owl and microbat species. The development has been located in a way to avoid impact to 13 HBTs and result in the removal of only one HBT.
Locating the envelope of sub-surface works, both in the horizontal and vertical plane, to avoid and minimise operations beneath the habitat features, e.g. locating long wall panels away from geological features of significance or water dependent plant communities and their supporting aquifers	The development does not involve deep construction into the soil horizon which may impact upon these geological features or water dependent plant communities.	The works do not involve excavation of deep underground structures. As such the development will not impact upon geological features of significance, water dependent plant communities and their supporting aquifers.

Approach	How addressed	Justification
Locating the project to avoid severing or interfering with corridors connecting different areas of habitat, migratory flight paths to important habitat or preferred local movement pathways	The development will involve the removal of some native vegetation which forms a connective corridor along the northern and eastern perimeter.	Although the development will result in the removal of some native and exotic vegetation along the eastern perimeter, the connectivity will be retained through vegetation along the western and southern boundaries. Additionally, the impacts have utilised areas which contain limited connectivity and retained connectivity within the areas of higher biodiversity values which extends beyond the development site in the south and western boundaries.
Optimising project layout to minimise interactions with threatened and protected species and ecological communities, e.g. designing turbine layout to allow buffers around features that attract and support aerial species, such as forest edges, riparian corridors and wetlands, ridgetops and gullies	The development has been strategically placed to avoid impacts to areas of high biodiversity value.	The development has utilised the centre portion of the development site which includes cleared lands and exiting development footprint and vegetation of low biodiversity values and retained areas of high biodiversity values in the south and west of the development site which includes areas of TEC of high quality Blue Gum High Forest.
Locating the project to avoid direct impacts on water bodies	The development has been strategically placed to avoid impacts to water bodies	There are no defined waterbodies within the development site. A small overland flow path is located along the southern boundary of the development site and will not be impacted by the proposed works. This drainage line is likely to flow into Swaines Creek located 250 m south-west of the development site.

2.1.3.2 Designing a project to avoid and minimise prescribed biodiversity impacts

The development has been designed in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 17.

Table 17: Designing a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed	Justification
Engineering solutions, e.g. proven techniques to minimise fracturing of bedrock underlying features of geological significance, water dependent communities and their supporting aquifers; proven engineering solutions to restore connectivity and favoured movement pathways	The development design has utilised the existing cleared, urban and disturbed areas and the works will not involve deep excavations into the bedrock.	The development design has utilised the zoning which allows tall buildings and therefore reduces the need to conduct deep excavation works and thus protect the geological processes and ground water processes.

Approach	How addressed	Justification
Design of project elements to minimise interactions with threatened and protected species and ecological communities, e.g. designing turbines to dissuade perching and minimise the diameter of the rotor swept area, Designing fencing to prevent animal entry to transport corridors	The development design has retained TEC within the development site and utilised areas with minimal impacts to biodiversity values.	The development design has utilised existing disturbed areas to minimise interactions with threatened species and minimised impacts to TECs located in the south and west of the development site which will be retained under the project.
Design of the project to maintain environmental processes critical to the formation and persistence of habitat features not associated with native vegetation	The formation of habitat features such as tree hollows has been retained within the development site.	A large number of trees of vary size has been retained within the development site which will provide suitable habitat features for a wide variety of hollow-dependent fauna species.
Design of the project to maintain hydrological processes that sustain threatened species and TECs	There are no threatened species and TECS which are depend upon hydrological processes.	The development design is located away from hydrological process and is not anticipated to alter the current hydrological flow regime of the overland flow path located in the southern boundary of the development site. There are no threatened species and TECs which are dependent upon hydrological processes identified within the development site or development site.
Design of the project to avoid and minimise downstream impacts on rivers, wetlands and estuaries by control of the quality of water released from the site.	The works are unlikely to alter the current hydrological flow of the unnamed 1st order stream.	The development design has been conducted so that hydrological flows will be captured on the sporting fields prior to entering the native vegetation located into the south-west of the development site and into any streams.

2.2 Assessment of Impacts

2.2.1 Direct impacts

The direct impacts of the development are provided below:

- native vegetation - Table 18
- threatened ecological communities - Table 19
- threatened species and threatened species habitat -Table 19
- prescribed biodiversity impacts are outlined in Section 2.2.2.

Direct impacts including the final project footprint (construction and operation) are shown on Figure 8.

Table 18: Direct impacts to 'native vegetation' as defined under the BAM

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Total (ha)
1237	*Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.*	North Coast Wet Sclerophyll Forests	Wet Sclerophyll Forests (Shrubby sub-formation)	0.37*

*THIS INCLUDES BUILDING AND LANDSCAPING FOR VEGETATION ZONE 2 AND 3

Table 19: Direct impacts on threatened ecological communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Direct impact (ha)	Listing status	Name	Direct impact (ha)
1237	CEEC	Blue Gum High Forest	0.032	CEEC	Blue Gum High Forest	0.032

2.2.2 Change in vegetation integrity

A vegetation integrity assessment using the Credit Calculator (BAMC) was undertaken and the results are outlined in Table 20. The proposed impacts include the removal of vegetation from all stratum for the proposed development footprint. Under the BAMC the impact area for vegetation zone 2 is too small and therefore, the BAMC automatically increased the impact area to 0.04 ha for the vegetation zone. Additionally, zone 3 is automatically increased to 0.4 ha of impact area.

Table 20: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
2	1237	Weedy	0.032	33.4	0	-33.4
3	1237	Planted_native	0.35	25	0	-25

2.2.3 Indirect impacts

The indirect impacts of the development are outlined in Table 21 and displayed in Figure 8. A 5 m construction buffer around the development footprint was conducted to account for potential indirect impacts during construction and post-construction phase. The indirect impacts have assumed that 0.05 ha of PCT 1237_weedy may be indirectly impacted through soil disturbance or over shadowing from the new buildings. Where possible these impacts will be mitigated through revegetation works and implementation of soil erosion control plan. Additional indirect impacts and appropriate mitigation measures are provided in Table 23.

Table 21: Indirect impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Runoff during construction works	Confined to development site with sediment fencing	During heavy rainfall or storm events	During rainfall events	Short-term impacts
Noise or dust	Construction	Noise and dust created from machinery	Noise and dust likely to carry beyond development site boundary	Daily, during construction works	Sporadic throughout construction period	Short-term impacts
Inadvertent impacts on adjacent habitat or vegetation	Construction	Damage to adjacent habitat or vegetation	Adjacent vegetation	Daily, during construction works	Throughout construction period	Short-term impacts
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Spread of weed seed or pathogens	Potential for spread into adjacent habitat	Daily, during construction works	Sporadic throughout construction period	Potentially long-term impacts
Vehicle strike	Construction / operation	Potential for native fauna to be struck by working machinery and moving vehicles	Within access road and development site	Daily, during both construction and operational phases.	Throughout life of project	Short-term impacts
Impact to threatened flora species	Construction / operation	No threatened flora species present	N/A	N/A	N/A	N/A
Rubbish dumping	Construction / operation	Illegal dumping by local residents/ construction crews	Potential for rubbish to spread via wind into adjacent vegetation	Potential to occur at any time throughout construction or operational phases	Throughout life of project	Short-term impacts
Wood collection	Construction / operation	Removal of wood in vegetation located in the southern extent of the development site	In southern portion of the development site	Potential to occur at any time throughout construction or operational phases	Throughout life of project	Short-term impacts
Bush rock removal and disturbance	Construction / operation	Removal of rocks in southern vegetation within the development site	In vegetation in the southern portion of the development site	Potential to occur at any time throughout construction or operational phases	Throughout life of project	Short-term impacts

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Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
Increase in predatory species populations	Construction / operation	Potential increase in domestic predatory species due to reduction of vegetation	In vegetation in the southern portion of the development site	During operational phase	Potential at any point during operation of development	Short-term impacts
Increase in pest animal populations	Construction / operation	Potential to increase if introduced	In vegetation in the southern portion of the development site	Potential to occur at any time throughout construction or operational phases	Throughout life of project	Short-term impacts
Increased risk of fire	Construction / operation	Potential due to presence of vegetation retained in the south of the development site	In vegetation in the southern portion of the development site	Potential to occur at any time, although, more likely during dry, windy conditions	Throughout life of project	Short-term and long-term impacts
Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	Construction / operation	Runoff during construction works	Confined to development site with sediment fencing	During heavy rainfall or storm events	During rainfall events	Short-term impacts
Overshadowing of new buildings on adjacent vegetation	Construction / operation	Changes in extent of natural sunlight to adjacent vegetation due to overshadowing	In adjacent vegetation to new buildings	Potential to occur at any time throughout construction or operational phases and beyond	Throughout life of project and beyond	Long term impacts
Impacts of artificial light	Construction / operation	Disruption to foraging behaviour of nocturnal species and impacts to roosting of diurnal species	In vegetation to be retained	Potential to occur at any time throughout construction or operational phases and beyond	Throughout life of project and beyond	Short and long term impacts
Increase in human traffic	Construction / operation	Increase in human movement in site and due to increase in school capacity	Throughout the site	Potential to occur at any time throughout construction or operational phases and beyond	Throughout life of project and beyond	Short and long term impacts
Impacts to TEC included fragmentation and accidental clearing	Construction / operation	Clearing or fragmentation of TEC during construction works	In west and south of Site 1	Potential to occur at any time throughout construction or operational phases	Throughout life of project and beyond	Short and long term impacts

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2.2.4 Prescribed biodiversity impacts

An assessment of impacts of the development on prescribed biodiversity impacts is outlined in Table 22 in accordance with Section 9.2.1of the BAM.

Table 22: Direct impacts on prescribed biodiversity impacts

BAM Criteria	Justification
9.2.1.3 The assessment of the impacts of the development on the habitat of threatened species or ecological communities associated with human made structures	
a) identify the human made structures with potential to be habitat for threatened species or ecological communities	The development site is located within a highly urbanised area. The proposed Upgrades to Chatswood Public School and Chatswood High School plan will involve the removal of three existing buildings (including a demountable structure) and construction of the development site. The ground inspection of the buildings did not detect potential gaps suitable for microbat access into the roof cavities. No other human made structures with potential habitat for threatened species or ecological communities were identified in the development site.
b) identify the species and ecological communities likely to use the habitat	Despite not obvious microbat activity in the buildings, there is potential that the buildings provide roosting habitat for a number of threatened microbat species including: *Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat) and *Falsistrellus tasmaniensis* (Eastern False Pipistrelle), *Miniopterus australis* (Little Bentwing-bat) and *Miniopterus orianae oceanensis* (Large Bent Winged Bat). These species are known to occasionally roost in buildings. There are BioNet records for these species within a 5 km radius for these species.
c) describe the nature, extent and duration of short and long-term impacts	The SSD application involves the permanent removal of three several multistorey education facilities. The removal of buildings would be considered a long-term impact. However, no obvious entry/exit points were identified in the buildings which may suggest that microbats utilise these buildings. The proposed SSD application consists of the construction of new buildings. The construction of new building may result in the production of noise and vibration which is considered a short-term impact. These impacts are likely to be minor considering alternative roost locations which may occur within the development site are likely to be are used by microbats under these circumstances.
d) describe, with reference to relevant literature the importance within the bioregion of the habitat of these species or ecological communities	According to literature documented in Australian Bat (Churchill 2009) the preferred roosting habitat of the following species includes: • Yellow-bellied Sheathtail Bat – this species will utilise tree hollows or buildings in small groups. There is potential that this species may utilise the building and tree hollows recorded within the development site and within the development site.

BAM Criteria	Justification
	• Eastern False Pipistrelle – this species primarily roosts in tree trunks in small groups, however it may occasionally utilise wooden buildings. It is unlikely this species would utilise buildings for maternity roosts due to the presence of hollow-bearing trees within the development site. • Little Bentwing-bat – this species forms specific maternity roosts in caves. They occasionally utilise buildings in the absence of other alternative roost locations (such as mines, culverts). There is potential that this species may on occasion utilise the buildings as an alternative roost location. • Large Bent Winged Bat – this species primarily roosts in caves, however, it occasionally roosts in human made structures such as buildings. There is potential that this species may on occasion utilise the buildings as an alternative roost location.
e) predict the consequences of the impacts for the local and bioregional persistence of the suite of threatened species and communities likely to use these areas as habitat, with reference to relevant literature and other published sources of information.	While these species of microbats have been known to utilise human structures for roosting, preferred roosting habitat for these species are non-human made structures (tree hollows or caves). Additionally, only one of the species is likely to utilise buildings more regularly including breeding times, this species is the Yellow-bellied Sheathtail Bat. The other species of microbats may utilise the buildings on occasion while traversing through the landscape or if other alternative roosting resources are not present. It should be noted that the development site provides marginal foraging and alternative roosting habitat in the form of buildings for a number of microbat species. The development site does not contain important habitat for these species. There is potential that the removal of the buildings may impact upon the number of available roosting resources for microbats migrating to breeding or non-breeding habitats such as the two Bentwing species. There is no available literature which has considered the impacts of removal of human made structures on microbat species. The Priority Action Statement for the Yellow-bellied Sheathtail-bat lists several recommended actions for help in the recovery of this species, those pertaining to retention of roosting habitat focus on the retention of large hollow-bearing trees and retention of vegetated areas. The Priority Action Statement for the Little Bentwing Bat and Eastern Bentwing Bat include further investigation of the wintering roosts for these species which includes tree hollows and undertaking restoration activities to create habitat and connectivity in the landscape. There is no mention of the use of buildings for Bentwing Bat species. The habitat within the development site is unlikely to be important for any of these microbat species.

9.2.1.4 The assessment of the impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation

BAM Criteria	Justification
a) identify the species and ecological communities likely to use the habitat	Several non-native tree species are present in the development site which have been planted within gardens or are invasive weeds. Non-native species to be removed includes *Celtis sinensis* and *Olea africana* which are listed as priority weeds and *Araucaria columnaris, Prunus sp..* These species are not considered suitable foraging species for Grey-headed Flying fox or Little Lorikeet. However, non-native vegetation may be utilised by arboreal mammals which comprise prey resources for Powerful Owl. A significant proportion of native and non-native vegetation will be retained within the development site and will not be impacted upon as part of this SSD application.
(b) describe the nature, extent and duration of short and long-term impact	The proposed development will result in the permanent removal of non-native trees (listed above). Some native planted and remnant vegetation will be impacted which may provide potential foraging habitat for Grey-headed Flying-fox and Little Lorikeet and marginal foraging habitat for the threatened microbat species and foraging habitat for Powerful Owl prey resources. Additional resources will be retained within the development site for threatened species.
(c) describe, with reference to relevant literature and other reliable published sources of information, the importance within the bioregion of the habitat to these species or ecological communities	These non-native species are not considered suitable foraging resources for the Grey-headed Flying-fox or Little Lorikeet. They may provide sheltering habitat for prey items for Powerful Owl. Flowering resources in the form of native planted vegetation, *Eucalyptus, Melaleuca* and *Callistemon* sp. would more likely be utilised for foraging resources by these threatened species and their prey items.
(d) predict the consequences of the impacts for the local and bioregional persistence of the suite of threatened species and communities likely to use these areas as habitat, with reference to relevant literature and other published sources of information.	The consequences of the permanent removal of those species listed above for the local and bioregional persistence of the threatened species is predicted to be negligible. Several of the non-native species recorded in the development site should be controlled such as *Celtis sinensis*, *Olea africana*, *Ligustrum sinense* and *Ligustrum lucidum* as they are listed as environmental weeds in the Greater Sydney Regional Strategic Weed Management Plan (2017-2022). There is an abundance of similar habitat within the locality and bioregion, and an abundance of higher quality habitat in the locality and bioregion.
9.2.1.5 The assessment of the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range must:	
(a) identify the area/s of connectivity joining different areas of habitat that intersect with the subject land and the areas of habitat that are connected according to Paragraph 4.2.1.3	The development site includes predominately disturbed vegetation. To the south and west of the development is a large tract of native vegetation retained within the development site. This area of vegetation connects to vegetation outside of the development site (site 1) and connects to Swaines Creek which eventually flows into Lane Cove River and the National Park. The vegetation within the development site is relatively small compared to the native vegetation retained within the development site and the vegetation connected in the broader landscape. However, due to

BAM Criteria	Justification
	the presence of major roads, only highly mobile species are likely to utilise the vegetation within the development site.
(b) identify the species and ecological communities likely to benefit from the connectivity	The species most likely to utilise the connectivity would be Grey-headed Flying-fox, microbat species, Little Lorikeet and dispersal of juvenile Powerful Owl. Blue Gum High Forest species are likely to benefit (i.e. exchange of genetic material and reduction of weeds) from the connectivity within the development site with adjacent vegetation to the south-west of the development site (site 1).
(c) describe the nature, extent and duration of short and long-term impacts	The proposed development will result in the permanent removal of 0.032 ha of native and 0.35 ha of planted native vegetation which forms connecting habitat for highly mobile species. Connectivity will be retained within the development site and in the adjacent broader locality.
(d) describe, with reference to relevant literature and other reliable published sources of information, the importance of the area of connectivity within the bioregion	The connectivity is considered limited except for highly mobile species which easily move across disturbed landscapes. The connecting habitat provides potential foraging habitat for the above listed species, which is part of a fragmented network of urban vegetation within the eastern suburbs. Within the Sydney Basin Bioregion, the removal of 0.032 ha of remnant, 0.35 native planted vegetation is considered to provide negligible connectivity on a landscape scale. The removal of connecting habitat would not prevent the highly mobile Grey-headed Flying-fox, Little Lorikeet, Powerful Owls or microbats from moving across the landscape in search of foraging resources. The removal of a small amount of connecting habitat from the development site is unlikely to be of importance to any threatened species within the bioregion considering the availability of connectivity retained within the development site and immediately adjacent to the development site.
(e) predict the consequences of the impacts for the bioregional persistence of the suite of threatened species and communities currently benefitting from the connectivity with reference to relevant literature and other published sources of information and taking into consideration mobility, abundance, range and other relevant life history factors.	The habitat to be removed forms part of a network or stepping stone habitat in the form of canopy, shrubs and ground layer garden plantings and native species. The vegetation connectivity flows from the south-west in site 1 and north-west in site 2. Only highly mobile species are likely to utilise the stepping stone vegetation from the development site. Under the proposal, canopy species will be retained within the development site to provide additional connectivity. The proposed development will not result in a loss of connectivity for the highly mobile species likely to utilise it.

2.2.5 Mitigating and managing impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 22.

Table 23: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Protection of resident fauna	Minor	Negligible	Following field assessment of habitat values, no trees within the development site contained suitable hollows for fauna habitation. As such, trees should be removed in accordance with best practise methods. In the event that fauna is injured during tree removal works a qualified ecologist/licensed wildlife handler should be contacted.	Relocation of fauna in a sensitive manner	Prior to and during clearing works	Contractor
Displacement of resident fauna	Minor	Negligible	Pre-clearance survey of trees to be removed and identification/location of habitat trees by a suitably qualified ecologist. Supervision by a qualified ecologist/licensed wildlife handler during tree removal in accordance with best practise methods.	Resident fauna relocated in a sensitive manner	Prior to and during clearing works	Contractor / Ecologist
Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or licensed wildlife handler during clearing events	Moderate	Minor	Pre-clearance survey of trees to be removed and identification/location of habitat trees by a suitably qualified ecologist. Trees identified for retention should be clearly delineated as a 'No Go' zone with high visibility bunting. Supervision by a qualified ecologist/licensed wildlife handler during tree removal in accordance with best practise methods. Any tree removal is to be undertaken by a suitably qualified and insured arborist.	Any fauna utilising habitat within the development site will be identified and managed to ensure clearing works minimise the likelihood of injuring resident fauna	During clearing works	Contractor / Ecologist
Installing artificial habitats for fauna in adjacent retained vegetation and habitat or human made structures to replace the habitat resources lost and	Minor	Negligible	Any trees removed that have hollows/hollow trunks/fissures should be retained as ground fauna habitat and/or used as replacement hollows and attached to trees within the within the development site/development site. If it is impractical to use salvaged hollows as replacement	Replacement of habitat features removed	Prior to and during clearing works	Contractor/ Ecologist

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
encourage animals to move from the impacted site, e.g. nest boxes			tree hollows, compensatory nest boxes should be installed within vegetation to be retained.			
Programming construction activities to avoid impacts; for example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting	Minor	Negligible	Where possible, timing of construction works should be planned to occur outside of the spring breeding season. If vegetation clearance occurs during spring breeding season, a pre-clearance survey is required to ensure no fauna is impacted by removal of vegetation.	impacts to fauna during nesting/nursing avoided	During clearing works	Contractor
Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance	Moderate	Minor	Install tree protection fencing around trees proposed for retention.	Trees to be retained not disturbed/impacted	Tree protection fencing to be set up prior to any works occurring on site and to remain throughout duration of construction works	Contractor
Staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Minor	Negligible	Construction staff to be briefed prior to work commencing to be made aware of sensitive biodiversity values present and environmental procedures such as: • Importance of retained vegetation areas and 'No Go' zones • Site environmental procedures (vegetation management, sediment and erosion control, exclusion fencing and noxious weeds) • What to do in case of environmental emergency (chemical spills, fire, injured fauna) Key contacts in case of environmental emergency	All staff entering the Development Site are fully aware of all the ecological values present within the Lot and environmental aspects relating to the development and know what to do in case of any environmental emergencies	To occur for all staff entering/working at the development site. Site briefings should be updated based on phase of the work and when environmental issues become apparent.	Contractor

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Minor	Negligible	Appropriate controls will be utilised to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways. Soil and erosion measures such as sediment fencing, clean water diversion must be in place prior the commencement of the construction work.	Erosion and sedimentation will be controlled	For the duration of construction works	Contractor
Noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise	Minor	Negligible	Considering the highly urbanised nature of the development site, the project is unlikely to result in impacts on wildlife resulting from noise Proposed hours of construction are as follows: Monday – Friday 7am – 6pm. Saturday 7am – 4pm.	Noise impacts associated with the development will be managed in accordance with guidelines	For the duration of construction works	Contractor
Adaptive dust monitoring programs to control air quality	Minor	Negligible	Dust suppression measures will be implemented during construction works to limit dust on site Commence revegetation as soon as practicable to minimise areas likely to create dust	Mitigate dust created during construction activities	For the duration of construction works	Contractor
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Moderate	Minor	Priority weeds present within the development site listed under the NSW *Biosecurity Act 2015* for the Greater Sydney Region will be removed. Weeds present include: 1. *Olea africana* (Olive) 2. *Asparagus aethiopicus* (Ground Asparagus) 3. *Celtis sinensis* 4. *Ligustrum lucidum* and *L. sinensis*	Prevent spread of weeds or pathogens	For the duration of construction works	Contractor
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Moderate	Minor	Vehicles, machinery and building refuse should remain only within the development site and not impinge on the areas of retained native vegetation to be retained in the east. Weed management to be undertaken in retained bushland following construction works.	Spread of weeds prevented	Post-construction	Contractor
Use of indigenous species from locally occurring plant community	Minor	Negligible	No remnant native vegetation is present within the site that would be suitable for restoration and rehabilitation.	Areas within the development site will	Throughout construction and	Contractor

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
for landscape plantings in the development site			Native vegetation present consists of street trees and garden plantings and is in general not representative of an indigenous PCT. It is recommended that landscape plantings be undertaken as part of the development using a minimum 50% locality derived native species in accordance with Randwick DCP (Part B4 Clause 3.2) increasing the presence of locally indigenous species.	be landscaped using appropriate species	following completion of construction activities	
Development control measures to regulate activity in vegetation and habitat adjacent to development including controls on rubbish disposal, wood collection, fire management and disturbance to nests and other niche habitats	Minor	Negligible	Strategy to be developed and implemented as part of the development may include: • Signage to indicate areas not to be disturbed i.e. No Go zones • Rubbish disposal guidance • Prohibition of wood collection • Prohibition of bush rock removal • Controls on pet ownership such as prohibitions on allowing pets to roam beyond fenced areas	Strategy to protect vegetation and habitat adjacent to development	To be developed to provide awareness to residents of housing development.	Client
Making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the development site	Minor	Negligible	Landscaping in the Development Site is to use locality derived native species and those found within the PCT present.	Areas within the development site will be landscaped using appropriate species	Throughout construction and following completion of construction activities.	Contractor
Overshadowing from new buildings on adjacent native vegetation	Minor	Negligible	Natural light will be allowed to filter into existing vegetation where possible through the use of strategic location of windows in the buildings. Installation of temporary structures during construction including demountable buildings are to be set-back away from native vegetation.	Allow natural light into adjacent native vegetation	During construction and design of building	Project manager and architect
Increase in human traffic	Minor	Negligible	Retain areas which does not permit regular human activities. Provide clusters of habitat for fauna crossing or stepping-stone habitat such as clusters of native ground cover species, fallen logs, shrubs and canopy species. This	Provide sheltering habitat for fauna	During construction and design of building	Project manager and architect

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
			allows for fauna species to shelter to avoid human interaction.	species to avoid human interactions.		
Impacts of artificial lighting	Minor	Negligible	Construction lights or development lights should be positioned to prevent shine into tree canopy or in vegetation to be retained. Lighting designed within the development site should have timers and be positioned low to the ground or prevent spill into adjacent areas. The use of a light shield is recommended.	Avoid impacts from artificial lighting on behaviour of nocturnal or diurnal fauna species.	For the duration of the construction phase and long-term	Project manager
Impacts to threatened *Syzygium paniculatum*	Moderate	Minor	Project arborist to mark out the location of Tree 161 to be retained. Highly visible fencing and signage is required around the root zone of this species. All contractors to be aware of threatened flora species and its location. Any works within 5 m of this species will require the project arborist to be present.	Avoid impacts to threatened flora species	For the duration of the construction phase and long-term	Project manager
Impacts to threatened ecological community Blue Gum High Forest	Moderate	Minor	All contractors to undertake an environmental toolbox talk to discuss the location of this TEC. Prior to any works, all vegetation to be retained must be clearly marked as no-go zone and signage present at regular intervals identifying significance of area. A vegetation management plan is required following the completion of the construction works.	Avoid impacts to TEC	For the duration of the construction phase and long-term	Project manager

2.2.6 Serious and Irreversible Impacts (SAII)

The development has one candidate Serious and Irreversible Impacts (SAII) values as outlined in Table 24. Detailed consideration of whether impacts on candidate TECs are serious and irreversible is included in Table 24, Table 25 and

Table 26.

Table 24: Candidate Serious and Irreversible Impacts

Species / Community	Common Name	Principle	Direct impact area (ha)	Threshold
Blue Gum High Forest in the Sydney Basin Bioregion	Blue Gum High Forest	Principals 1, 2, 3 & 4	0.025	Listed as 'under development' in BioNet

Table 25: Determining whether impacts are serious and irreversible

Determining whether impacts are serious and irreversible	Assessment
Principle 1	
Does the proposal impact on a species, population or ecological community that is a candidate entity because it is in a rapid rate of decline?	Yes
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible	The Thresholds for Blue Gum High Forest have not been published yet according to the Threatened Biodiversity Data Collection provided in DPIE BioNet. Blue Gum High Forest is listed as a SAII candidate as it has undergone a dramatic rate of decline due to the extent of vegetation clearance. However, the Blue Gum High Forest within the development site is unlikely to be considered subject to SAII as only very marginal amount of vegetation will be removed and the vegetation to be removed does not represent a characteristic species of the Blue Gum High Forest. The proposed works result in the removal of one *Brachychiton acerifolius* which was located within an area mapped as PCT_1237_weedy Blue Gum High Forest. This species is not listed as associated with PCT 1237 or part of the Blue Gum High Forest final determination species. The remaining vegetation to be removed is also not considered part of the TEC. As the proposed works will not result in the direct removal of Blue Gum High Forest it is unlikely the works are considered SAII.
Principle 2	
Does the proposal impact on a species that is a candidate entity because it has been identified as having a very small population size?	Yes
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible	Blue Gum High Forest has been extensively cleared within the Sydney Bioregion, therefore, impacts to this TEC may be considered serious and irreversible. However, the proposed redevelopment will result in the removal of one species *Brachychiton acerifolius* which is not considered a

Determining whether impacts are serious and irreversible	Assessment
	characteristic species of this community. All other vegetation within the areas mapped as Blue Gum High Forest will be retained. Indirect impacts of 0.05 ha of Blue Gum High Forest may occur during construction and will be controlled through mitigation measures. The works are unlikely to result in a serious and irreversible impacts as only marginal amount of vegetation will be removed which is not considered part of the Blue Gum High Forest. An additional 1.33 ha of Blue Gum High Forest in varying condition will be retained within the development site.
Principle 3	
Does the proposal impact on the habitat of a species or an area of an ecological community that is a candidate entity because it has a very limited geographic distribution?	Yes
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible.	The Thresholds for Blue Gum High Forest have not been published according to the Threatened Biodiversity Data Collection provided in BioNet. The development site occurs within the geographic distribution of Blue Gum High Forest. The development site is not located within the outer limits of Blue Gum High Forest geographic distribution, furthermore, the proposed development will not result in the loss of connectivity features or fragmentation of Blue Gum High Forest as a result of the works.
Principle 4	
Does the proposal impact on a species, a component of species habitat or an ecological community that is a candidate entity because it is irreplaceable?	Yes
b. If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible.	The Thresholds for Blue Gum High Forest have not been published according to the Threatened Biodiversity Data Collection provided in BioNet. The proposed development has actively avoided the removal of canopy species which are mapped as part of Blue Gum High Forest (i.e. PCT 1237_good and PCT 1237_weedy). Impacts to Blue Gum High Forest is limited to planted species such as *Brachychiton acerifolius* which is not considered characteristic of the community, therefore, the impacts are considered minor in nature.

Table 26: Evaluation of an impact on a TEC – Blue Gum High Forest

Impact Assessment Provisions	Assessment
1. The area and condition of the TEC to be impacted directly and indirectly by the proposed development	The development will remove 0.025 ha of vegetation identified as *PCT 1237_weedy* condition. This is likely to occur as trimming of outer branches of canopy trees and slight disturbance to soil profile during construction works.

Impact Assessment Provisions	Assessment
2. The extent and overall condition of the TEC within an area of 1500 metres, and then 5000 metres, surrounding the proposed development footprint. In the case of strategic biodiversity certification projects, the extent and overall condition of the TEC may be assessed across the IBRA sub region	Within the development site, 0.58 ha of Blue Gum High Forest in good condition and 0.75 ha of Blue Gum High Forest in weedy condition will be retained. In addition to what has been mapped within the development site, there is an estimated 25.18 ha of Blue Gum High Forest within an area of 1,500 m, in varying condition (from large tracts to small patches) (mapped by OEH 2016). The removal of 0.025 ha of Blue Gum High Forest within the development site represents 0.024% of the mapped Blue Gum High Forest extent within the 1,500 m radius. Within 5,000 m radius of the development site, there is an estimated 369.57 ha of Blue Gum High Forest that has been mapped with low disturbance condition. The removal of 0.025 ha of Blue Gum High Forest from within the development site, represents 0.03% of the mapped Blue Gum High Forest extent within the 5,000 m radius.
3. An estimate of the extant area and overall condition of the TEC remaining before and after the impact of the proposed development has been taken into consideration	The development will not result in the overall decline of the condition of Blue Gum High Forest retained in the development site after development. There is approximately 0.58 ha of good condition Blue Gum High Forest and 0.75 ha of weedy Blue Gum High Forest to be retained within the development site and an additional 25.18 ha of Blue Gum High Forest recorded in a 1,500 m radius of the site.
4. The development proposal's impact on:	
a. Abiotic factors critical to the long-term survival of the TEC; for example, will the impact lead to a reduction of groundwater levels or substantial alteration of surface water patterns; will it alter natural disturbance regimes that the TEC depends upon, e.g. fire, flooding etc.?	The development will not impact abiotic factors critical to the long-term survival of the TEC.
b. Characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of under-storey species or harvesting of plants	The development will not impact characteristic and functionally important species outside of the proposed impact area as only a small amount of Blue Gum High Forest will be affected and the remaining Blue Gum High Forest (weedy condition) will be retained. Therefore, the vegetation is not considered characteristically / functionally important species. .
c. The quality and integrity of an occurrence of the TEC through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in the TEC	The development proposal has potential to assist in the spread of invasive species into the patch of Blue Gum High Forest that will be retained within the development site. These potential impacts will be controlled during the construction phase through implementation of mitigation measures. The site will be subject to long-term management of weeds through bush regeneration works in the development site.
5. Direct or indirect fragmentation and isolation of an area of the TEC	The development will not result in an increase in the direct or indirect fragmentation or isolation of any areas of Blue Gum High Forest. The development will impact upon weedy condition Blue Gum High Forest, however, much of the

Impact Assessment Provisions	Assessment
	canopy will be retained and therefore, connectivity will also be retained.
6. The measures proposed to contribute to the recovery of the TEC in the IBRA subregion.	In its current form, the proposed development does not contribute to the recovery of this TEC in the IBRA subregion.

2.3 Risk assessment

A risk assessment has been undertaken for any residual impacts likely to remain after the mitigation measures (Section Table 23) have been applied. Likelihood criteria, consequence criteria and the risk matrix are provided in Table 27, Table 28 and Table 29 respectively.

Table 27: Likelihood criteria

Likelihood criteria	Description
Almost certain (Common)	Will occur, or is of a continuous nature, or the likelihood is unknown. There is likely to be an event at least once a year or greater (up to ten times per year). It often occurs in similar environments. The event is expected to occur in most circumstances.
Likely (Has occurred in recent history)	There is likely to be an event on average every one to five years. Likely to have been a similar incident occurring in similar environments. The event will probably occur in most circumstances.
Possible (Could happen, has occurred in the past, but not common)	The event could occur. There is likely to be an event on average every five to twenty years.
Unlikely (Not likely or uncommon)	The event could occur but is not expected. A rare occurrence (once per one hundred years).
Remote (Rare or practically impossible)	The event may occur only in exceptional circumstances. Very rare occurrence (once per one thousand years). Unlikely that it has occurred elsewhere; and, if it has occurred, it is regarded as unique.

Table 28: Consequence criteria

Consequence category	Description
Critical (Severe, widespread long-term effect)	Destruction of sensitive environmental features. Severe impact on ecosystem. Impacts are irreversible and/or widespread. Regulatory and high-level government intervention/action. Community outrage expected. Prosecution likely.
Major (Wider spread, moderate to long term effect)	Long-term impact of regional significance on sensitive environmental features (e.g. wetlands). Likely to result in regulatory intervention/action. Environmental harm either temporary or permanent, requiring immediate attention. Community outrage possible. Prosecution possible.
Moderate (Localised, short-term to moderate effect)	Short term impact on sensitive environmental features. Triggers regulatory investigation. Significant changes that may be rehabilitated with difficulty. Repeated public concern.
Minor (Localised short-term effect)	Impact on fauna, flora and/or habitat but no negative effects on ecosystem. Easily rehabilitated. Requires immediate regulator notification.

Consequence category	Description
Negligible (Minimal impact or no lasting effect)	Negligible impact on fauna/flora, habitat, aquatic ecosystem or water resources. Impacts are local, temporary and reversible. Incident reporting according to routine protocols.

Table 29: Risk matrix

Consequence	Likelihood				
	Almost certain	Likely	Possible	Unlikely	Remote
Critical	Very High	Very High	High	High	Medium
Major	Very High	High	High	Medium	Medium
Moderate	High	Medium	Medium	Medium	Low
Minor	Medium	Medium	Low	Low	Very Low
Negligible	Medium	Low	Low	Very Low	Very Low

Table 30: Risk assessment

Potential impact	Project phase	Risk (pre-mitigation)	Risk (post mitigation)
Vegetation clearing	Construction / operation	Medium	Low
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Medium	Low
Noise, dust or light spill	Construction	Low	Very Low
Inadvertent impacts on adjacent habitat or vegetation	Construction	Medium	Low
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Medium	Low
Vehicle strike	Construction / operation	Low	Very Low
Trampling of threatened flora species	Construction / operation	Low	Very Low
Rubbish dumping	Construction / operation	Low	Very Low
Wood collection	Construction / operation	Low	Very Low
Bush rock removal and disturbance	Construction / operation	Medium	Low
Increase in predatory species populations	Construction / operation	Low	Very Low
Increase in pest animal populations	Construction / operation	Low	Very low

Potential impact	Project phase	Risk (pre-mitigation)	Risk (post mitigation)
Increased risk of fire	Construction / operation	Medium	Low
Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	Construction / operation	Medium	Low
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Low	Very Low

2.4 Adaptive management strategy

This section is required for those impacts that are infrequent, cumulative or difficult to predict. Impacts associated with the proposed development have been considered and addressed in Section 2.5 and no further impacts are required to be addressed. For major projects: details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain.

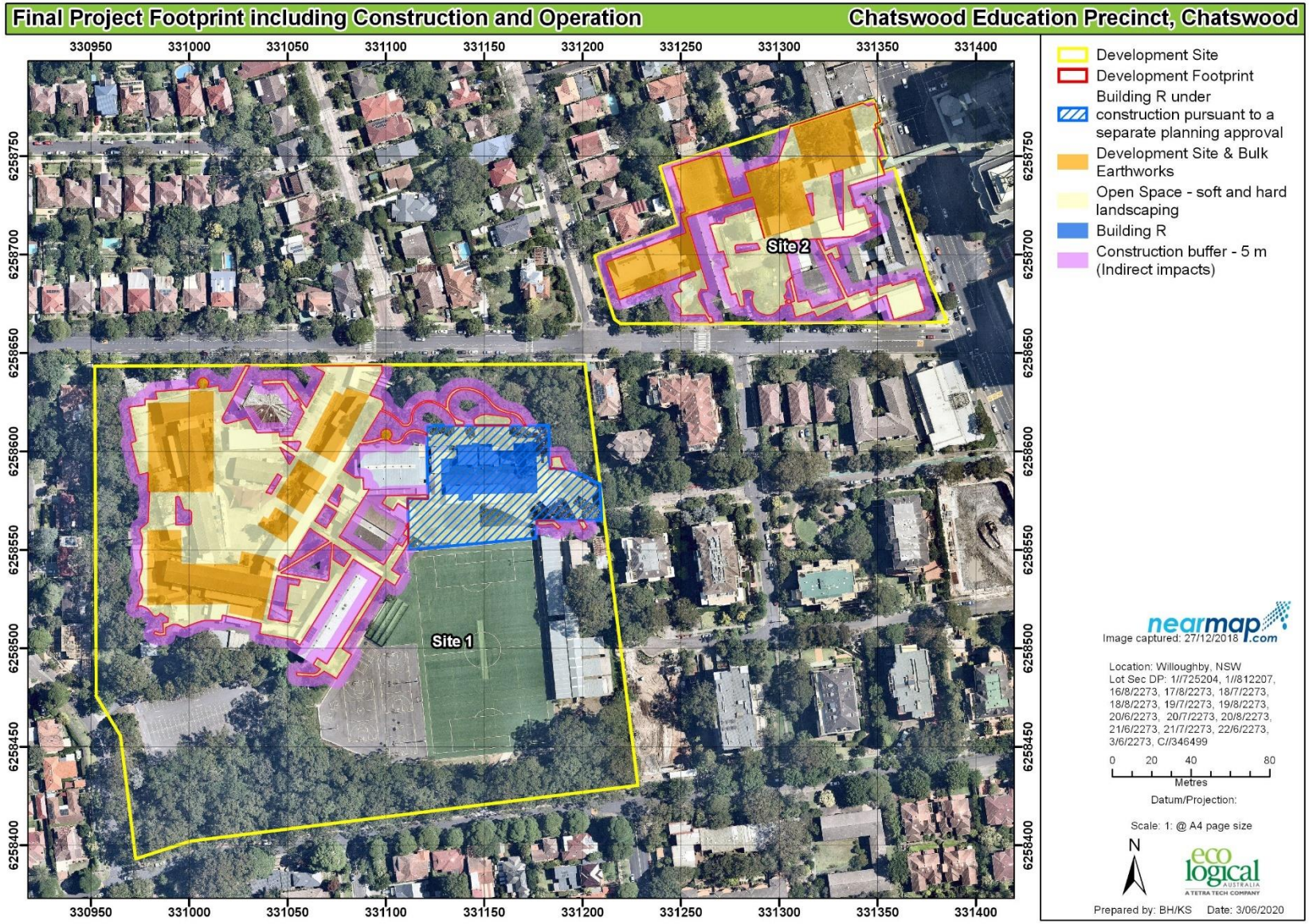

Figure 8: Final project footprint including construction and operation

2.5 Impact summary

Following implementation of the BAM and the BAMC, the following impacts have been determined.

2.5.1 Serious and Irreversible Impacts (SAII)

The development has candidate Serious and Irreversible Impacts (SAII) values as outlined in Table 24 and shown on Figure 9. Detailed consideration of whether impacts on candidate TEC are serious and irreversible is included in Table 31.

Table 31: Serious and Irreversible Impacts Summary

Species / Community	Common Name	Principle	Direct impact area (ha)	Summary
Blue Gum High Forest	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.	Principals 1, 2, 3 & 4	0.025	The thresholds for Blue Gum High Forest have not been published by DPIE. It is considered that the proposed development is unlikely to result in a SAII on Blue Gum High Forest

2.5.2 Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 32 and shown on Figure 10. The impacts of the development requiring offset for threatened species and threatened species habitat are outlined in Figure 10.

Table 32: Impacts to native vegetation that require offsets

Veg zone	PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)	Rationale
2	1237	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.	North Coast Wet Sclerophyll Forests	Wet Sclerophyll Forests (Shrubby sub-formation)	0.032	No further reduction in building footprint could be achieved
3	1237	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.	North Coast Wet Sclerophyll Forests	Wet Sclerophyll Forests (Shrubby sub-formation)	0.35	No further reduction in building footprint could be achieved

Table 33: Impact to threatened species and habitat that require offsets

Species	Common name	Direct impact (# of individuals)	NSW listing status	EPBC listing status	Rationale
Syzygium paniculatum	Magenta Lilly Pilly	1	Endangered	Vulnerable	One individual located in development footprint will be removed

2.5.3 Impacts not requiring offsets

All native vegetation within the development site which will be removed requires offsets.

2.5.4 Areas not requiring assessment

Areas not requiring assessment include existing buildings, recreational areas (sporting fields), carparks, paths and cleared areas. The development site contained cleared areas which are shown in Figure 3 . These areas were not consistent with any listed PCT, nor did they contain any threatened species, hence further assessment under the BAM was not required. Areas not requiring assessment are shown on Figure 11.

2.5.5 Credit summary

The number of ecosystem credits required for the development are outlined in Table 34. The number of species credits species is provided in Table 35. The biodiversity credit reports are included in Appendix A.

Table 34: Ecosystem credits required

PCT ID	PCT Name	Ancillary	Trading Group	Direct impacts (ha)	Credits required
1237	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion	Weedy	North Coast Wet Sclerophyll Forests >90% cleared group (Tier2 or higher)	0.032	1
1237	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion	Planted native	North Coast Wet Sclerophyll Forests >90% cleared group (Tier2 or higher)	0.35	5

Table 35: Species credits required

Species name	Count (# of individuals)	Biodiversity risk weight	Trading group	Credits required
Syzygium paniculatum	1	2	Any in NSW	2 credits

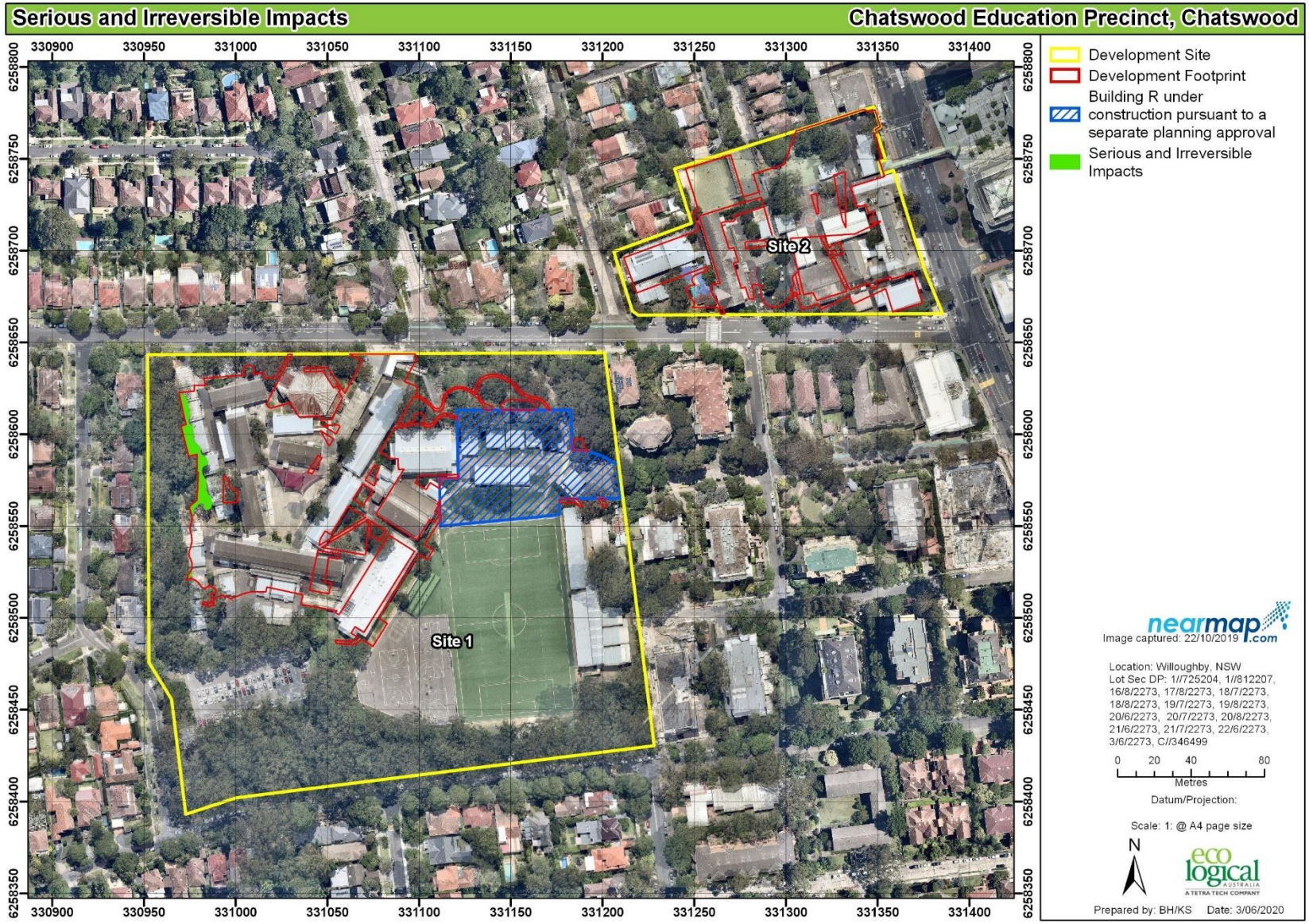

Figure 9: Serious and Irreversible Impacts

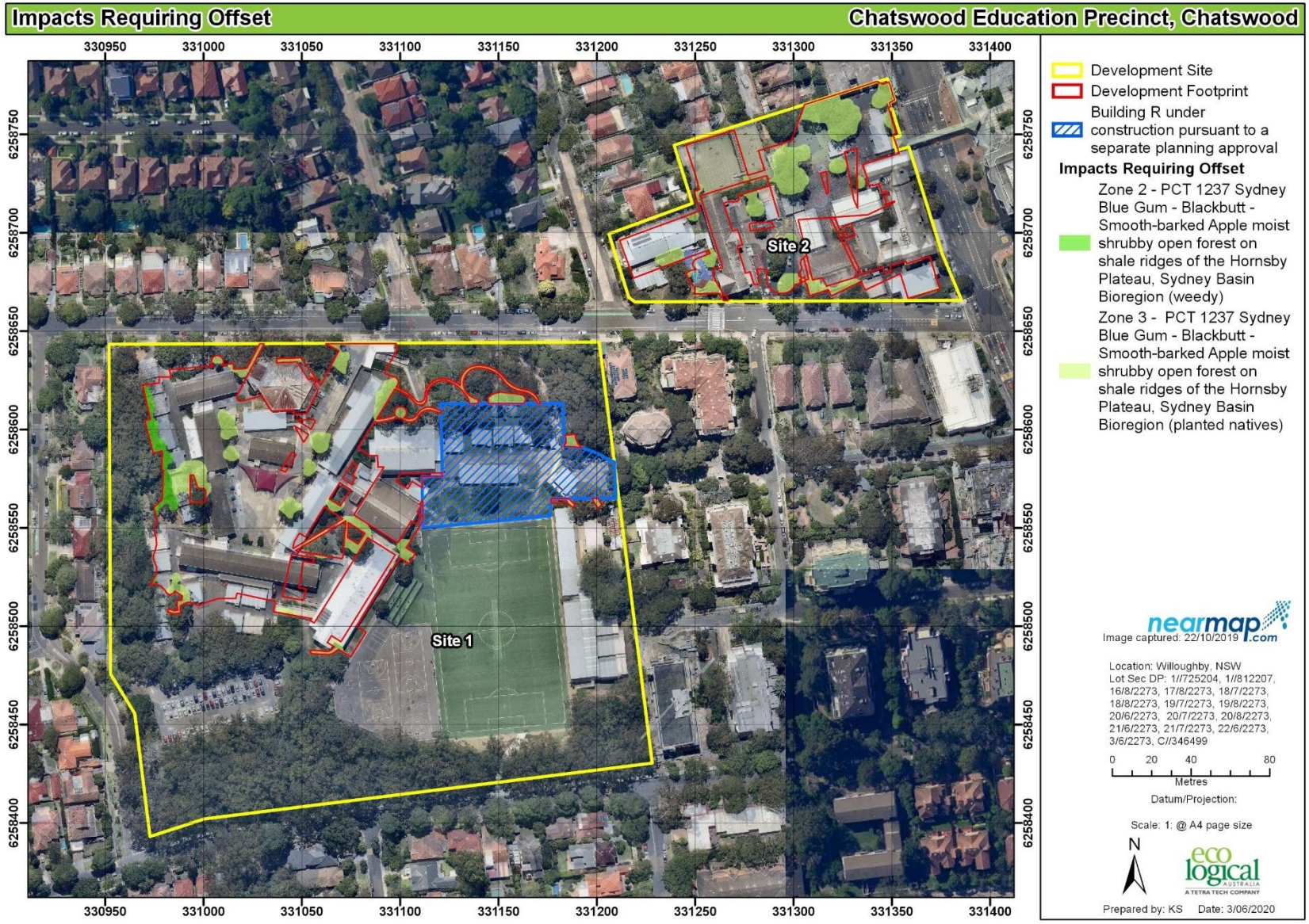

Figure 10: Impacts requiring offset

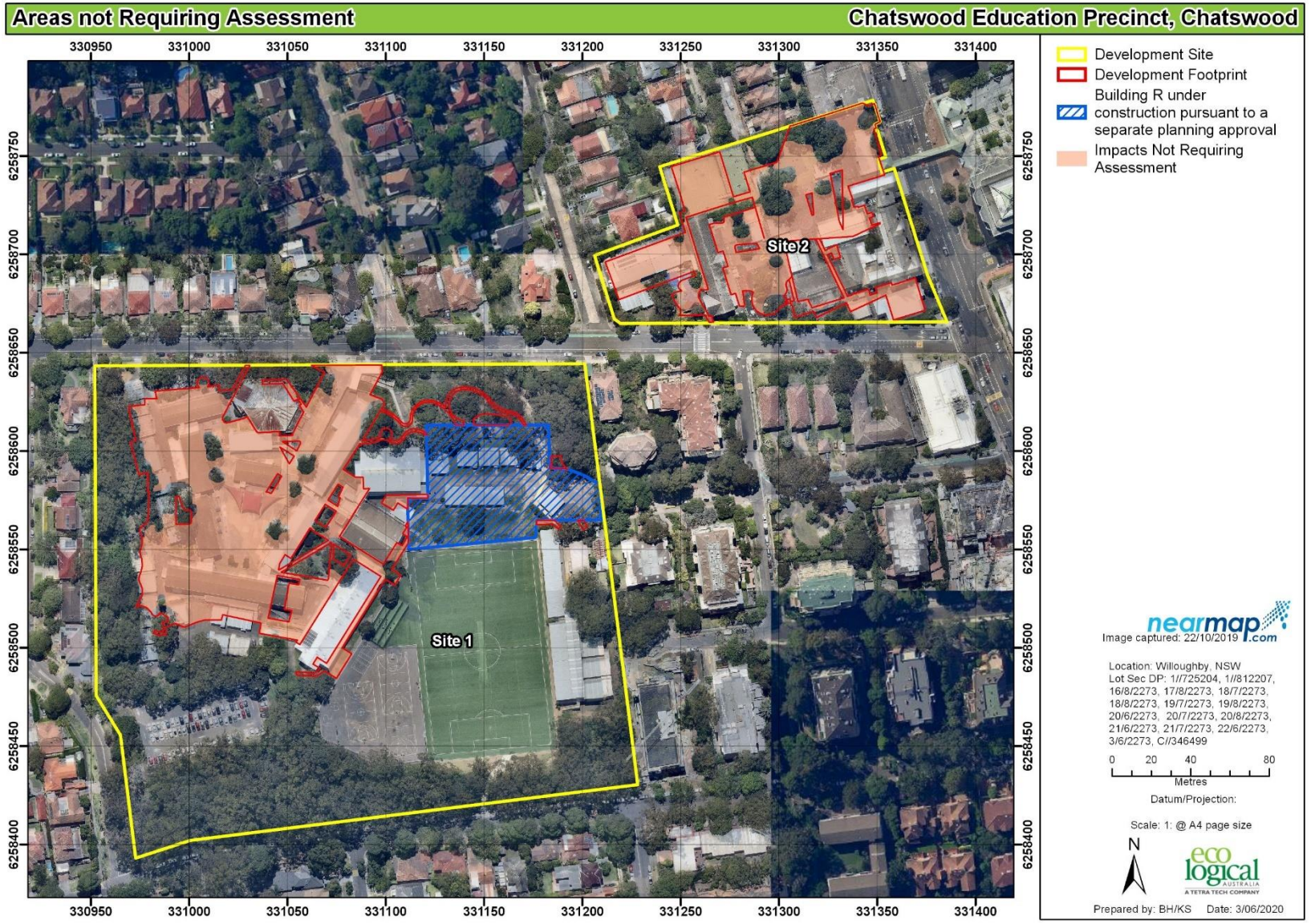

Figure 11: Areas not requiring assessment

2.6 Consistency with legislation and policy

Additional matters relating to impacts on flora and fauna which are not covered by the BC Act must also be addressed for the proposed development. Potential Matters of National Environmental Significance (MNES) in accordance with the EPBC Act have been addressed in Section 2.6.1. Matters relating to Willoughby Council planning instruments have been addressed in Section 2.6.3.

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

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where Matters of National Environmental Significance (MNES) may be affected. Under the Act, any action which 'has, will have, or is likely to have a significant impact on a matter of MNES' is defined as a controlled action, and requires approval from the Commonwealth Department of Agriculture, Water and Environment (DAWE), which is responsible for administering the EPBC Act.

A habitat assessment and Likelihood of Occurrence was completed and two MNES *Pteropus poliocephalus* (Grey-headed Flying-fox) and *Syzygium paniculatum* were assessed.

Pteropus poliocephalus (Grey-headed Flying-fox)

The Grey-headed Flying-fox is listed as a Vulnerable species under the EPBC Act.

This species utilises a wide variety of habitats (including disturbed areas) for foraging and have been recorded travelling long distances on feeding forays. Fruits and flowering plants of a wide variety of species are the main food source. The species roosts in large 'camps' of up to 200 000 individuals. Camps are usually formed close to water and along gullies, however, the species has been known to form camps in urban areas (DECCW 2009).

The Gordon Grey-headed Flying-fox camp is known from the locality to be within 10 km of the development site (DIPE 2020b). The vegetation within the development site provides potential foraging habitat. It is considered likely that this species would use the site on occasion for foraging purposes. According to the National Flying-fox Monitoring Program, no Grey-headed Flying-fox camps currently occur or have been recorded within the development site (DAWE 2020b).

Table 36: EPBC Act of Significance for *Pteropus poliocephalus* (Grey-headed Flying-fox)

Criterion	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criterion a: lead to a long-term decrease in the size of an important population of a species	The Grey-headed Flying-Fox is considered one population due to the constant exchange of genetic material between individuals and its movement between camps throughout its entire geographic range (DAWE 2020c). Maternity or other roosting habitat is considered important habitat for this species. No roosting habitat (i.e. camps) have been recorded within the development site. The site does not support key source populations for breeding or dispersal, populations necessary for maintaining genetic diversity, or populations near the limit of the species range. According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the development site (DAWE 2020b). The nearest active GHFF camp occurs approximately 10 km to the north-west of the development site, within Gordon (DAWE 2020b).

Criterion	Assessment
	The development site contains 1.89 ha of potential foraging habitat for this species which will be retained. Additional foraging resources were identified in the broader locality of the development site including Lane Cove National Park. Given the proximity of more suitable habitat within the assessment area, the removal of 0.37 ha of potential foraging habitat is unlikely to result in a long-term decrease in the size of an important population of Grey-headed Flying-fox.
Criterion b: reduce the area of occupancy of an important population	The proposed development will reduce the extent of available foraging habitat for the Grey-headed Flying-fox. Approximately 0.37 ha of potential foraging habitat will be removed, and 1.89 ha will be retained within the development site. The vegetation within the development site may provide supplementary foraging habitat for this species. The development site does not contain breeding or sheltering habitat (i.e. bat camps). The Grey-headed Flying-fox is known to fly long distances (up to 50 km per night) and move between bat camps. As such this species is likely to utilise a large extent of habitat around the Gordon camp which may include some habitat within the development site and a large amount of habitat in adjacent lands including Lane Cove National Park. Due to the extent of habitat within a 50 km radius of the known bat camp at Gordon, the removal of a small amount of native planted vegetation is unlikely to significantly reduce the extent of occupancy for this species.
Criterion c: fragment an existing important population into two or more populations	The proposed development will result in the loss of 0.37 ha of potential foraging habitat in the form of native canopy species within the development site. The proposed works will not affect camps. Additionally, due to the highly urbanised nature of the vegetation within the development site, it is likely that the vegetation affected by the development is considered marginal or supplementary foraging habitat for this species. A large amount of intact better quality native vegetation was identified 1 km from the development site, within Lane Cove National Park. The Grey-headed Flying-fox is a highly mobile species and is considered part of one large population. As the vegetation within the development site is considered supplementary habitat for this species, it is unlikely that the proposed works will result in the fragmentation of populations for this highly mobile species.
Criterion d: adversely affect habitat critical to the survival of a species	The Draft Recovery Plan for the Grey-headed Flying-fox 2017 identifies 'a continuous temporal sequence of productive foraging habitats, linked by migration corridors or stopover habitats, and suitable roosting habitat within nightly commuting distance of foraging areas' as habitat critical to the survival of the species. No camps will be affected by the proposed action. The proposed action will remove 0.37 ha of vegetation, some of which comprises suitable foraging habitat for the Grey-headed Flying-fox. The Grey-headed Flying-fox is recorded as travelling long distances (50 km) on feeding forays and suitable habitat is available outside of the development site. 0.37 ha represents a negligible amount of potential foraging resources in the locality. Potential foraging habitat will persist in close proximity to the development site, within the remaining development site and in large stands of high quality intact native vegetation within Ferndale Park and into Swaines Creek riparian corridor 250 m adjacent to the development site and in the Lane Cove River National Park (approximately 1 km west from the development site). Given that this species is highly mobile (traveling up to 50 km to forage), it is considered unlikely that the works would adversely affect habitat critical to the survival of this species
e: disrupt the breeding cycle of an important population	According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the development site (DAWE 2020b). The nearest active GHFF camp occurs approximately 10 km to the north-west of the development site, within Gordon (DAWE 2020b). Thus, no important population of GHFF occurs within

Criterion	Assessment
	the development site, and the proposed works are unlikely to disrupt the breeding cycle of an important population.
Criterion f: Adversely affect habitat critical to the survival of a species; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The potential foraging habitat to be removed is marginal and of low quality. Given the small amount of potential foraging habitat to be removed, that potential foraging habitat will persist within the development site and across the locality, and that this species is highly mobile, it is unlikely that the habitat to be removed would cause the species to decline.
Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed works will not result in the establishment of an invasive species that is harmful to the Grey-headed Flying-fox.
Criterion h: Introduce disease that may cause the species to decline	The proposed works will not result in the introduction of a disease that is harmful to the Grey-headed Flying-fox.
Criterion i: Interfere substantially with the recovery of the species	Considering the above factors, the proposed works will not interfere substantially with the recovery of this species.
Conclusion	In consideration of the above, the proposed works are considered unlikely to have a significant impact on the Grey-headed Flying-fox.

Syzygium paniculatum (Magenta Lilly Pilly)

This species is listed as vulnerable under the EPBC Act. It occurs from Upper Landsowne to Conjola State Forest. It is restricted mainly to remnant stands of littoral (coastal) rainforest.

Table 37: EPBC Act of Significance for *Syzygium paniculatum*

Criterion	Response
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criterion a: lead to a long-term decrease in the size of an important population of a species	An important population is defined as a population that is necessary for a species' long-term survival and recovery. The *Syzygium paniculatum* proposed to be removed is located within a landscaped garden and is disconnected with suitable habitat for this species. There is potential that this specimen and the other specimen to be retained within the development site has been planted and does not form part of an important population. Consequently, it is considered that the proposed development will not lead to a long-term decrease in the size of an important population of the species.
Criterion b: reduce the area of occupancy of an important population	This species typically grows in littoral coastal rainforests of NSW. The *Syzygium paniculatum* proposed to be removed is not located within littoral rainforest. There is potential that this species has been planted outside of its natural area of distribution. Therefore, it is unlikely to form part of an important population. Consequently, it is considered that the proposed development will not reduce the area of occupancy of an important population of this species.

Criterion	Response
Criterion c: fragment an existing important population into two or more populations	The development site contains two *Syzygium paniculatum* specimens, of which one plant will be removed for the proposed redevelopment. The proposed works will result in the loss of individuals of this threatened species. However, the specimens within the development site are unlikely to be considered an important or viable population given that these specimens may have been planted and do not form part of an important population (i.e. they are not located in their natural habitat). Consequently, it is considered that the proposed development will not fragment an existing important population.
Criterion d: adversely affect habitat critical to the survival of a species	The *Syzygium paniculatum* proposed to be removed was identified within a landscaped garden and is therefore it is not considered to be important or critical to the survival of the species. Consequently, it is considered that the proposed development will not adversely affect habitat critical to the survival of this species.
Criterion e: disrupt the breeding cycle of an important population	Not applicable.
Criterion f: Adversely affect habitat critical to the survival of a species; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The *Syzygium paniculatum* proposed to be removed was identified outside its natural littoral coastal rainforest habitat. It is considered unlikely that the development site will modify, destroy, remove or isolate or decease the availability or quality of habitat to the extent that the species is likely to decline.
Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The site is currently in a disturbed and modified condition and does not represent known habitat for this threatened species. Consequently, the proposed development is unlikely to result in the establishment of an invasive species that is harmful to this species.
Criterion h: Introduce disease that may cause the species to decline	It is considered unlikely that the proposed action would introduce disease that may cause the decline of *Syzygium paniculatum.*
Criterion i: Interfere substantially with the recovery of the species	The 2012 *Syzygium paniculatum* Recovery Plan aims to • ensuring a coordinated and efficient approach to the implementation of recovery efforts • establishing the full extent of the distribution of Magenta Lilly Pilly • increasing the understanding of Magenta Lilly Pilly biology and ecology • minimising the decline of Magenta Lilly Pilly through in situ habitat protection and management • reducing impacts of Myrtle Rust on Magenta Lilly Pilly and its habitat • maintaining a representative ex situ collection of Magenta Lilly Pilly • raising awareness of the conservation significance of Magenta Lilly Pilly and involving the broader community in the recovery program The proposed removal of the single planted specimen would not interfere substantially with the recovery of this species.
Conclusion	No. The proposed action is unlikely to have a significant impact on the *Syzygium paniculatum* for the following reasons: • The specimen to be removed may have been planted and does not form part of an important population • The development site is located outside of its known habitat (littoral coastal rainforests). • Only one individual will be removed and one individual will be retained.

2.6.2 Willoughby Local Environmental Plan 2012 (WLEP)

The Chatswood High School is currently zone SP2 (Infrastructure – Educational Establishment) and E2 (Environmental Conservation). The Chatswood Public School is currently zoned R2 (Low Density Residential). In accordance with Clause 6.1 of the Willoughby LEP 2012 both sites are mapped as having Class 5 Acid Sulphate Soils. The objective of this clause is to ensure that development does not disturb, expose of drain acid sulphate soils and cause environmental damage.

2.6.3 Willoughby Council Development Control Plan 2006

Clause 9 (Preservation of Trees or Vegetation) of the Willoughby Council Development Control Plan 2006 aims to:

- *promote sustainable vegetation management and conserve and enhance the tree resources, natural systems including bushland, and landscape quality of Willoughby City; and*
- *encourage the use of professional best practice in tree management*

The objectives of this clause are as follows:

- *To minimise unnecessary damage to or removal of trees and bushland;*
- *To conserve trees and bushland of ecological, heritage, aesthetic, botanic and cultural significance;*
- *To encourage the planting of trees that are appropriate for site conditions;*
- *To encourage the planting of local native species where appropriate;*
- *To facilitate the removal of noxious weeds, undesirable trees and inappropriate plantings;*
- *To provide for no net loss over time of tree cover and bushland in Willoughby City.*

The proposed development has, as much as possible, aimed to conserve the majority of the native bushland within the development site and minimise unnecessary damage or removal of trees and bushland. In particularly, no direct impacts to the Blue Gum High Forest to the south of the Centennial Avenue site 1 will be impacted and concept design within the north-east corner has been re-designed to reduce the amount of trees required to be removed.

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Appendix A Definitions

Terminology	Definition
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish
Broad condition state:	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Development site	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length
Local population	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
Mitchell landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.

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Terminology	Definition
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines
Operational Manual	The Operational Manual published from time to time by OEH, which is a guide to assist assessors when using the BAM
Patch size	An area of intact native vegetation that: a) occurs on the development site or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site or stewardship site...
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5 cm within a vegetation zone.
Remaining impact	An impact on biodiversity values after all reasonable measures have been taken to avoid and minimise the impacts of development. Under the BAM, an offset requirement is calculated for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	Riparian buffers applied to water bodies in accordance with the BAM
Sensitive biodiversity values land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
Site-based development	a development other than a linear shaped development, or a multiple fragmentation impact development
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land? It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by OEH and accessible from the BioNet website.
Threatened species	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.

Terminology	Definition
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a development site, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs

Appendix B Vegetation plot data

Table 38: Vegetation integrity data (Composition, Structure and function)

Plot location data							
Plot no.	PCT	Vegetation Zone	Condition	Zone	Eastings	Northings	Bearing
1	1237	3	Planted natives	56	331124	6258626	78
2	1237	2	Weedy	56	330957	6258594	160

Composition (number of species)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	2	0	3	4	0	0
2	5	1	0	4	0	0

Structure (Total cover %)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	30	0	5	7	0	0
2	62	<1	0	10	0	0

Function											
Plot no.	Large Trees	Hollow trees	Litter Cover	Length Fallen Logs	Tree Stem 5-9	Tree Stem 10-1 9	Tree Stem 20-2 9	Tree Stem 30-49	Tree Stem 50-79	Tree Regen	High Threat Weed Cover
1	1	0	61	0	0	1	1	1	1	0	43
2	1	1	3.6	53	0	1	1	0	1	0	66

Table 39: Species matrix (species recorded by plot)

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) Plot 1	Cover (%) Plot 2
M	TG	*Acacia parramattensis*				1
G		*Acetosa sagittata*	*			15
G		*Anagallis arvensis*	*		0.1	
U	TG	*Angophora costata*				10
G		*Anredera cordifolia*	*			15
G		*Araujia sericiflora*	*			2
G		*Asparagus aethiopicus*		*	0.1	
G		*Bidens pilosa*	*		15	5

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) Plot 1	Cover (%) Plot 2
M		*Brachycome angustifolia*				2
U	TG	*Celtis* spp.	*			35
M		*Cinnamomum camphora*	*	*	0.1	15
G		*Cirsium vulgare*	*		0.1	0.1
G	FG	*Commelina* spp.				5
G		*Conyza bonariensis*	*		0.1	1
G	GG	*Cynodon dactylon*			5	
G		*Cyperus eragrostis*	*		0.5	
G	FG	*Dianella caerulea*				0.1
G	FG	*Dichondra repens*			0.1	
G		*Ehrharta erecta*	*		25	5
G	FG	*Einadia hastata*			5	5
U	TG	*Eucalyptus pilularis*				25
U	TG	*Eucalyptus saligna*			25	
G		*Euphorbia peplus*	*			0.1
G	FG	*Geranium solanderi*				25
G		*Hypochaeris radicata*	*		0.5	
M		*Lantana camara*	*	*		1
M		*Ligustrum lucidum*	*	*	2	
U	TG	*Lophostemon confertus*			5	
G		*Malva parviflora*	*		0.1	
G	GG	*Microlaena stipoides*			0.1	
G		*Modiola caroliniana*				0.1
M		*Olea europaea*	*	*	0.1	
G	GG	*Oplismenus aemulus*			0.1	
G	GG	*Oxalis perennans*			0.5	0.1
M		*Phyllostachys aurea*	*	*		10
G		*Plantago lanceolata*	*		1	
G	FG	*Pseuderanthemum variabile*			1	
G	SG	*Rubus parvifolius*				0.1
G		*Sida rhombifolia*	*		0.2	
M		*Solanum nigrum*				1
G		*Soliva sessilis*	*		1	
G		*Sonchus asper*	*		0.1	0.1
U	TG	*Syncarpia glomulifera*				1

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) Plot 1	Cover (%) Plot 2
G	FG	*Tetragonia tetragonioides*				25
G		*Tradescantia albiflora*	*	*		5
M		*Trema* spp.	*			1
G		*Trifolium repens*	*		0.1	
U		*Ulmus* spp.	*		0.1	0.1

Table 40: Other species recorded within the development site

Botanic Name	Common Name	Native / Exotic/HTE
Acacia decurrens	Black Wattle	N
Acacia linifolia	White Wattle	N
Acacia parramattensis		N
Acetosa sagittata		HTE
Adiantum aethiopicum	Common Maidenhair	N
Lysimachia arvensis		E
Angophora costata	Sydney Red Gum	N
Anredera cordifolia	Madeira Vine	HTE
Araujia sericifera	Moth vine, Moth plant	E
Aristida vagans	Threeawn Speargrass	B
Asparagus aethiopicus	Asparagus fern	HTE
Bidens pilosa	Cobblers Pegs	E
Blechnum cartilagineum	Gristle Fern	N
Brachycome angustifolia	Flame Tree	N
Breynia oblongifolia	Coffee Bush	N
Bromus catharticus	Prairie Grass	E
Bursaria spinosa	Blackthorn	N
Callicoma serratifolia	Black Wattle	N
Callistemon sp.		N
Cassytha pubescens		N
Casuarina glauca	Swamp Oak	N
Cayratia clematidea	Native Grape	N
Celtis sp.		E
Cenchrus clandestinus	Kikuyu	E
Centella asiatica	Indian Pennywort	N

Botanic Name	Common Name	Native / Exotic/HTE
Ceratopetalum gummiferum	New South Wales Christmas-bush	N
Cinnamomum camphora	Camphor Laurel	E
Cirsium vulgare		E
Clematis aristata	Old Man's Beard	N
Commelina cyanea		N
Conyza bonariensis	Flaxleaf Fleabane	E
Corymbia maculata	Spotted Gum	N
Cyathea australis	Black Tree-fern	N
Cynodon dactylon	Couch	E
Cyperus eragrostis		E
Desmodium brachypodum	Large Tick-trefoil	N
Dianella caerulea		N
Dichondra repens	Kidney Weed	N
Dodonaea triquetra	Large-leaf Hop-bush	N
Doodia aspera	prickly rasp fern	N
Echinopogon caespitosus	Bushy Hedgehog-grass	N
Ehrharta erecta	Panic Veldtgrass	E
Einadia hastata		N
Elaeocarpus reticulatus	Blueberry Ash	N
Entolasia marginata	Bordered Panic	N
Eragrostis curvula	African Lovegrass	E
Eucalyptus pilularis	Blackbutt	N
Eucalyptus saligna	Sydney blue gum	N
Euphorbia peplus		E
Eustrephus latifolius	Wombat Berry	N
Geranium solanderi		N
Glycine tabacina		N
Goodenia ovata	Hop Goodenia	N
Hardenbergia violacea	Purple Coral Pea	N
Homalanthus populifolius	Bleeding Heart	N
Hypochaeris radicata	Catsear	E
Imperata cylindrica	Blady Grass	N
Kunzea ambigua	Tick Bush	N
Lagerstroemia archeriana	Crepe Myrtle	E
Lantana camara	Lantana	HTE
Ligustrum lucidum	Large-leaved Privet	E

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Botanic Name	Common Name	Native / Exotic/HTE
Ligustrum sinensis	Small-leaved Privet	E
Liquidambar styraciflua	Liquidambar	E
Lissanthe strigosa	Native Peach	N
Lomandra longifolia	Spiny-headed Mat-rush	N
Lonicera japonica	Japanese Honeysuckle	E
Lophostemon confertus	Brush Box	N
Malva parviflora		E
Microlaena stipoides	Weeping Grass	N
Modiola caroliniana		E
Ochna serrulata	Ochna	E
Olea europaea subsp. *cuspidata*	African Olive	THE
Oplismenus aemulus	Australian Basket Grass	N
Oplismenus imbecillis	Creeping Beard Grass	N
Oxalis perennans		N
Ozothamnus diosmifolius	White Dogwood	N
Paspalum dilatatum	Paspalum	E
Passiflora sp.		E
Phyllanthus hirtellus	Thyme Spurge	N
Phyllostachys aurea		E
Pittosporum undulatum		N
Plantago lanceolata	Lamb's Tongues	E
Platylobium formosum	Handsome Flat Pea	N
Plectranthus parviflorus	Cockspur Flower	N
Polyscias sambucifolia	Elderberry Panax	N
Pratia purpurascens	Whiteroot	N
Pseuderanthemum variabile	Pastel Flower	N
Pteridium esculentum	Bracken	N
Sida rhombifolia		E
Smilax glyciphylla	Sweet Sarsaparilla	N
Solanum nigrum		E
Sonchus asper		E
Syncarpia glomulifera	Turpentine	N
Syzygium paniculatum	Magenta Cherry	N
Tradescantia fluminensis	Trad	E
Veronica plebeia		N

HTE = HIGH THREAT EXOTIC

Photo 4: Vegetation zone 1: PCT 1237_good (to be retained)

Photo 5: Vegetation zone 2 – PCT 1237_weedy

Photo 6: Vegetation zone 3 – PCT 1237_planted native _Plot 1 end

Appendix C Floristic analysis results

Plot/vegetation zone	Veg analysis tool (Hager Metro)	PCT tool (ELA)	Chosen PCT
Plot 1 / Vegetation zone 3	N/A	N/A	This plot was conducted in planted native vegetation and did not contain adequate number of characteristic native species for statistical analysis
Plot 2/ Vegetation zone 2	**PCT 1237** **45% / 3.64** PCT 1281 48% / 3.42	PCT 1281 8 diagnostic species	This vegetation plot did not achieve the required number of diagnostic species for the Hager analysis. The best fit PCT was PCT 1237.
Opportunistic species list for vegetation zone 1	**PCT 1237** **54% / 7.28** PCT 1281 49% / 5.59	PCT 1281 13 diagnostic species PCT 1237 10 diagnostic species	The opportunistic species list indicated that PCT 1237 was the best fit PCT. The Hager analysis tool has more quantitative bearing than the ELAs internal tool and should be used as the preferred option.

* INDICATES THE RATIO OF POSITIVE DIAGNOSTIC SPECIES AND A STANDARDISED RATIO COMPARISON (+VE X (REQ/TOTAL): TOTAL NATIVE)
** DENOTES PLOT DATA DID NOT ACHIEVE THE REQUIRED NUMBER OF DIAGNOSTIC SPECIES FOR ANALYSIS
PLOT 1 / VEGETATION ZONE 2 PLANTED VEGETATION DID NOT CONTAIN ADEQUATE NUMBER OF NATIVE SPECIES FOR STATISTIC ANALYSIS

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Appendix D : EPBC Act Likelihood of Occurrence

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the Protected Matters Search Tool. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the site inspection and professional judgement. Some Migratory or Marine species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- 'known' = the species was or has been observed on the site
- 'likely' = a medium to high probability that a species uses the site
- 'potential' = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- 'unlikely' = a very low to low probability that a species uses the site
- 'no' = habitat within the study area and in the vicinity is unsuitable for the species.

A test of significance was conducted for threatened species or ecological communities that were recorded within the study area or had a higher likelihood of occurring and were not recorded during the site visit. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the study area intermittently for foraging. For these fauna species, the habitat present and likely to be impacted is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, a test of significance in reference to Commonwealth legislation was not considered necessary.

Information provided in the habitat associations' column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database and the NSW Threatened Species Data Collection.

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			FAUNA			
Anthochaera phrygia	Regent Honeyeater	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of *Casuarina cunninghamiana* (River Oak).	Unlikely - foraging habitat features associated with this species were not identified within the development site. The development site is not within an important breeding area for the species.	No	No – the species is highly mobile and preferable foraging habitat is available within the broader locality.
Apus pacificus	Fork-tailed Swift	M	Recorded in all regions of NSW. Riparian woodland., swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes.	Unlikely - suitable habitat not identified within the site.	N/A	No
Botaurus poiciloptilus	Australasian Bittern	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly *Typha* spp. (bullrushes) and *Eleocharis* spp. (spikerushes).	Unlikely - suitable habitat not identified within the site.	N/A	No
Calidris acuminata	Sharp-tailed Sandpiper	M	Summer migrant. Widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions. Shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	Unlikely - suitable habitat not identified within the site.	N/A	No
Calidris canutus	Red Knot	E	Red Knots are widespread around the Australian coast, less in the south and with few inland records. Small numbers visit Tasmania and off-shore islands. It is widespread but scattered in New Zealand. They breed in North America, Russia, Greenland and Spitsbergen. Red Knots are a non-breeding visitor to most continents.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Calidris ferruginea	Curlew Sandpiper	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	Unlikely - suitable habitat not identified within the site.	N/A	No
Calidris tenuirostris	Great Knot	CE	Sheltered coastal habitats containing large intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and inlets, or exposed reefs or rock platforms.	Unlikely - suitable habitat not identified within the site.	N/A	No
Charadrius leschenaultii	Greater Sand Plover	V	Entirely coastal in NSW, foraging on intertidal sand and mudflats in estuaries, roosting during high tide on sandy beaches or rocky shores.	Unlikely - suitable habitat not identified within the site.	N/A	No
Charadrius mongolus	Lesser Sand Plover	E	Favours coastal areas including beaches, mudflats and mangroves where they forage. They may be seen roosting during high tide on sandy beaches or rocky shores.	Unlikely - suitable habitat not identified within the site.	N/A	No
Chalinolobus dwyeri	Large-eared Pied Bat	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	Unlikely - there is no suitable breeding habitat such as caves, overhangs, mines or culverts present for the species to utilise the site.	N/A	No
Dasyornis brachypterus	Eastern Bristlebird	E	There are three main populations: Northern - southern Qld/northern NSW, Central - Barren Ground NR, Budderoo NR, Woronora Plateau, Jervis Bay NP, Booderee NP and Beecroft Peninsula and Southern - Nadgee NR and Croajingalong NP in the vicinity of the NSW/Victorian border. Central and southern populations inhabit heath and open woodland with a heathy understorey. In northern NSW, habitat comprises open forest with dense tussocky grass understorey.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Dasyurus maculatus maculatus	Spotted-tailed Quoll	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Unlikely – suitable habitat, in the form of maternal den sites or large areas of relatively intact vegetation, were not identified within the site.	N/A	No
Diomedea antipodensis	Antipodean Albatross	V	The Antipodean Albatross is marine, pelagic and aerial. It is endemic to New Zealand, however forages on cephalopods, fish and crustaceans in open water in the south-west Pacific Ocean, Southern Ocean and the Tasman Sea, notably off the coast of NSW.	Unlikely - suitable habitat not identified within the site.	N/A	No
Dimedea antipodensis gibsoni	Gibson's Albatross	V	The Gibson's Albatross is marine, pelagic and aerial. It is endemic to New Zealand, however forages on cephalopods, fish and crustaceans in open water in the south-west Pacific Ocean, Southern Ocean and the Tasman Sea, notably off the coast of NSW.	Unlikely - suitable habitat not identified within the site.	N/A	No
Diomedea epomophora	Southern Royal Albatross	V	The Southern Royal Albatross is marine and pelagic. During the non-breeding season it has a wide and possibly circumpolar distribution, ranging north to about 35°S. It is moderately common throughout the year in offshore waters of southern Australia, mostly off southeastern NSW, Victoria and Tasmania. It has been observed where the water surface temperature is 6 to 20°C.	Unlikely - suitable habitat not identified within the site.	N/A	No
Diomedea exulans	Wandering Albatross	V	The Wandering Albatross is marine, pelagic and aerial. It occurs where water surface temperatures range from -2° to 24°C. In the Australasian region, it occurs inshore, offshore and in pelagic waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Diomedea sanfordi	Northern Royal Albatross	E	This species breeds on Chatham Island and Taiaroa Head on the South Island of New Zealand. It can be found in open waters off SE Australia.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Epinephelus daemelii	Black Rockcod	V	This species is a marine species.	Unlikely - suitable habitat not identified within the site.	N/A	No
Gallinago hardwickii	Latham's Snipe	M	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	Unlikely - suitable habitat not identified within the site.	N/A	No
Grantiella picta	Painted Honeyeater	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	Unlikely - suitable habitat not identified within the site.	N/A	No
Heleioporus australiacus	Giant Burrowing Frog	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	Unlikely - suitable habitat not identified within the site.	N/A	No
Hirundapus caudacutus	White-throated Needletail	M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Unlikely - suitable habitat not identified within the site.	N/A	No
Hoplocephalus bungaroides	Broad-headed Snake	V	Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney. Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands.	Unlikely - suitable habitat not identified within the site.	N/A	No
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E	Found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River. Heath or open forest with a heathy understorey on sandy or friable soils.	Unlikely - suitable habitat not identified within the site.	N/A	No

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Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Lathamus discolor	Swift Parrot	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.	Potential – foraging habitat features associated with this species were identified within the development site.	Yes (minor foraging only)	No – the species is highly mobile and more foraging habitat is available within the broader locality.
Limosa lapponica baueri	Bar-tailed Godwit	M	Summer migrant to Australia. Widespread along the coast of NSW, including the offshore islands. Also numerous scattered inland records. Intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, bays, seagrass beds, saltmarsh, sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. Rarely inland wetlands, paddocks and airstrips.	Unlikely - suitable habitat not identified within the site.	N/A	No
Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit	CE	Mainly coastal, usually sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats. This species has been recorded across coastal Australia during non-breeding seasons.	Unlikely - suitable habitat not identified within the site.	N/A	No
Litoria aurea	Green and Golden Bell Frog	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region. Marshes, dams and stream-sides, particularly those containing *Typha* spp. (bullrushes) or *Eleocharis* spp. (spikerushes). Some populations occur in highly disturbed areas.	Unlikely - suitable habitat not identified within the site.	N/A	No
Macronectes giganteus	Southern Giant-Petrel	E	The Southern Giant-Petrel is marine bird that occurs in Antarctic to subtropical waters. It possibly concentrates north of 50° S in winter, as it is rare in waters of the southern Indian Ocean, but common off	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			South America, South Africa, Australia and New Zealand. It occurs in both pelagic and inshore waters.			
Macronectes halli	Northern Giant-Petrel	V	The Northern Giant-Petrel is marine and oceanic. Visits areas off the Australian mainland mainly during the winter months (May-October). Immature and some adult birds are commonly seen during this period in offshore and inshore waters from around Frenamtle (WA) to around Sydney (NSW).	Unlikely - suitable habitat not identified within the site.	N/A	No
Macquaria australasica	Macquarie Perch	E	Habitat for the Macquarie perch is on the bottom or mid-water in slow-flowing rivers with deep holes, typically in the upper reaches of forested catchments with intact riparian vegetation. Macquarie perch also do well in some upper catchment lakes. In some parts of its range, the species is reduced to taking refuge in small pools which persist in midland–upland areas through the drier summer periods.	Unlikely - suitable habitat not identified within the site.	N/A	No
Mixophyes balbus	Stuttering Frog	V	Along the east coast of Australia from southern Qld to north-eastern Victoria. Rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.	Unlikely - suitable habitat not identified within the site.	N/A	No
Monarcha melanopsis	Black-faced Monarch	M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park and Wombeyan Caves. It is rarely recorded farther inland. Rainforest, open eucalypt forests, dry sclerophyll forests and woodlands, gullies in mountain areas or coastal foothills, Brigalow scrub, coastal scrub, mangroves, parks and gardens.	Unlikely - habitat present is substantially degraded such that this species is unlikely to utilise the site for foraging or breeding.	N/A	No
Motacilla flava	Yellow Wagtail	M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA. Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	Unlikely - suitable habitat not identified within the site.	N/A	No
Myiagra cyanoleuca	Satin Flycatcher	M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			western plains. Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies.			
Numenius madagascariensis	Eastern Curlew	CE	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records. Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	Unlikely - suitable habitat not identified within the site.	N/A	No
Pachyptila turtur subantarctica	Fairy Prion	V	Breeds on Macquarie Island and a number of other subantarctic islands outside of Australia. Some individuals may migrate towards New Zealand and southern Australia in winter.	Unlikely - suitable habitat not identified within the site.	N/A	No
Petauroides volans	Greater Glider	V	This population on the south coast of NSW is bounded by the Moruya River to the north, Coila Lake to the south and the Princes Highway and cleared land exceeding 700 m in width to the west. Eucalypt forests and woodlands.	Unlikely - habitat present is substantially degraded such that this species is unlikely to utilise the site for foraging or breeding.	N/A	No
Petrogale penicillata	Brush-tailed Rock-wallaby	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	Unlikely - suitable habitat not identified within the site.	N/A	No
Phascolarctos cinereus	Koala	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. Eucalypt woodlands and forests.	Unlikely - Habitat present is substantially degraded such that this species is unlikely to utilise the site for foraging or breeding.	N/A	No
Pommerhelix duralensis	Dural Land Snail	E	Endemic to NSW. Occurs along the northwest fringes of the Cumberland Plain, within the Hills Shire, Blue Mountains City, Penrith City, Hornsby Shire and Parramatta City LGAs. Shale-sandstone transitional landscapes. Found in Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest; Turpentine-Ironbark Forest;	Unlikely - Habitat present is substantially degraded such that this species is unlikely to utilise the site for foraging or breeding.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			Shale/Sandstone Transition Forest; Turpentine Ironbark Margin Forest; Hinterland Sandstone Gully Forest; and Sydney Hinterland Transition Woodland.			
Pseudomys novaehollandiae	New Holland Mouse	V	Fragmented distribution across eastern NSW. Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	Unlikely - suitable habitat not identified within the site.	N/A	No
Pteropus poliocephalus	**Grey-headed Flying-fox**	**V**	**Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.**	**Likely – seasonal foraging habitat available within the study area. No camps identified within study area.**	**Yes (foraging only)**	**Yes**
Rhipidura rufifrons	Rufous Fantail	M	Coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW. Wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands.	Unlikely - suitable habitat not identified within the site.	N/A	No
Rostratula australis	Australian Painted Snipe	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas.	Unlikely - suitable habitat not identified within the site.	N/A	No
Sternula nereis nereis	Australian Fairy Tern	V	The Fairy Tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline.	Unlikely - suitable habitat not identified within the site.	N/A	No
Synemon plana	Golden Sun Moth	CE	It is found in native open temperate grasslands and open grassy woodlands dominated by *Austrodanthonia* spp.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Thalassarche bulleri	Buller's Albatross	V	This species breeds in New Zealand but regularly visits Australian marine waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche bulleri platei	Northern Buller's Albatross	V	This species is a non-breeding visitor to Australian waters. This species is mostly limited to the Pacific Ocean and Tasman Sea and not the east coast of Australia mainland.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche cauta cauta	Shy Albatross	V	Most common distribution occurs below 25o S in southeastern and Tasmanian shelf waters. During non-breeding seasons the Shy Albatross extends across the continental shelf in subantarctic and subtropical waters including NZ. It spends most of it's life out to sea coming to shore to breed in September at Stradbroke Island in Qld and south to Tasmania.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche cauta steadi	White-capped Albatross	V	This species breeds predominately in New Zealand. It may forage in marine waters off eastern mainland Australia.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche eremita	Chatham Albatross	E	The Chatham Albatross is a marine species that breeds on Pyramid Rock, Chatham Islands, off the coast of New Zealand. It occurs in subantarctic and subtropical waters and has been noted in shelf-waters around breeding islands, over continental shelves during the non-breeding season, and occurs inshore and offshore.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche impavida	Campbell Albatross	V	This species is a non-breeding migrant to Australian waters. Forages in temperate waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche melanophris	Black-browed Albatross	V	Commonly occuring in southern Australian waters in winter. Breeds on offshore Islands off southern Australia including Heard Is, Macquarie Is and McDonald Is, to name a few. It is a marine specialist foraging for fish, crustaceans and squid in Antarctic, subantarctic and temperate waters.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Thalassarche salvini	Salvin's Albatross	V	The Salvin's Albatross is a non-breeding visitor to Australian waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thinornis rubricollis rubricollis	Hooded Plover (eastern)	V	This species utilises sandy beaches along south-eastern Australia.	Unlikely - suitable habitat not identified within the site.	N/A	No
Tringa nebularia	Common Greenshank	M	Summer migrant to Australia. Recorded in most coastal regions of NSW; also widespread west of the Great Dividing Range. Terrestrial wetlands and sheltered coastal habitats.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			FLORA			
Acacia bynoeana	Bynoe's Wattle	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				within the site.		
Acacia pubescens	Downy Wattle	V	Restricted to the Sydney region around the Bankstown-Fairfield-Rookwood and Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. Open woodland and forest, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Occurs on alluviums, shales and at the intergrade between shales and sandstones.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Acacia terminalis subsp. *terminalis*	Sunshine Wattle	E	Limited mainly to near-coastal areas from the northern shores of Sydney Harbour south to Botany Bay. Coastal scrub and dry sclerophyll woodland on sandy soils.	Unlikely - the presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially disturbed such that this	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				species is unlikely to utilise the development site.		
Allocasuarina glareicola	-	E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Castlereagh woodland on lateritic soil. Found in open woodland with *Eucalyptus parramattensis*, *Eucalyptus fibrosa*, *Angophora bakeri*, *Eucalyptus sclerophylla* and *Melaleuca decora*.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Asterolasia elegans	-	E	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Likely to occur in the western part of Gosford local government area. Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys.	Unlikely – the development site is not within the seven recognised populations of the species.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Caladenia tessellata	Thick Lip Spider Orchid	V	Currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Grassy sclerophyll woodland on clay loam or sandy soils, or low woodland with stony soil.	Unlikely –the development site is not within the recognised populations of the species.	N/A	No
Cryptostylis hunteriana	Leafless Tongue Orchid	V	in NSW, recorded mainly on coastal and near coastal ranges north from Victoria to near Forster, with two isolated occurrences inland north-west of Grafton. Coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest.	Unlikely - suitable habitat not identified within the site.	N/A	No
Cynanchum elegans	White-flowered Wax Plant	E	Occurs at ecotone of dry subtropical rainforests and sclerophyll forests.	Unlikely - suitable habitat not identified within the site.	N/A	No
Darwinia biflora	-	V	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas, in an area bounded by Maroota, North Ryde, Cowan and Kellyville. Woodland, open forest or scrub-heath on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Deyeuxia appressa	-	E	A highly restricted grass, known from only two pre-1942 records in Sydney area (Herne Bay and Georges River). This species may be extinct in the wild. The habitat and ecology of this species remains unknown.	Unlikely - suitable habitat not identified within the site.	N/A	No
Eucalyptus camfieldii	Camfield's Stringybark	V	Narrow band from the Raymond Terrace area south to Waterfall. Coastal heath on shallow sandy soils overlying Hawkesbury sandstone, mostly on exposed sandy ridges.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Genoplesium baueri	Bauer's Midge Orchid	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Dry sclerophyll forest and moss gardens over sandstone.	Unlikely - suitable habitat not identified within the site.	N/A	No
Haloragodendron lucasii	-	E	Confined to a very narrow distribution on the north shore of Sydney. Dry sclerophyll forest and low open woodland on sheltered slopes near creeks, in moist sandy loam soils.	Unlikely - suitable habitat not	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				identified within the site.		
Leptospermum deanei	-	V	Hornsby, Warringah, Ku-ring-gai and Ryde LGAs in the Sydney region. Woodland, riparian scrub and open forest on lower hill slopes or near creeks, on sand or sandy alluvial soil.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the site.	N/A	No
Melaleuca biconvexa	Biconvex Paperbark	V	Only found in NSW, populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Damp places, often near streams or low-lying areas on alluvial soils.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Melaleuca deanei	Deane's Paperbark	V	Ku-ring-gai/Berowra area, Holsworthy/Wedderburn area, Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Heath on sandstone.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Persicaria elatior	Tall Knotweed	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). Beside streams and lakes, swamp forest or disturbed areas.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the site.	N/A	No
Persoonia hirsuta	Hairy Geebung	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Unlikely - suitable habitat not identified	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				within the site.		
Pimelea curviflora var. *curviflora*	-	V	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south. Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	Unlikely - The presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially degraded such that this species is unlikely to utilise the development site.	N/A	No
Pimelea spicata	Spiked Rice-flower	E	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). Well-structured clay soils. Eucalyptus moluccana (Grey Box) communities and in areas of ironbark on the Cumberland Plain. Coast Banksia open woodland or coastal grassland in the Illawarra.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Prostanthera junonis	Somersby Mintbush	E	This species is only known from eastern part of Somersby Plateau in Gosford. Occurs along drainage lines in sandy soils overlying Hawkesbury Sandstone.	Unlikely - suitable habitat not identified within the site.	N/A	No
Syzygium paniculatum	**Magenta Lilly Pilly**	**V**	**Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Subtropical and littoral rainforest on gravels, sands, silts and clays.**	**Known from previous BioNet records within the site.**	**One planted specimen will be removed and a second plant retained**	**Yes**
Thesium australe	Austral Toadflax	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. Grassland on coastal headlands or grassland and grassy woodland away from the coast.	Unlikely - suitable habitat not identified within the site.	N/A	No

Appendix E : Biodiversity credit report

E1 Section 1 Vegetation Zone 2 PCT 1237_weedy

NSW GOVERNMENT

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00014503/BAAS18045/19/00014647	Chatswood Education Precinct	05/05/2020
Assessor Name	Report Created	BAM Data version *
Belinda Jane Failes	03/06/2020	26
Assessor Number	BAM Case Status	Date Finalised
BAAS18159	Open	To be finalised
Assessment Revision	Assessment Type	
4	Major Projects	

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

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

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Blue Gum high forest								
1	1237_Weedy	33.4	0.0	0.25	High Sensitivity to Potential Gain	2.50	TRUE	1
							Subtotal	**1**
							Total	**1**

NSW GOVERNMENT

BAM Credit Summary Report

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits

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E2 Section 2 Vegetation zone 3 PCT 1237 planted natives (non-TEC)

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00014503/BAAS18045/19/00014640	Upgrades Chatswood Public and High School	05/05/2020
Assessor Name	**Report Created**	**BAM Data version ***
Belinda Jane Failes	03/06/2020	26
Assessor Number	**BAM Case Status**	**Date Finalised**
BAAS18159	Open	To be finalised
Assessment Revision	**Assessment Type**	
0	Major Projects	

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

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

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits

BAM Credit Summary Report

Blue Gum high forest								
1	1237_Planted_native	25.0	0.4	0.25	High Sensitivity to Potential Gain	2.50		5
							Subtotal	5
							Total	5

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits
Syzygium paniculatum / Magenta Lilly Pilly (Flora)						
1237_Planted_native	N/A	1	0.25	2	False	2
					Subtotal	2

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