Lindfield Village Hub Planning Proposal
Flora and Fauna Assessment

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DOCUMENT TRACKING

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Template 2.8.1

Executive Summary

Eco Logical Australia Pty Ltd was engaged by Allen Jack + Cottier to prepare a Flora and Fauna Assessment for a planning proposal for the proposed Lindfield Village Hub (the development site) in the Ku-ring-gai Council local government area. This report describes the biodiversity values of the site and outlines the measures to be taken to avoid, minimise and mitigate impacts to the vegetation and species habitat present within the development site.

This report has followed the Biodiversity Assessment Method 2017 (BAM) established under Section 6.7 of the *NSW Biodiversity Conservation Act 2016* (BC Act). Whilst this method is typically applied at a development application stage, the method has been used for this Planning Proposal to ensure all biodiversity values and likely offset measures are understood early in the project. The report describes the number of biodiversity credits that would need to be retired if the development proceeds as described, however it is important to note that the offset requirements are not required at the Planning Proposal stage and would be applicable at the development application stage.

The current planning proposal involves direct impacts to the site, equal to those of Ku-ring-gai Council's existing masterplan (as indicated in the Ku-ring-gai Local Centres Development Control Plan 2012. The unavoidable direct impacts of the planning proposal were calculated in accordance with the BAM by utilising the Biodiversity Assessment Method Credit Calculator. Requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999,* applicable State Environmental Planning Policies and the Ku-ring-gai *Local Environment Plan (Local Centres) 2012* and *Development Control Plan (Local Centres) 2016* have also been addressed in this report.

The proposed development site is 1.39 ha. This is defined as the assessable area which includes the area of land defined by land title boundaries (1.34 ha), plus a small portion of land to the north outside the land title boundaries. The development site is located on public land in Lindfield, northern Sydney, bordered by Bent Street to the north and north west, local businesses along the Pacific Highway to the east, Beaconsfield Parade to the south and residential development to the west. The development site has been subject to considerable vegetation disturbance as a result of historical development, comprising a public carpark, residential housing and public roads.

Remnant native trees, shrubs and ground cover species are present within part of the development site. These remnants also contain horticultural planting and weeds and are subject to regular mowing and garden maintenance activities. The development site also contains six former privately owned residential lots, three of which have been recently demolished, now comprising a mix of regrowth native vegetation, exotic horticultural garden plants and weeds. The rest are currently leased as residential. The vegetation along the southern edge of the development site is substantially degraded and comprises dense areas of weeds.

This report has been prepared to assess the worst case scenario, assuming that the planning proposal will result in the removal of all vegetation within the development site and impacts to one threatened ecological community *Sydney Turpentine-Ironbark Forest* listed as a Critically Endangered Ecological Community (CEEC) under the BC Act. One Plant Community Type (PCT) is present within the development site, PCT *1281 Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion*. A portion of PCT 1281 in the development site conforms to the CEEC *Sydney*

Turpentine-Ironbark Forest: PCT 1281 within the development site has been split into two vegetation zones based on the presence of two condition states. These condition states are as follows: vegetation zone 1*: PCT 1281 CEEC moderate condition* and vegetation zone 2: *PCT 1281 non CEEC planted*.

All native vegetation within the development site will be directly impacted, resulting in the clearing of 0.29ha of vegetation zone 1 *PCT 1281 CEEC moderate condition* and 0.14 ha of vegetation zone 2 *PCT 1281 non CEEC planted*.

It is noted that *Sydney Turpentine-Ironbark Forest* is also listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as critically endangered. However, the condition of the vegetation representing the PCT within the development site did not meet the minimum condition thresholds for the listing criteria under the EPBC Act.

During the field survey one threatened flora species listed under the BC Act and EPBC Act, *Eucalyptus scoparia* (Wallangarra White Gum) was recorded within the development site. This species naturally occurs in a geographically restricted area of the NSW Northern Tableland and southern Queensland and is commonly used as a cultivated and planted specimen in the Sydney region. Therefore, this species does not represent the listed entity under the BC and EPBC Acts and no further assessment is required.

No other threatened flora or fauna species were recorded within the study area.

A total of eight (8) ecosystem credits are required to offset 0.29 ha of unavoidable impacts to PCT 1281 vegetation zone 1 on the development site. Offsets are not required for PCT 1281 vegetation zone 2 as the vegetation integrity score for this zone was below the offset threshold (< 20) for a PCT that is not a Threatened Ecological Community, in accordance with the BAM. Habitat for candidate species credit species was not recorded in the study area, therefore, no species credits are required to offset for the development.

The BAM credit calculations were undertaken on 9 May 2019 when *Sydney Turpentine Ironbark Forest* was still listed as an Endangered Ecological Community. This community was relisted to a Critically Endangered Ecological Community on 31 May 2019. The BAM Calculator (BAMC) was accessed on 10 July 2019 to update the calculations in accordance with the new listing, however this new listing is currently not reflected in the BAMC. These calculations will therefore need to be updated at the development application stage.

At the detailed design stage the site should be re-assessed for presence or absence of ecosystem and species credit species. The is deemed necessary due to potential changes in species habitat distribution, changes and updates to the BAM assessment requirements and changes in the design. Also, during the detailed design stage it may be determined that particular trees will remain, for example selected high retention values trees may be retained. If this is the case, the assessment will be updated, and credits recalculated, if required, to reflect any changes.

Finally, it should be noted that in accordance with advice provided by Ku-ring-gain Council in July 2019…. *Council has endorsed (through the Delivery Program 2018-2021 and Operational Plan 2018-2019 24 July2018) creation of a 'Ku-ring-gai Biodiversity Offset Code of Practice' to inform offsetting for Council works (currently at draft stage). In its current form, this Code goes beyond BC Act and BAM offset scheme*

requirements, by seeking offsets for vegetation below prescribed thresholds and vegetation integrities. Should this code apply to the future DAs, additional vegetation offsetting may be required.

Serious and Irreversible Impact (SAII) values have also been considered in this assessment. *Sydney Turpentine Ironbark Forest* is listed as a SAII in the BioNet threatened biodiversity data collection. The SAII threshold for this community is yet to be published by the Office of Environment and Heritage. As such, consideration of whether impacts on *Sydney Turpentine Ironbark Forest* are serious and irreversible is provided in the report . Given the small area of *Sydney Turpentine Ironbark Forest* to be cleared it is considered unlikely that the planning proposal would result in a SAII, however this will be determined by the consent authority during the development assessment phase.

One Matter of National Environmental Significance was identified as having potential to be adversely affected by the proposed works. *Pteropus poliocephalus* (Grey-headed Flying-fox) is listed as Vulnerable under the EPBC Act and it is considered that this species is likely to use some of the development site for seasonal foraging. An assessment of the Commonwealth Significant Impact Criteria was undertaken for the Grey-headed Flying-fox and concluded that the planning proposal would not result in a significant impact to this species.

Contents

List of Figures

List of Tables

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
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically Endangered Ecological Community
DNG	Derived Native Grassland
DoEE	Commonwealth Department of Environment and Energy
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
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

Abbreviation	Description
FM Act	NSW Fisheries Management Act 1994
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
LLS	Local Land Service
NSW	New South Wales
NOW	NSW Office of Water
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
SSD	State Significant Development
SSI	State Significant Infrastructure
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WM Act	NSW Water Management Act 2000

1. Stage 1: Biodiversity assessment

1.1 Introduction

This planning proposal Flora and Fauna Assessment has been prepared to meet the requirements of the Biodiversity Assessment Method 2017 established under Section 6.7 of the *NSW Biodiversity Conservation Act 2016* (BC Act). This report has been prepared by Nicole McVicar (BAAS18077), who is an Accredited Person under the *NSW Biodiversity Conservation Act 2016* (BC Act). The report has been peer reviewed by Diane Campbell (BAAS 17069) who is also an accredited person under the BC Act.

1.1.1 General description of the development site

The proposed development site is 1.39 ha. This is defined as the assessable area which includes the area of land defined by land title boundaries (1.34 ha), plus a small portion of land to the north outside the land title boundaries. The development site is located on public land in Lindfield, northern Sydney, bordered by Bent Street to the north and north west, local businesses along the Pacific Highway to the east, Beaconsfield Parade to the south and residential development to the west. The development site has been subject to considerable vegetation disturbance as a result of historical development, comprising a public carpark, residential housing and public roads.

Remnant native trees, shrubs and ground cover species are present within part of the development site. These remnants also contain horticultural plantings and weeds and are subject to regular mowing and garden maintenance activities. The development site also contains six former privately owned residential lots, three of which have been recently demolished, now comprising a mix of regrowth native vegetation, exotic horticultural garden plants and weeds. The rest are currently leased as residential. The vegetation along the southern edge of the development site is substantially degraded and comprises areas impacted by weeds.

The general description of the development site is displayed on the following maps:

- Development Footprint Map (Figure 1)
- Site Map (Figure 2)
- Location Map (Figure 3)

1.1.2 Development site footprint

The planning proposal involves the development of a new Lindfield Village Hub (the Hub), comprising a mix of green open public space, community buildings (i.e. a library and new community centre), an underground carpark, public domain, new housing and a retail centre. This will result in complete modification of the existing site. It should be noted that this report has taken the worst case scenario approach assuming all vegetation will be removed from the development site. If, during the detailed design stage, it is determined that particular trees will remain, the assessment will be updated, and credits recalculated, if required, to reflect any changes.

It is understood that the operational and construction footprint will be contained wholly within the development site. The development site footprint is shown in Figure 1.

1.1.3 Sources of information used

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

- BioNet Vegetation Classification
- BioNet Atlas
- *Environment Protection and Biodiversity Conservation Act 1999* EPBC Act Protected Matters Search Tool 5 km database search (DotEE 2018)
- Threatened Biodiversity Data Collection
- NSW Government Biodiversity Values Map (accessed on 3 May 2019)
- The Native Vegetation of the Sydney Metropolitan Area (OEH 2016)
- Ku-ring-gai Greenweb mapping and aerial mapping (NearMap)
- Additional GIS datasets including soil, topography, geology and drainage.
- Footprint Green Pty Ltd 2015 Arboricultural Site Analysis – Lindfield Community Hub Project
- NGH Environmental March 2017 *Review of Environmental Factors Lindfield Community Hub, proposed Tree Removal*
- Ku-ring-gai Local Environment Plan (Local Centres) 2012
- Ku-ring-gai Development Control Plan (Local Centres) 2016

Figure 1: Development site footprint

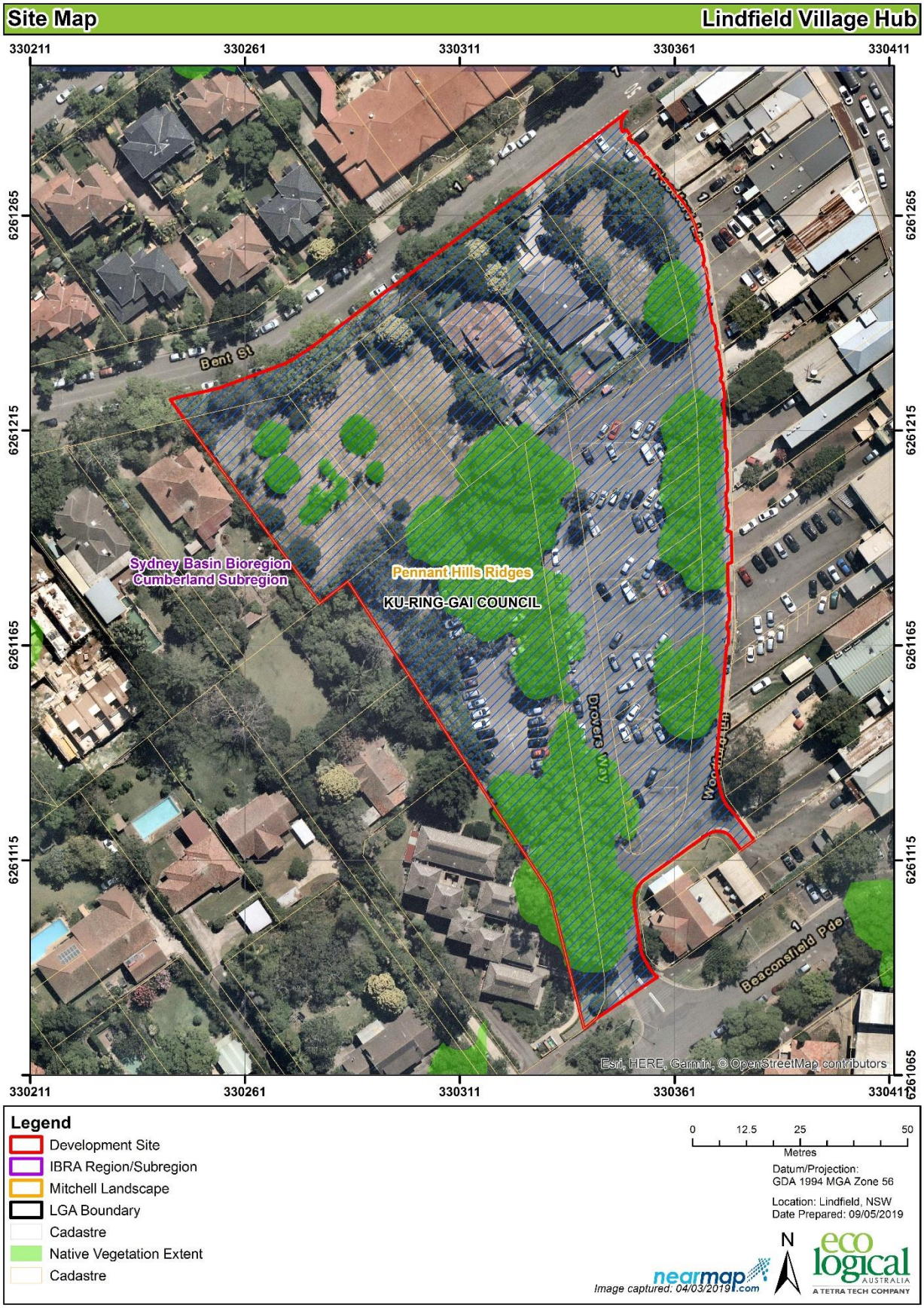

Figure 2: Site Map

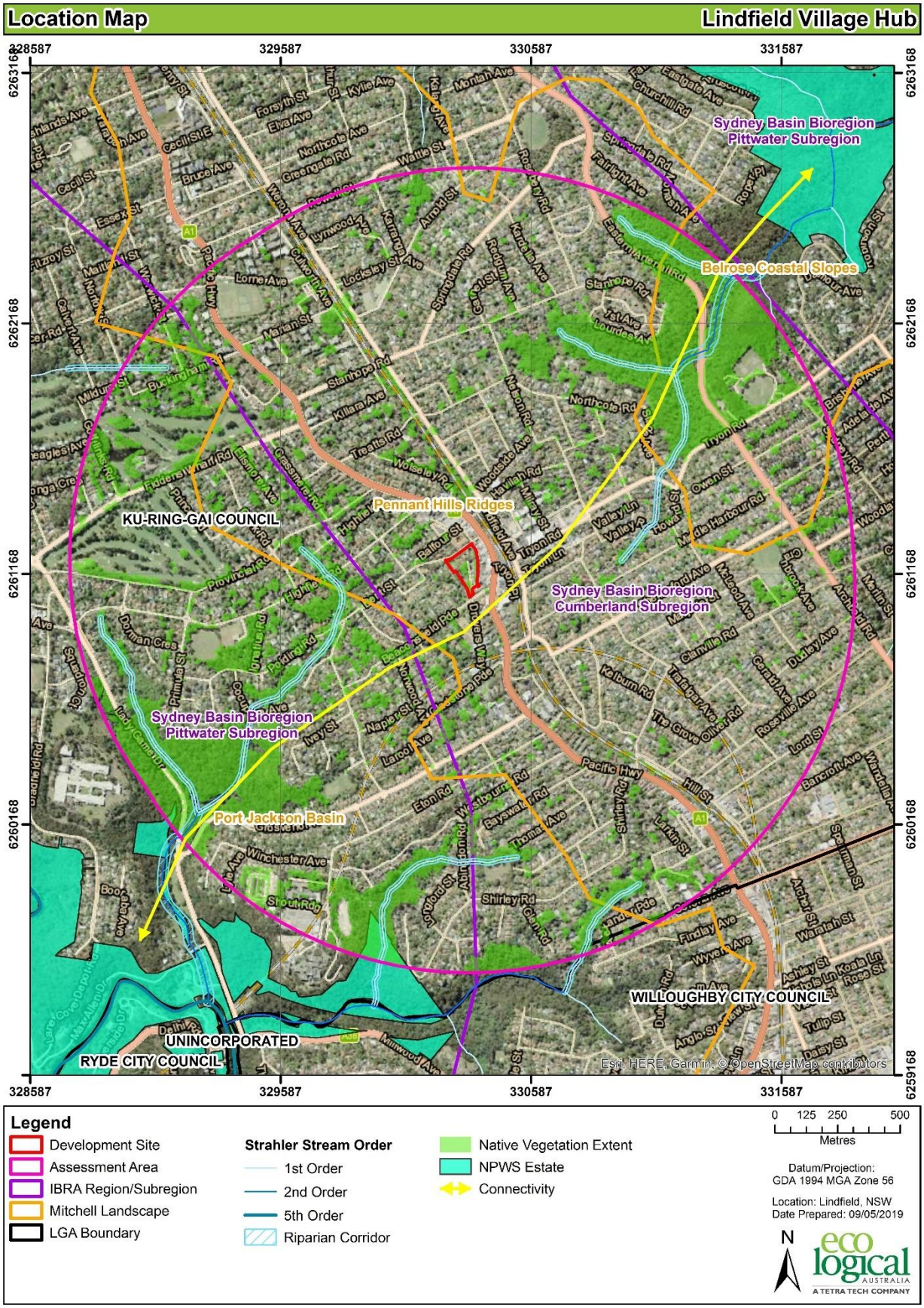

Figure 3: Location Map

1.2 Legislative context

Table 1: Legislative context

Name	Relevance to the project
Commonwealth	
***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**	Matters of National Environmental Significance have been identified on or near the development site. This report assesses impacts to MNES and concludes that the development is not likely to have a significant impact on MNES.
State	
Biodiversity Conservation Act 2016 (BC Act)	The BC Act 2016 does not have specific controls relating to Planning Proposals. At the development application stage the development will need to be assessed in accordance with the BC Act 2016. A Biodiversity Development Assessment Report is required to be submitted with any development that has a significant impact on biodiversity values. There are four triggers for a significant impact: • exceeding the clearing threshold in section 7.2 of the BC Regulation 2017 (see below) • impacting on vegetation shown on the Biodiversity Values Map in section 7.3 of the BC Regulation 2017. As the site is not shown on this map, this trigger does not apply. • a significant impact in accordance with section 7.3 of the BC Act 2016 • impacts to Areas of Outstanding Biodiversity Value. As there are not AOBV on site, this trigger does not apply. Exceeding the clearing threshold relates to the amount of clearing and the minimum lot size of the site as described in the LEP. As this site has no minimum lot size (at present) in the LEP, the actual lot sizes are used. Whilst the total site is more than 1 hectare, all lots within the site are less than 1 ha. If less than 1 ha, the clearing threshold is exceeded if the clearing is more than 0.25 ha of native vegetation. As approximately 0.43 ha of native vegetation would be cleared, this threshold is exceeded and therefore a Biodiversity Development Assessment Report is likely to be required. Confirmation of this interpretation with Ku-ring-gai Council and the Department of Planning, Infrastructure and Environment is recommended prior to preparation of DA documentation.
Fisheries Management Act 1994	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.
Local Land Services Amendment Act 2016	The LLS Act does not apply to areas of the state to which the Vegetation SEPP applies. The Vegetation SEPP applies to the Ku-ring-gai Council local government area.
Water Management Act 2000	The project does not involve works on waterfront land. A Controlled Activity Approval under s91 of the WM Act is not required.
State and Local Planning Instruments	
Vegetation SEPP	The Vegetation SEPP applies to development that does not require consent. As this project requires consent under the Ku-ring-gai LEP, the Vegetation SEPP is not relevant.
Coastal SEPP	The proposed development is not located on land subject to this SEPP
SEPP 44 – Koala Habitat Protection	The proposed development does not impact on core koala habitat as defined by SEPP 44.
Ku-ring-gai Local Environment Plan (LEP) (Local Centres) 2012	The development site is zoned B2 Local Centre under the Ku-ring-gai LEP (Local Centres) 2012. There is no minimum lot size for this zoning. The development site been mapped on the Ku-ring-gai Council

Name	Relevance to the project
	Biodiversity Map and Greenweb Map (Landscape Remnant) in the *Ku-ring-gai Local Environment Plan (Local Centres) 2012*. The development site is subject to the Terrestrial Biodiversity – Biodiversity Significance overlay which requires consideration of matters listed under *Part 6 Clause 6.3 Biodiversity Protection.* These matters have been addressed in this report. The matters are as follows: *6.3 Biodiversity protection* *(1) The objective of this clause is to protect, maintain and improve the diversity and condition of native vegetation and habitat, including:* *(a) protecting biological diversity of native fauna and flora, and* *(b) protecting the ecological processes necessary for their continued existence, and* *(c) encouraging the recovery of threatened species, communities, populations and their habitats, and* *(d) protecting, restoring and enhancing biodiversity corridors.* *(2) This clause applies to land identified as "Areas of Biodiversity Significance" on the Natural Resource—Biodiversity Map.* *(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:* *(a) the impact of the proposed development on the following:* *(i) any native vegetation community,* *(ii) the habitat of any threatened species, population or ecological community,* *(iii) any regionally significant species of plant, animal or habitat,* *(iv) any biodiversity corridor,* *(v) any wetland,* *(vi) the biodiversity values within any reserve,* *(vii) the stability of the land, and* *(b) any proposed measure to be undertaken to ameliorate any potential adverse environmental impact, and* *(c) any opportunity to restore or enhance remnant vegetation, habitat and biodiversity corridors.* *(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:* *(a) is consistent with the objectives of this clause, and* *(b) is designed, and will be sited and managed, to avoid any potentially adverse environmental impact or, if a potentially adverse environmental impact cannot be avoided:* *(i) the development minimises disturbance and adverse impacts on remnant vegetation communities, habitat and threatened species and populations, and* *(ii) measures have been considered to maintain native vegetation and habitat in parcels of a size, condition and configuration that will facilitate biodiversity protection and native flora and fauna movement through biodiversity corridors, and* *(iii) the development avoids clearing steep slopes and facilitates the stability of the land, and* *(iv) measures have been considered to achieve no net loss of significant vegetation or habitat.* *(5) In this clause:* *biodiversity corridor means an area that facilitates the connection and maintenance of native fauna and flora habitats and, within the urban landscape, includes areas that may be broken by roads and other urban elements and may include remnant trees and associated native and exotic vegetation.*

Name	Relevance to the project
Ku-ring-gai Local Centres Development Control Plan (DCP) 2012	The Ku-ring-gai Local Centres DCP contains provisions relating to native vegetation. Part 13 Tree and Vegetation Preservation states the following: *Injuring a tree or other vegetation does not require consent under this Part, where actions are required or authorised under separate legislation, including:* • *works required as part of other works for which a development application is required, the works will be assessed as part of the Development Application (approved under Part 4 Environmental Planning and Assessment Act 1979).* The planning proposal has been assessed in accordance with the Biodiversity Assessment Method to comply with requirements under Part 4 of the *Environmental Planning and Assessment Act 1979.* No further assessment under the Ku-ring-gai Local Centres DCP is therefore required to address the requirements of the Local Centres DCP. Finally , it should be noted that in accordance with advice provided by Ku-ring-gain Council in July 2019.... *Council has endorsed (through the Delivery Program 2018-2021 and Operational Plan 2018-2019 24 July2018) creation of a 'Ku-ring-gai Biodiversity Offset Code of Practice' to inform offsetting for Council works (currently at draft stage). In its current form, this Code goes beyond BC Act and BAM offset scheme requirements, by seeking offsets for vegetation below prescribed thresholds and vegetation integrities. Should this code apply to the future DAs, additional vegetation offsetting may be required.*

1.3 Landscape features

1.3.1 Interim Biogeographic Regionalisation for Australia (IBRA) regions and subregions

The development site falls within the IBRA region and subregions as outlined in Table 2 and Table 3.

Table 2: IBRA regions

IBRA region	Area within development site (ha)
Sydney Basin	1.39

Table 3: IBRA subregions

IBRA subregion	Area within development site (ha)
Cumberland	1.39

1.3.2 Mitchell Landscapes

The development site falls within the Pennant Hills Ridges Mitchell Landscapes (DECC 2002) as outlined in Table 4.

Table 4: 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 90m with local relief 60m. 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*	1.39

Mitchell landscape	Description	Area within Development Site (ha)
	saligna and *Syncarpia glomulifera*. Rainforest elements in protected moist gully heads are also present.	

1.3.3 Native vegetation extent

The extent of native vegetation within the development site and 1500 m buffer is outlined in Table 5. There are no differences between the mapped vegetation extent and the aerial imagery.

Table 5: Native vegetation extent

Area within the development site (ha)	Area within the 1,500 m buffer area (ha)
0.43	158

1.3.4 Rivers and streams

The development site does not contain any rivers or streams.

1.3.5 Wetlands

The development site does not contain any wetlands.

1.3.6 Connectivity features

The development site contains the connectivity features outlined in Table 6 and shown in Figure 3.

Connectivity to large tracts of habitat is considered suitable for highly mobile species such as birds and bats. This includes flyways for migratory birds and bat species moving through the landscape.

Fragmented connections are present connecting the development site to nearby Lane Cove National Park to the west and Garigal National Park to the east.

Table 6: Connectivity features

Connectivity feature name	Feature type
Garigal National Park	Core bushland and riparian area
Lane Cove National Park	Core bushland and riparian areas

1.3.7 Areas of geological significance and soil hazard features

The development site does not contain areas of geological significance and soil hazard features.

1.3.8 Site context

1.3.8.1 Method applied

The site based method has been applied to this development.

1.3.8.2 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 NearMap) using increments of 5%. The percent native vegetation cover within the 1,500 m buffer area is 20 % (158 ha).

1.3.8.3 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 is 101 ha.

1.4 Native vegetation

1.4.1 Survey effort

Vegetation survey was undertaken within the development site by ecologists Nicole McVicar and Carolina Mora on 3 May 2019 (A total of two (2) full-floristic vegetation plots were undertaken to identify PCTs and TECs on the development site (Table 7). A total of two (2) vegetation integrity plots were undertaken on the development site in accordance with the BAM (Table 8). Plot locations are displayed in Figure 5.

The site visit also involved vegetation mapping of the remaining development site, assessment of habitat and mapping of habitat features, namely hollow-bearing trees (HBTs). The location of these trees is displayed in Figure 4.

All field data collected, photos, and full-floristic and vegetation integrity plots are included in Appendix B, C and D.

Table 7: Full-floristic PCT identification plots

PCT ID	PCT Name	Number of plots surveyed
1281	Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	2

Table 8: Vegetation integrity plots

Veg Zone	PCT ID	PCT Name	Condition	Area (ha)	Plots required	Plots surveyed
1	1281	Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	CEEC moderate condition	0.29	1	1
2	1281	Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	Non CEEC planted	0.14	1	1

1.4.2 Plant Community Types present

One Plant Community Type (PCT) was identified on the development site (Table 9, Figure 4). This PCT may be listed as a TEC under the BC Act and/or EPBC Act (Table 11, Figure 6). The development site also

contains planted native canopy, shrubs and occasionally ground cover species which are native to NSW, however these were not considered locally indigenous to the PCTs. However, under the BAM, planted vegetation native to NSW requires consideration as to the 'best fit' PCT. Based on the soil landscape, elevation, and presence of remnant vegetation within the development site it was determined that planted native vegetation 'best-fit' PCT was PCT 1281. Justification for the selection of PCTs occurring on the development site is based on a quantitative analysis of full-floristic plot data and a summary is provided in Table 10.

Table 9: Plant Community Types

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area	Percent cleared
1281	Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	Northern Hinterland Wet Sclerophyll Forests	Wet Sclerophyll Forests (Grassy sub-formation)	0.43	90%

Photo 1: PCT 1281 vegetation zone 1 Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion moderate condition CEEC.

1.4.2.1 PCT selection justification

Justification for the selection of PCTs occurring on the development site is based on a quantitative analysis of full-floristic plot data and a summary is provided in Table 10. PCT 1281 was determined through analysis of mapped soil landscapes, elevation and the presence of key diagnostic canopy species namely *Eucalyptus paniculata, Eucalyptus resinifera*, *Eucalyptus globoidea, Eucalyptus pilularis* and *Angophora costata*. *Eucalyptus punctata* was also present in the development site, and although not a positive diagnostic species, this species occurs quite commonly in PCT 1281. The absence of *Eucalyptus saligna* (Sydney Blue Gum) assisted in determining that community was not PCT 1237 *Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion*, which is associated with Blue Gum High Forest Critically Endangered Ecological Community.

The development site is mapped with the Glenorie Erosional soil landscape, associated with clay soils of the Wianamatta Group Ashfield Shale. This soil landscape transitions to the west to the Lucas Heights Residual soil landscape, a landscape associated with more transitional geology between Ashfield Shale and Hawkesbury Sandstone. This soil landscape is consistent with PCT 1281/*Sydney Turpentine Ironbark Forest* which occurs on clay soils derived from Wianamatta Shale, or shale layers with Hawksbury Sandstone (Chapman and Murphy 1989).

Photo 2: PCT 1281 vegetation zone 2 Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion planted non CEEC.

Table 10: PCT selection justification

PCT ID	PCT Name	Selection criteria	Species relied upon for identification of vegetation type and relative abundance
1281	Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	IBRA region, subregion, soil landscape, elevation and results of floristic plot analysis including the presence of positive diagnostic canopy species	Presence of *Eucalyptus paniculata, E. resinifera, E. globoidea, E. pilularis* and *Angophora costata*.

1.4.2.2 Threatened Ecological Communities Justification

The BioNet Vegetation Classification lists PCT 1281 as comprising *Sydney Turpentine Ironbark Forest* which is listed as critically endangered under the BC Act and critically endangered under the EPBC Act. This PCT was categorised as a moderate condition vegetation zone based on the presence of weeds and regular management and disturbance. The condition of this PCT 1281 conforms to the *Sydney Turpentine Ironbark Forest* listing under the BC Act. The PCT does not conform to the listing under the EPBC Act. The criteria for listing under the EPBC Act for *Sydney Turpentine Ironbark Forest* are provided below (DotEE 2019b):

- *The vegetation contains some characteristic components from all structural layers (tree canopy, small tree/shrub midstorey, and understorey).* **The vegetation did not contain components of all structural layers.**
- *Tree canopy cover is greater than 10% and remnant size is greater than one hectare. These areas have the greatest conservation value and their high quality and size makes them most resilient to disturbance.* **Although the canopy over is greater than 10%, the remnant size is not greater than one hectare.**
- *However, remnants with tree canopy cover less than 10% are also included in the ecological community, if the fragments are greater than one hectare in size and occur in areas of native vegetation in excess of 5 hectares in area. These areas enhance the potential for connectivity and viability of the ecological community. They support native flora and fauna species by facilitating gene flow among remnants and buffering against disturbance.* **N/A**

Table 11: Threatened Ecological Communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha)	Listing status	Name	Area (ha)
1281	CEEC	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	0.29 *	N/A **	N/A	N/A

CEEC – Critically endangered ecological community

* Note that PCT 1281 non CEEC planted (0.14 ha) did not satisfy the requirements for listing under the BC Act or EPBC Act criteria.

** Note that PCT 1281 CEEC (0.29) did not satisfy the requirements for listing under the EPBC Act criteria.

1.4.3 Vegetation integrity assessment

A vegetation integrity assessment using the Biodiversity Assessment Method Credit Calculator (BAMC) was undertaken and the results are outlined in Table 12.

Table 12: Vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
1	1281	CEEC Moderate condition	0.29	43.4	56.1	64.8	54
2	1281	Non CEEC Planted	0.14	21.6	12.2	15	15.8

1.4.4 Use of local data

The use of local data is not proposed for this assessment.

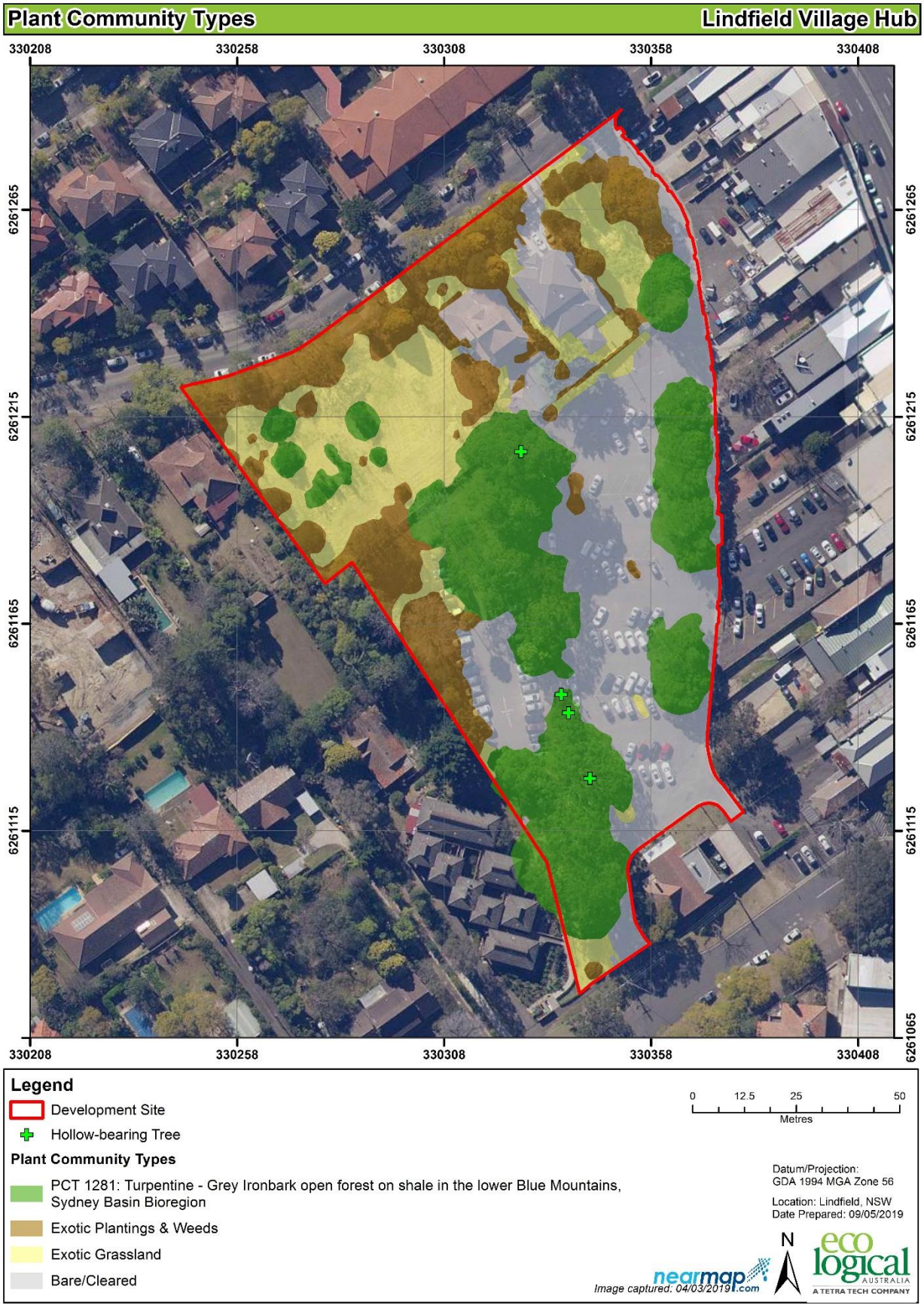

Figure 4: Plant Community Types and native vegetation extent

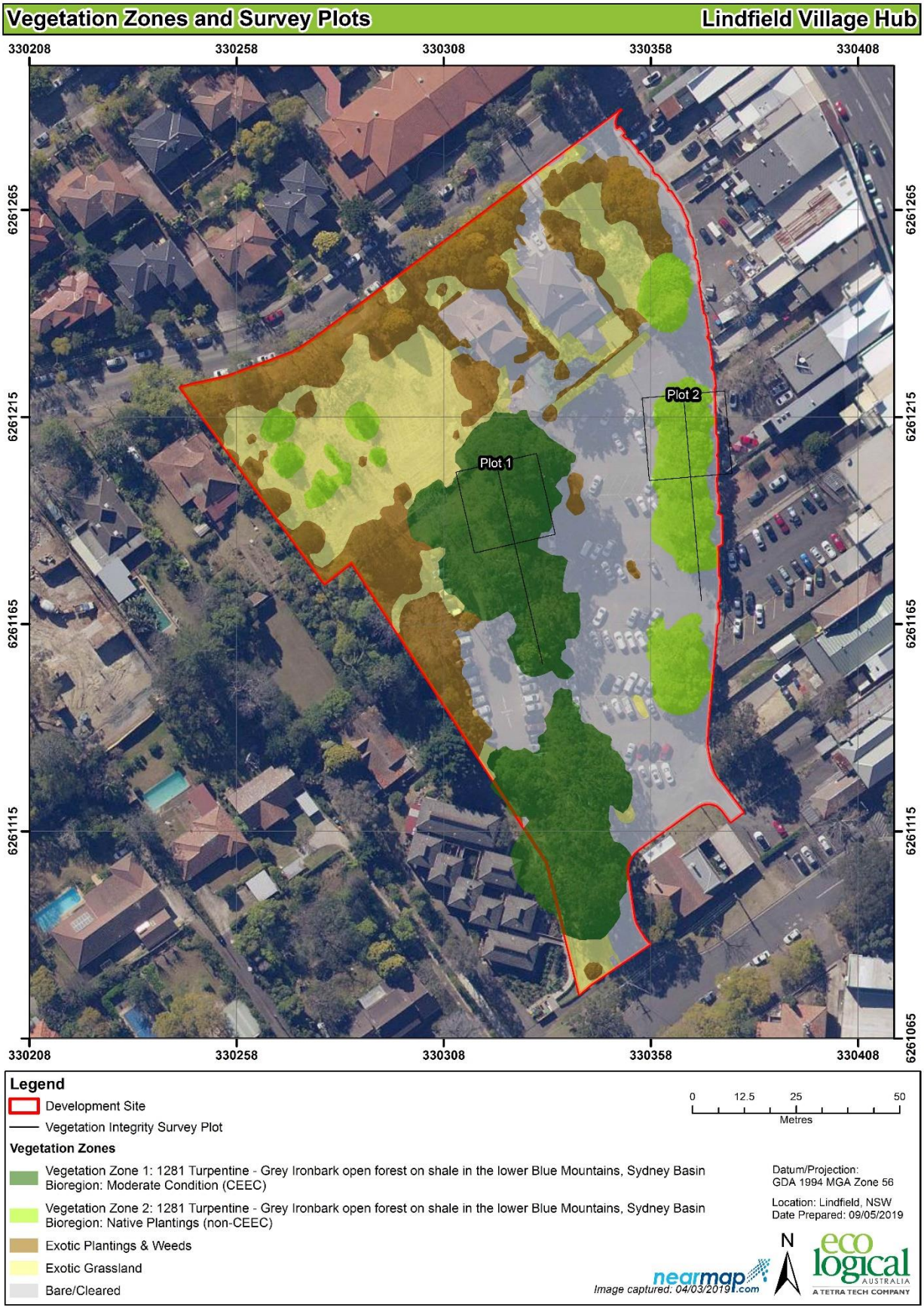

Figure 5: Plot locations

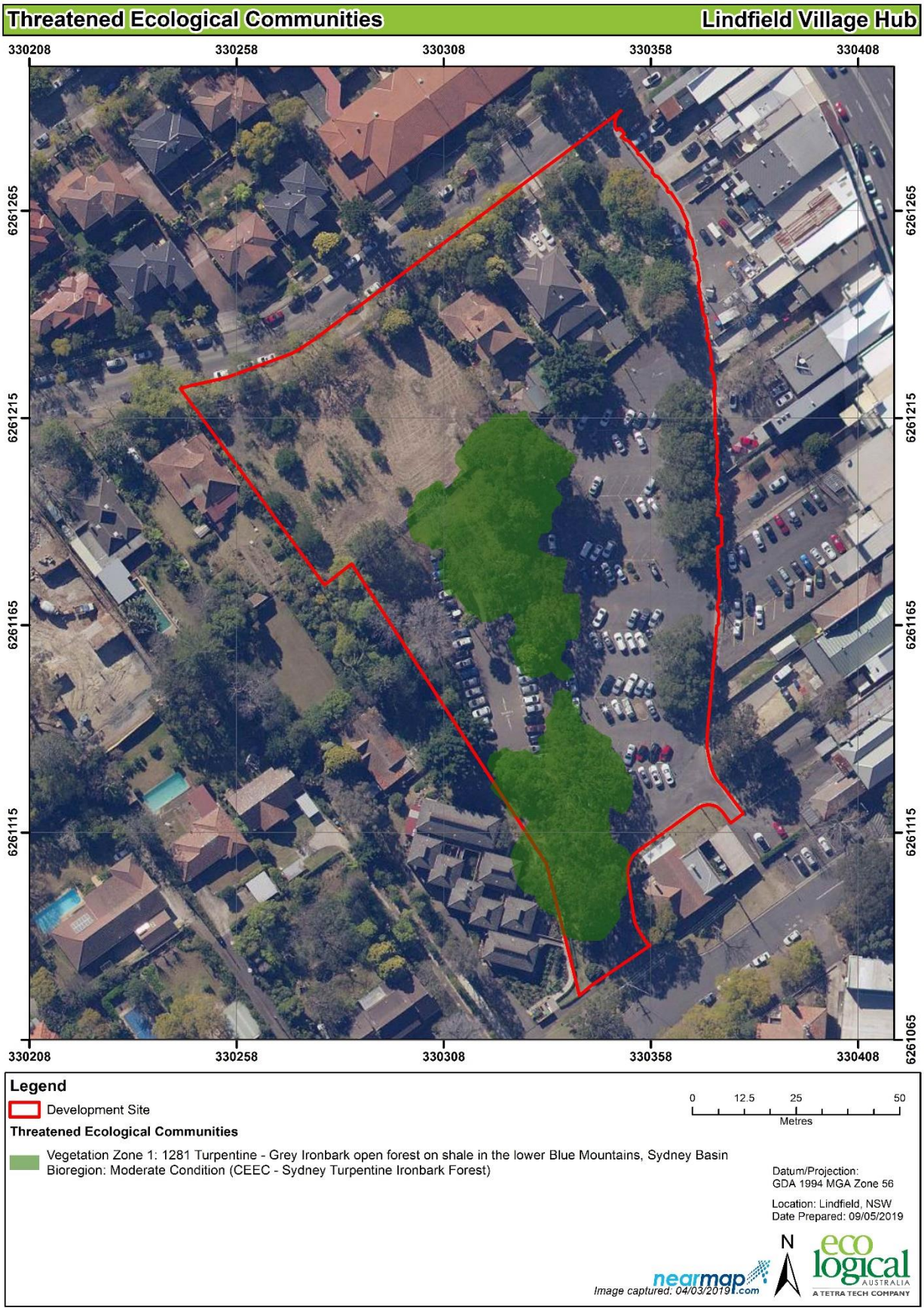

Figure 6: Threatened Ecological Communities

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 is included in Table 13.

Ecosystem credit species which have been excluded from the assessment and relevant justification is also included in Table 13.

Table 13: Justification for exclusion of 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 key plant species required for foraging.
Artamus cyanopterus cyanopterus	Dusky Woodswallow		Moderate	V	Not Listed	Excluded Habitat features for this species are not present at this site. The development site does not comprise key plant species required for foraging.
Callocephalon fimbriatum	Gang-gang Cockatoo (Foraging)	N/A	Moderate	V	Not Listed	Excluded Although BioNet records exist within 10 km of the development site, it is considered that the 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.
Calyptorhynchus lathami	Glossy Black-Cockatoo (Foraging)	N/A	High	V	Not Listed	Included There are nine BioNet records for this species within a 10 km radius of the development site. This species may utilise the flowering species within the development site very occasionally for seasonal foraging This species was included in this assessment

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Chthonicola sagittata	Speckled Warbler	N/A	High	V	Not Listed	Excluded Habitat present does not contain suitable habitat features for this species such as abundance of fallen logs. The vegetation within the development site is substantially degraded.
Dasyurus maculatus	Spotted-tailed Quoll	N/A	High	V	E	Excluded Habitat features for this species are not 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.
Grantiella picta	Painted Honeyeater	N/A	Moderate	V	V	Excluded Habitat features associated with this species are not present in the development site. This species is a specialist feeder requiring mistletoe which is absent from the development site.
Glossopsitta pusilla	Little Lorikeet	N/A	High	V	Not Listed	Included There are six BioNet records for this species within a 10 km radius of the development site. This species may utilise the flowering species within the development site for seasonal foraging This species was included in this assessment
Hieraaetus morphnoides	Little Eagle (Foraging)	N/A	Moderate	V	Not Listed	Included Included in this assessment.
Lathamus discolor	Swift Parrot (Foraging)	N/A	Moderate	E	CE	Included There are 12 BioNet records for this species within a 10 km radius of the development site. Foraging habitat features associated with this species were identified 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
Lophoictinia isura	Square-tailed Kite (Foraging)	N/A	Moderate	V	Not Listed	Excluded Habitat features associated with this species are not present on the development site. This species requires dry woodlands and open forests with a particular preference for timbered watercourses.
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	N/A	Moderate	V	Not Listed	Excluded Habitat features associated with this species are not present on the development site. This species requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses which the development site does not contain. No individuals have been recorded within 10 km of the development site.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	N/A	Moderate	V	Not Listed	Excluded Habitat features associated with this species are not present in the development site. This species occupies forests or woodlands dominated by box and ironbark eucalypts (especially Mugga Ironbark), which the development site is not dominated by. No individuals have been recorded within 5km of the development site.
Miniopterus australis	Little Bentwing-bat (Foraging)	N/A	High	V	Not Listed	Included Seasonal foraging habitat was identified in this assessment.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat (Foraging)	N/A	High	V	Not Listed	Included Seasonal foraging habitat was identified in this assessment
Mormopterus norfolkensis	Eastern Freetail-bat	N/A	High	V	Not Listed	Included Seasonal foraging habitat was identified in this assessment

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Neophema pulchella	Turquoise Parrot	N/A	High	V	Not Listed	Excluded Habitat features associated with this species are not present in the development site. No individuals have been recorded within 10 km of the development site.
Ninox connivens	Barking Owl (Foraging)	N/A	High	V	Not Listed	Included Marginal foraging habitat was identified in this assessment. There are ten BioNet records for this species within a 10 km of the development site.
Ninox strenua	Powerful Owl (Foraging)	N/A	High	V	Not Listed	Included Marginal foraging habitat was identified in this assessment. There are 470 BioNet records for this species within a 10 km radius of the development site.
Petroica boodang	Scarlet Robin	N/A	Moderate	V	Not Listed	Excluded Habitat features associated with this species includes an abundance of logs and fallen timber, these features were not present in the development site.
Petroica phoenicea	Flame Robin	N/A	Moderate	V	Not Listed	Excluded Habitat features associated with this species are not present in the development site. This species requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses which the development site does not contain. No individuals have been recorded within 10 km of the development site.
Phascolarctos cinereus	Koala (Foraging)	N/A	High	V	V	Excluded Habitat present is substantially degraded and highly fragmented such that this species is unlikely to utilise the development site. No feed trees were identified 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
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	N/A	High	V	V	Included Seasonal foraging habitat was identified in this assessment.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	N/A	High	V	Not Listed	Included Seasonal foraging habitat was identified in this assessment.
Tyto novaehollandiae	Masked Owl (Foraging)	N/A	High	V	Not Listed	Included Marginal foraging habitat was identified in this assessment.
Varanus rosenbergi	Rosenberg's Goanna	To northern and south western margins of the sub region	High	V	Not Listed	Excluded Habitat features for this species are not present in the development site. Critical habitat components such as termite mounds are not present in the development site.

CE = Critically Endangered; E = Endangered; E2 = Endangered Population; V = Vulnerable

1.6 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 is included in Table 14.

Species credit species which have been excluded from the assessment and relevant justification are also included in Table 14.

Habitat assessments were undertaken during the field surveys on 29 March 2019 and 3 May 2019 to determine the likelihood of threatened species occurring within the development site on an intermittent or permanent basis.

Habitat assessments involved a search of all possible hollow-bearing trees within the development site, and a search for evidence of fauna foraging such as chewed cones, sap trees or roosting habitat in the form of white wash/pellets, plus inspection of structures to determine of suitable roosting/breeding habitat for threatened microbats.

Tree hollow were inspected with a torch where accessible. Binoculars were used when required to inspect hollows identified within high branches in the tree's canopy.

No hollows inspected displayed any apparent visual evidence of microbat occupation. Microbat scats and/or markings were not observed around any of the entrances, nor were any microbats observed when inspecting inside the accessible hollows. A range of urban birds were observed foraging in the study area including the Noisy Minor (*Manorina melanocephala*), Rainbow Lorikeet (*Trichoglossus*

haematodus) and Laughing Kookaburra (*Dacelo novaeguineae*). *Apis mellifera* (European Honey Bee) were also observed utilising the hollows.

The trees within the development site may be used as potential seasonal foraging habitat for microbats, and the hollows may potentially be used as temporary roosting habitat, however it is highly unlikely that the development site contains suitable breeding habitat for microbats. This is due to the fact that the development site is located within a highly urbanised environment, exposed and open, and under constant use and disturbance from the local community. The vegetation within the development site is a considerably fragmented and disturbed example of *Sydney Turpentine Ironbark Forest* mixed in with urban native and exotic plantings. The development site is also located a considerable distance from core bushland, and no watercourses are present within the vicinity. It is more likely that suitable breeding habitat would be present outside the development site in these core areas.

It should be noted that there was one flora species *Eucalyptus scoparia* (Wallangarra White Gum) identified within the development site, listed as endangered under the BC Act and vulnerable under the EPBC Act. The species has been planted and is a horticultural variety. The species is known from only three locations in NSW near Tenterfield, which is more than 640 km from the development site and is therefore located outside of its normal distribution. Cultivated varieties are not considered to be threatened species. No further assessment for Wallangarra White Gum under the BC and EPBC Act is therefore required.

Table 14: 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
Acacia bynoeana	Bynoe's Wattle	N/A	High	E	V	Excluded 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.
Acacia prominens – endangered population	Endangered population Gosford Wattle, Hurstville and Kogarah LGAs	N/A	High	E2	Not Listed	Excluded The development site is not located within the Gosford, Hurstville or Kogarah LGAs. This species is not considered a candidate species for this assessment.
Acacia pubescens	Downy Wattle	N/A	High	V	V	Excluded The presence of this species was not identified (conspicuous species) and it was determined that the habitat features associated with this species

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						are not present within the development site.
Anthochaera phrygia	Regent Honeyeater (Breeding)	N/A	High	CE	CE	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site is not within an important breeding area for the species (National Recovery Plan).
Burhinus grallarius	Bush Stone-curlew	Fallen/standing dead timber including logs	High	E	Not Listed	Excluded Habitat features for this species are not present in the development site: critical habitat components such as fallen or standing dead timber are not present.
Caladenia tessellata	Thick Lip Spider Orchid	N/A	Moderate	E	V	Excluded Habitat for this species was not considered suitable in the development site. The site is substantially degraded, and this species occurs in grassy sclerophyll woodlands which were not recorded within the development site. Furthermore, this species is only known from old records in Sydney area.
Callocephalon fimbriatum	Gang-gang Cockatoo (Breeding)	N/A	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)	N/A	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.
Camarophyllopsis kearneyi	-	Lane Cove Bushland Park	High	E	Not Listed	Excluded The development site is not in within Lane Cove Bushland Park (it is located 5 km away to the south of the

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						Development Site). This species is unlikely to occur within the development site.
Cercartetus nanus	Eastern Pygmy-possum		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. present. No individuals have been recorded within 5km of the development site.
Chalinolobus dwyeri	Large-eared Pied Bat	Cliffs Within 2km of rocky areas containing caves, overhangs, escarpment, outcrops, or crevices, or within 2km of old mines or tunnels	Very High	V	V	Excluded Habitat features associated with this species (caves) are not present in the development site. There is no suitable breeding habitat such as caves, overhangs, mines or culverts present for the species to utilise the site.
Epacris purpurascens var. *purpurascens*	-	N/A	Moderate	V	Not Listed	Excluded 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.
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	N/A	High	V	V	Excluded The presence of this species was not identified (conspicuous species) and it was determined that the habitat features associated with this species are not present within the development site and the habitat is substantially degraded such that this species is unlikely to utilise the development site.
Grevillea parviflora subsp. *supplicans*	-	N/A	High	E	Not Listed	Excluded The presence of this species was not identified (conspicuous species) and it was determined that the habitat features associated with this species are not present within the development

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						site, and the site is substantially degraded such that this species is unlikely to utilise the development site.
Gyrostemon thesioides	Gyrostemon thesioides	N/A	High	E	Not Listed	Excluded 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.
Hibbertia puberula	Hibbertia puberula	N/A	High	E	Not Listed	Excluded The presence of this species was not identified, and it was determined that the habitat features associated with this species are not present within the development site. The site is substantially degraded such that this species is unlikely to utilise the development site.
Hibbertia spanantha	Julian's Hibbertia	N/A	N/A	CE	CE	Excluded The presence of this species was not identified, and it was determined that the habitat features associated with this species are not present within the development site. The site is substantially degraded such that this species is unlikely to utilise the development site.
Hibbertia superans	Hibbertia superans	Other Ridgetops	High	E	Not Listed	Excluded The presence of this species was not identified, and it was determined that the habitat features associated with this species are not present within the development site. The site is substantially degraded such that this species is unlikely to utilise the development site.
Hieraaetus morphnoides	Little Eagle (Breeding)	N/A	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.
Hygrocybe anomala var.	-	Lane Cove Bushland Reserve	High	V	Not Listed	Excluded The development site is not in within Lane Cove Bushland Reserve (it is

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
ianthinomargin ata						located approximately 5 km away to the south of the development site). This species is unlikely to occur within the development site.
Hygrocybe aurantipes	-	Lane Cove Bushland Reserve	High	V	Not Listed	Excluded The development site is not in within Lane Cove Bushland Reserve (it is located approximately 5 km away to the south of the development site). This species is unlikely to occur within the development site.
Hygrocybe austropratensis	-	Lane Cove Bushland Reserve	High	E	Not Listed	Excluded The development site is not in within Lane Cove Bushland Reserve (it is located approximately 5 km away to the south of the development site). This species is unlikely to occur within the development site.
Hygrocybe collucera		Lane Cove Bushland Reserve	High	E	Not Listed	Excluded The development site is not in within Lane Cove Bushland Reserve (it is located approximately 5 km away to the south of the development site). This species is unlikely to occur within the development site.
Hygrocybe griseoramosa		Lane Cove Bushland Reserve	High	E	Not Listed	Excluded The development site is not in within Lane Cove Bushland Reserve (it is located approximately 5 km away to the south of the development site). This species is unlikely to occur within the development site.
Hygrocybe lanecovensis		Lane Cove Bushland Reserve	High	E	Not Listed	Excluded The development site is not in within Lane Cove Bushland Reserve (it is located approximately 5 km away to the south of the development site). This species is unlikely to occur within the development site.
Hygrocybe reesiae		Lane Cove Bushland Reserve	High	V	Not Listed	Excluded The development site is not in within Lane Cove Bushland Reserve (it is located approximately 5 km away to the south of the development site). This

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						species is unlikely to occur within the development site.
Hygrocybe rubronivea		Lane Cove Bushland Reserve	High	V	Not Listed	Excluded The development site is not in within Lane Cove Bushland Reserve (it is located approximately 5 km away to the south of the development site). This species is unlikely to occur within the development site.
Lathamus discolor	Swift Parrot (Important foraging areas)		Moderate	E	CE	Excluded There are 12 BioNet records for this species within a 10 km radius of the development site. Marginal seasonal foraging habitat features associated with this species were identified within the development site and this has therefore been included as an ecosystem credit species only.
Litoria aurea	Green and Golden Bell Frog	Semi-permanent/ ephemeral wet areas Within 1km of wet areas, swamps Within 1km of swamp, waterbodies Within 1km of waterbody	High	E	V	Excluded Habitat features associated with this species are not present on the development site. There are no suitable pools, swamps or fringing vegetation within the development site which may contain suitable habitat for this species
Lophoictinia isura	Square-tailed Kite (Breeding)	N/A	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 breeding habitat that is suitable for the species to utilise the site. No nests were observed during field surveys.
Meridolum corneovirens	Cumberland Plain Land Snail	N/A	High	E	Not Listed	Excluded Habitat features associated with this species are not present in the development site. This species occurs

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						within Cumberland Plain Woodland and associated shale vegetation communities. The development site does not support these habitat features.
Miniopterus australis	Little Bentwing-bat (Breeding)	N/A	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 that are suitable for the species to utilise the site.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat (Breeding)	N/A	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 within the development site is isolated and disturbed with a higher likelihood of this species using more suitable habitat within the locality. Although hollow bearing trees were identified within the development site, the nearest drainage line is approximately 500 m away from the development site.
Ninox connivens	Barking Owl (Breeding)	N/A	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.
Ninox strenua	Powerful Owl (Breeding)	N/A	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						breeding. The development site does not contain suitable breeding habitat.
Persoonia hirsuta	Hairy Geebung	N/A	High	E	E	Excluded The presence of this species was not identified, and it was determined that the habitat is substantially degraded such that this species is unlikely to utilise the development site.
Petaurus norfolcensis	Squirrel Glider	N/G	High	V	Not Listed	Excluded Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Habitat in the development site is isolated and disturbed with a higher likelihood of this species more suitable habitat within the locality. Additionally, this species has a strong preference for old growth forests which does not include the development site. Additionally, there are no BioNet records for this species within a 10 km radius of the development site.
Phascolarctos cinereus	Koala (Breeding)	N/A	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 considered unsuitable and substantially degraded such that this species is highly unlikely to utilise the site for breeding.
Pimelea curviflora var. *curviflora*	Pimelea curviflora var. curviflora	N/A	High	V	V	Excluded 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.
Pomaderris prunifolia – endangered population	Endangered population in Parramatta, Auburn, Strathfield and	N/A	High	E	V	Excluded The development site is not located within the LGA for this endangered population. Furthermore, the presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially degraded such that this

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
	Bankstown LGA					species is unlikely to utilise the development site.
Pommerhelix duralensis	Dural Woodland Snail	Other Leaf litter and shed bark or within 50m of litter or bark, 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 in the development site is isolated and disturbed. Habitat requirements were not recorded within the development site.
Pteropus poliocephalus	Grey-headed Flying-fox (Breeding)	N/A	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 that are suitable for the species to utilise.
Syzygium paniculatum	Magenta Lilly Pilly	N/A	Moderate	E	V	Excluded The development site does not provide suitable habitat for this species.
Tetratheca glandulosa	Tetratheca glandulosa	N/A	High	V	Not Listed	Excluded Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Habitat in the development site is isolated and disturbed.
Tyto novaehollandiae	Masked Owl (Breeding)	N/A	High	V	Not Listed	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.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Wahlenbergia multicaulis – endangered population	Tadgell's Bluebell in the LGAs of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	Other Land situated in damp, disturbed sites	High	E	Not Listed	Excluded This species has two populations recorded in northern Sydney (Thornleigh and Mt Ku-ring-gai), which does not include the development site area.

CE = Critically Endangered; E = Endangered; E2 = Endangered Population; V = Vulnerable

1.6.1 Targeted surveys

Due to the high level of modification of vegetation within the development site and lack of potential habitat, targeted surveys were not conducted for species credit species. Justification for the exclusion of species credit species is provided above in Table 14.

Some microbat species are dual credit species with only breeding habitat considered for species credits. None of the dual credit species are known to breed in man-made structures such as roof cavities. However, under Section 9.2.1 of the BAM, the accessor must take into consideration Prescribed Biodiversity Impacts including any man-made structures which may be roosting habitat for the following threatened microbat species:

- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat)
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
- *Miniopterus australis* (Little Bentwing-bat)
- *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat).

The methodology and results for the microbat surveys are detailed in the Prescribed Biodiversity Impact Assessment Section 2.1.3.

1.6.2 Expert reports

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

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 planning proposal will result in the complete removal of vegetation from the development site. However, the site is located in an urban area which avoids and minimises impacts to better quality vegetation and more important habitat in the locality, as outlined in Table 15.

Table 15: 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 biodiversity values present within the development site will not be protected. Although this is a highly modified site, remnant STIF CEEC canopy is located within the development site and this will be removed for the development.	The planning proposal has been located to utilise areas where native vegetation and threatened species habitat is in lower condition in the context of STIF the locality. There is an estimated 62.90 ha of STIF within an area of 1,500m, in varying condition (from larger tracts to small remnant urban canopy patches) (mapped by OEH, 2016). Within 5,000 m radius of the development site, there is an estimated 273.82 ha of STIF that has been mapped. This also ranges from larger tracts to small remnant urban canopy patches. In the context of the surrounding locality , it is considered that this STIF remnant is in a disturbed and fragmented condition, and thus it is considered that there will be minimal impacts on vegetation and habitat.
Locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition	The planning proposal has been located to utilise areas where native vegetation and threatened species habitat is in lower condition in the context of STIF the locality. This is reflected in the Ku-ring-gai Council Natural Resources Greenweb mapping, which maps the patch as a Landscape Remnant, as opposed to Core Biodiversity Land or Support for Core Biodiversity Lands .	As above, in the context of the surrounding locality, it is considered that this STIF remnant is in a disturbed condition and fragmented, and thus the planning proposal is considered to be located in an areas of relatively poor condition vegetation.
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	As stated above, the planning proposal has been located to utilise areas where native vegetation and threatened species habitat is in lower condition in the context of STIF CEEC in the locality. This is reflected in the Ku-ring-gai Council Natural Resources Greenweb mapping, which maps the patch as a	As above, in the context of the surrounding locality , it is considered that the planning proposal has been located in an area of STIF CEEC remnant in a relatively disturbed, fragmented and urbanised condition. Thus, the location of the project is considered to avoid habitat for species and

Approach	How addressed	Justification
	Landscape Remnant, as opposed to Core Biodiversity Land or Support for Core Biodiversity Lands .	vegetation in the highest threat categories (i.e. CEEC in good condition).
Locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained	The vegetation with the planning proposal location is fragmented and thus movement of genetic material between areas of nearly habitat will be not be maintained if this patch of vegetation is removed.	As above, in the context of the surrounding locality , it is considered that this STIF remnant is in a disturbed condition and already highly fragmented. Thus, the planning proposal is considered to be located in an area where exchange of genetic material between adjacent or nearby habitat is already limited and will not impact areas mapped as Core and Support for Core Biodiversity Land on Ku-ring-gai Council's Greenweb mapping.

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

The planning proposal will result in complete removal of vegetation.

2.1.3 Prescribed biodiversity impacts

The development site has the prescribed biodiversity impacts as outlined in Table 16.

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 section 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 use by species as a flyway or migration route - the project does not involve any wind farm development.

The development site contains both human made structures and non-native vegetation. 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 hollow bearing trees.

A literature review was conducted to identify if buildings or structures could potentially be utilised as a roosting resource by microbats, including BioNet records within the development site and surrounding landscape. Visual surveys were conducted to visually determine if the buildings within the development site contain potential openings, possibly utilised by microbats. Possible threatened microbats surveyed for include:

- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat)
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)

- *Miniopterus australis* (Little Bentwing-bat)
- *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat)

Existing buildings in the development were recently constructed and no potential roost sites were observed. It is unlikely that microbat species utilise these dwelling for roosting or breeding habitat. Non-native vegetation within the development site may contain marginal and seasonal roosting and foraging habitat for microbats.

Table 16: Prescribed biodiversity impacts

Prescribed biodiversity impact	Description in relation to the development site	Threatened species or ecological communities effected
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 and areas of exotic vegetation. The buildings are relatively recently constructed and do not provide potential microbat roosts. The development site contains nectar producing non-native vegetation canopy, in formal gardens which will be removed as part of the planning proposal. The development site contains non-native vegetation for common urban arboreal mammals (possums) which provides foraging opportunities for threatened nocturnal bird species. The planning proposal will result in a reduction in the extent of foraging habitat and reduction in availability of their prey items. Roosting habitat for microbats in not native vegetation is considered to be marginal.	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 schreibersii oceanensis* (Eastern Bentwing-bat). Potential foraging habitat for other threatened microbat species above non-native vegetation canopy. Potential foraging habitat for *Pteropus poliocephalus* (Grey-headed Flying Fox (GHFF). Potential foraging habitat for *Ninox strenua* (Powerful Owl).
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	The proposed development will require the removal of non-native vegetation from within the development site. The development will result in a minor reduction in the extent of existing non-native vegetation within the development site which provides stepping stone habitat between urban fragmented patches of vegetation	Reduction in extent of potential foraging habitat for GHFF. Reduction in extent of potential habitat for Powerful Owl. 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.	GHFF, Powerful Owl and microbat species.

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 17.

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

Approach	How addressed	Justification
Locating the planning proposal to avoid direct impacts on the non-native vegetation and human made structures	The biodiversity values present within the development site will not be protected. Although this is a highly modified site, remnant native and non-native canopy is located within the development site and this will be removed for the development.	The planning proposal has been located to utilise areas where native vegetation and threatened species habitat is in lower condition in the context of vegetation in the locality. There is an estimated 62.90 ha of STIF within an area of 1,500m, in varying condition (from larger tracts to small remnant urban canopy patches) (mapped by OEH, 2016). Within 5,000 m radius of the development site, there is an estimated 273.82 ha of STIF that has been mapped. This also ranges from larger tracts to small remnant urban canopy patches. In the context of the surrounding locality, it is considered that this vegetation is in a disturbed and fragmented condition, and thus it is considered that there will be minimal impacts on vegetation and habitat.
Locating the planning proposal to avoid severing or interfering with corridors connecting different areas of habitat, migratory flight paths to important habitat or preferred local movement pathways	The vegetation with the planning proposal location is fragmented and thus movement of genetic material between areas of nearly habitat, and migratory/foraging connectivity corridor will be not be maintained if this patch of vegetation is removed.	As above, in the context of the surrounding locality, it is considered that vegetation is in a disturbed condition and already highly fragmented. Thus, the planning proposal is considered to be located in an area where exchange of genetic material between adjacent or nearby habitat is already limited and will not impact areas mapped as Core and Support for Core Biodiversity Land on Ku-ring-gai Council's Greenweb mapping.
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 planning proposal has been located in an area which avoids impacts to areas of high biodiversity value in the locality.	The planning proposal has been located to utilise areas where native vegetation and threatened species habitat is in lower condition in the context of vegetation in the locality. In the context of the surrounding locality, it is considered that this vegetation is in a disturbed and fragmented condition, and thus it is considered that there will be minimal impacts on vegetation and habitat.

2.1.3.2 Designing a project to avoid and minimise prescribed biodiversity impacts

The planning proposal will result in complete removal of vegetation and all dwellings. Although the development has been located in an area which avoids and minimises impacts to better quality vegetation and more important habitat in the locality, it has not been designed in a way which avoids and minimises impacts on prescribed biodiversity values within the site.

2.1.4 Direct impacts

The direct impacts of the planning proposal on:

- native vegetation are outlined in Table 18
- threatened ecological communities are outlined in Table 19
- threatened species and threatened species habitat is outlined in Table 20.
- prescribed biodiversity impacts outlined in Section 2.1.5

Direct impacts including the final project footprint (construction and operation) are shown on Figure 7.

Table 18: Direct impacts to native vegetation

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1281	*Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion*	Northern Hinterland Wet Sclerophyll Forests	Wet Sclerophyll Forests (Grassy sub-formation)	0.43

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)
1281	CEEC	Sydney Turpentine-Ironbark Forest	0.29	NA		

2.1.5 Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 20.

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
1	1281	CEEC Moderate Condition	0.29	54	0	-54
2	1281	Non CEEC planted	0.14	15.8	0	-15.8

2.1.6 Indirect impacts

The indirect impacts of the development are outlined in Table 21.

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, dust or light spill	Construction	Noise and dust created from machinery (no night works proposed therefore no light spill)	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
Trampling of threatened flora species	Construction / operation	No threatened flora species present	N/A	N/A	N/A	N/A

2.1.7 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. Note that these measures will be relevant at the Development Application stage and are therefore provided here as an indicator of the types of measures that could be applied.

Table 22: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
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	Project Manager / Ecologist
Timing works to avoid critical life cycle events such as breeding or nursing	Minor	Negligible	Avoid clearing works in later winter/spring during breeding/nesting period for birds	Impacts to fauna during nesting/nursing avoided	During clearing works	Project Manager
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	Project Manager / 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. If it is impractical to use salvaged hollows as replacement tree hollows, compensatory nest boxes should be installed where practical.	Replacement of habitat features removed	Prior to and during clearing works	Project Manager/ Ecologist

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
encourage animals to move from the impacted site, e.g. nest boxes						
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Moderate	Minor	Appropriate controls are to 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	Project Manager
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	Timing of construction works should be planned to occur outside of the winter/spring breeding season.	Impacts to fauna during nesting/nursing avoided	During clearing works	Project Manager
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. Weed management to be undertaken where required.	Spread of weeds prevented	Post-construction	Project Manager
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 any sensitive biodiversity values present and environmental procedures such as: • Site environmental procedures (vegetation management, sediment and erosion control, exclusion fencing and 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	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	Project Manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
				any environmental emergencies	issues become apparent.	
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. Planting should also consider replacement of fauna foraging resources to support seasonal foraging.	Areas within the development site will be landscaped using appropriate species	Throughout construction and following completion of construction activities.	Project Manager

2.2 Risk assessment

A risk assessment has been undertaken for any residual impacts likely to remain after the mitigation measures have been applied. Likelihood criteria, consequence criteria and the risk matrix are provided in Table 23, Table 24 Table 25 and Table 26 respectively.

Table 23: 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 24: 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.
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 25: 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 26: Risk assessment

Potential impact	Project phase	Risk (pre-mitigation)	Risk (post mitigation)
Vegetation clearing	Construction / operation	Low	Very 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	Low	Very 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	Low	Low
Increase in pest animal populations	Construction / operation	Low	Very low
Increased risk of fire	Construction / operation	Low	Very Low
Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	Construction / operation	Low	Very Low

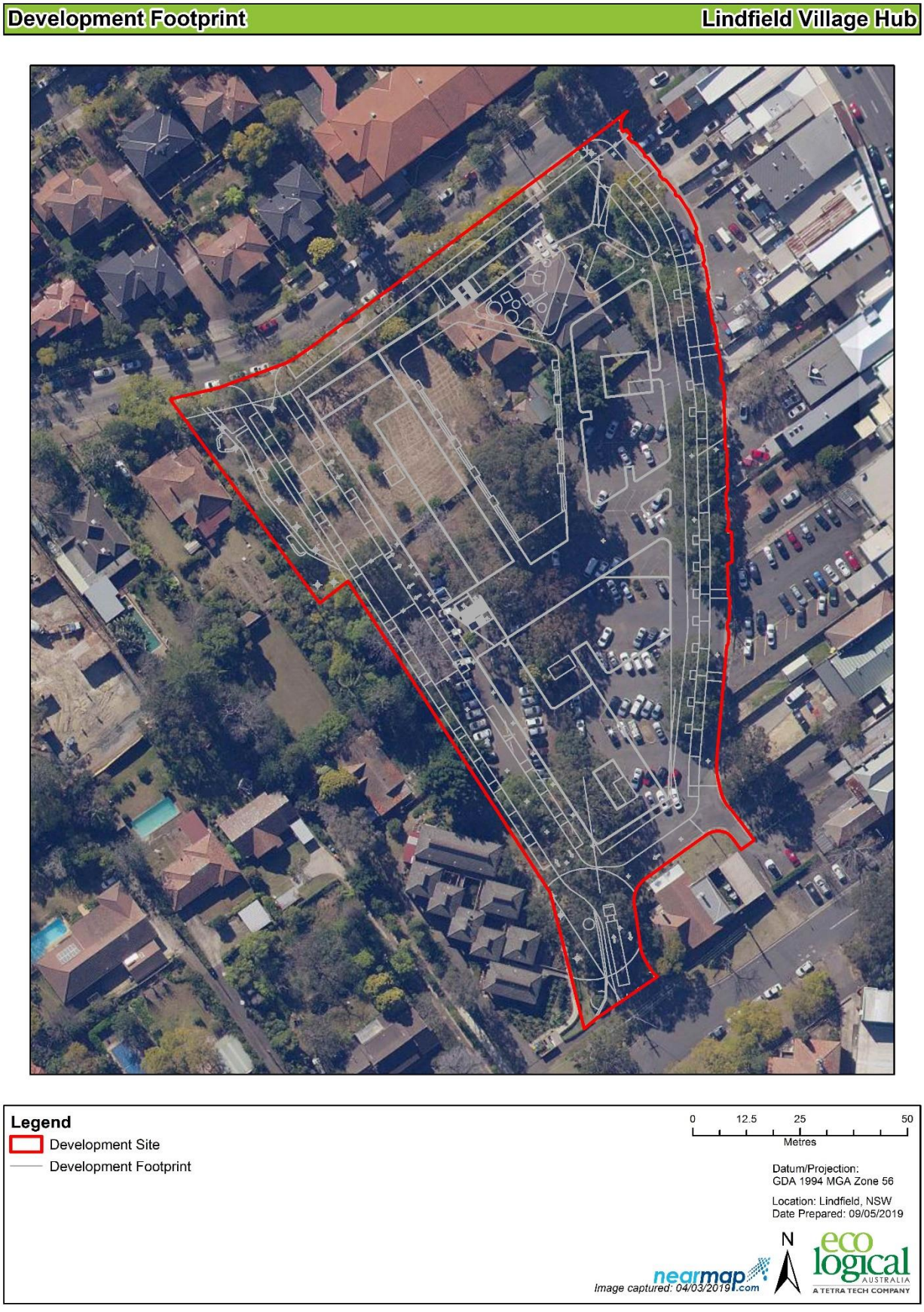

Figure 7: Final project footprint including construction and operation

2.3 Impact summary

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

2.3.1 Serious and Irreversible Impacts (SAII)

The development has candidate Serious and Irreversible Impacts (SAII) values as outlined Table 27 and shown on Figure 8. Detailed consideration of whether impacts on candidate species are serious and irreversible is included in Table 28 and on TECs is included in Table 29.

Table 27: Serious and Irreversible Impacts Summary

Species / Community	PCT Name	Principle	Direct impact individuals / area (ha)	Summary
Sydney Turpentine-Ironbark Forest (STIF)	Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	Principles 1, 3 & 4	0.29	The thresholds for STIF have not been published by Office of Environment (OEH) and Heritage. The impacts of the proposed development is unlikely to result in a SAII on STIF

Table 28: 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 STIF have not been published yet according to the Threatened Biodiversity Data Collection provided in OEH BioNet.
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?	No. The proposal will not impact upon threatened flora/fauna species which are a candidate entity species because it has been identified as having a small population size.
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	N/A
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

Determining whether impacts are serious and irreversible	Assessment
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 STIF have not been published yet according to the Threatened Biodiversity Data Collection provided in OEH BioNet.
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
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 STIF have not been published yet according to the Threatened Biodiversity Data Collection provided in OEH BioNet.

Table 29: Evaluation of an impact on a TEC Sydney Turpentine Ironbark Forest

Impact Assessment Provisions	Assessment
1. The area and condition of the TEC to be impacted directly and indirectly by the proposed development	The planning proposal will remove 0.29 ha of STIF which is in a disturbed and modified condition. The STIF impacted within the development site is represented by remnant canopy trees and a ground layer of mixed native and exotic species subject to regular mowing. The shrub layer is absent.
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	There is an estimated 62.90 ha of STIF within an area of 1,500m, in varying condition (from larger tracts to small remnant urban canopy patches) (mapped by OEH, 2016). Within 5,000 m radius of the development site, there is an estimated 273.82 ha of STIF that has been mapped. This also ranges from larger tracts to small remnant urban canopy patches.
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 removal of 0.29 ha of STIF within the development site represents 0.45% of the mapped STIF extent within the 1,500 m radius. The removal of 0.29 ha of STIF from within the development site, represents 0.11 % of the mapped STIF extent within the 5,000 m radius. The development will not result in the overall decline of the condition of STIF remaining in the locality after development.
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. The proposal will not result in a reduction in ground water levels or substantial alteration of surface water patterns or natural disturbance regimes of which the TEC depends upon outside of the development site.
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.

Impact Assessment Provisions	Assessment
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 site is located within a highly modified urban area of with areas impacted by weeds which will be removed during the proposed works. The planning proposal has the potential to result in the introduction of new weed plumes into the development site. These potential impacts will be controlled during the construction phase and long-term maintenance of the development site.
5. Direct or indirect fragmentation and isolation of an area of the TEC	The development will result in an increase in the direct or indirect fragmentation or isolation of any areas of STIF. All STIF in this development site will be removed therefore increasing fragmentation of remaining STIF in the locality.
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.

2.3.2 Impacts requiring offsets

The impacts of the development requiring offsets for native vegetation are outlined in Table 30 and shown on Figure 9.

Table 30: Impacts to native vegetation that require offsets

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1281 CEEC	Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	Northern Hinterland Wet Sclerophyll Forests	Wet Sclerophyll Forests (Grassy sub-formation)	0.29

2.3.3 Impacts not requiring offsets

The impacts of the development not requiring offset for native vegetation are outlined in Table 31 and shown on Figure 10.

Table 31: Impacts to native vegetation not requiring offsets

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)	Justification
1281 non CEEC planted	Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	Northern Hinterland Wet Sclerophyll Forests	Wet Sclerophyll Forests (Grassy sub-formation)	0.14	The vegetation integrity score of 15.8 was below the vegetation integrity score of 20 where the PCT is not representative of a TEC or associated with threatened species habitat, therefore no offsets are required.

2.3.4 Areas not requiring assessment

Areas not requiring assessment include existing buildings, carparks, paths, exotic garden lawn and exotic vegetation. The development site contains build/cleared areas, exotic lawn and exotic vegetation (0.7 ha) as shown in Figure 4. These areas were not consistent with any listed PCT, nor did they contain any threatened species. An assessment of Prescribed Impacts has been undertaken, hence further assessment under the BAM was not required. Areas not requiring assessment are shown on Figure 11.

2.3.5 Credit summary

The number of ecosystem credits required for the development are outlined in Table 32. A total of 8 (eight) ecosystem credits are required for impacts to PCT 1281. No candidate species credit species or likely habitat was recorded within the development site; hence no species credits are required to offset the development. The biodiversity credit report is included in Appendix E.

Note that the BAM credit calculations were undertaken on 9 May 2019 when *Sydney Turpentine Ironbark Forest* was still listed as an Endangered Ecological Community. This community was relisted to a Critically Endangered Ecological Community on 31 May 2019. The BAM Calculator (BAMC) was accessed on 10 July 2019 to update the calculations in accordance with the new listing, however this new listing is currently not reflected in the BAMC. These calculations will therefore need to be updated at the development application stage.

Table 32: Ecosystem credits required

PCT ID	PCT Name	Vegetation Formation	Direct impact (ha)	Credits required
1281	Turpentine – Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	Wet Sclerophyll Forests (Grassy sub-formation)	0.29	8

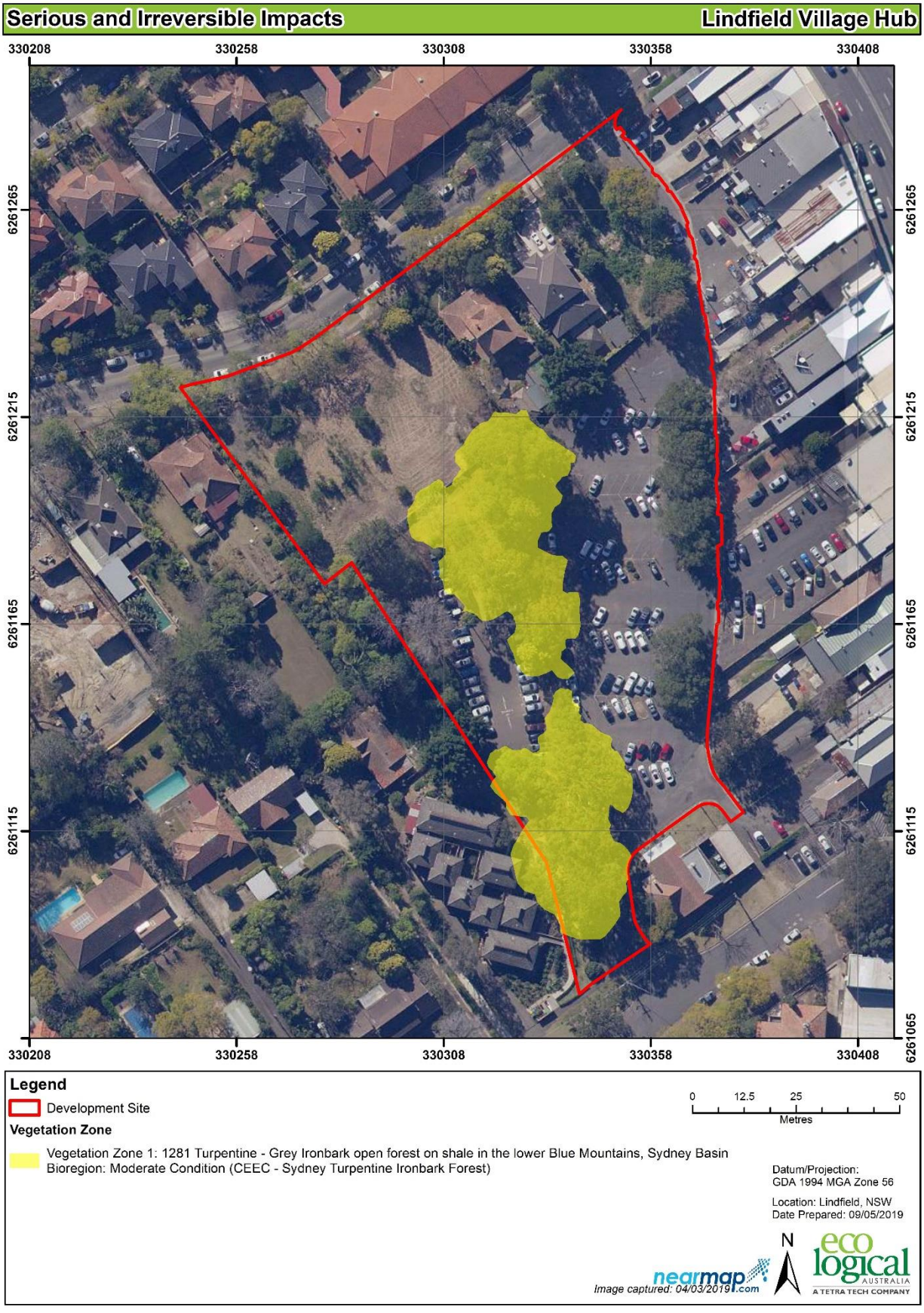

Figure 8: Serious and Irreversible Impacts

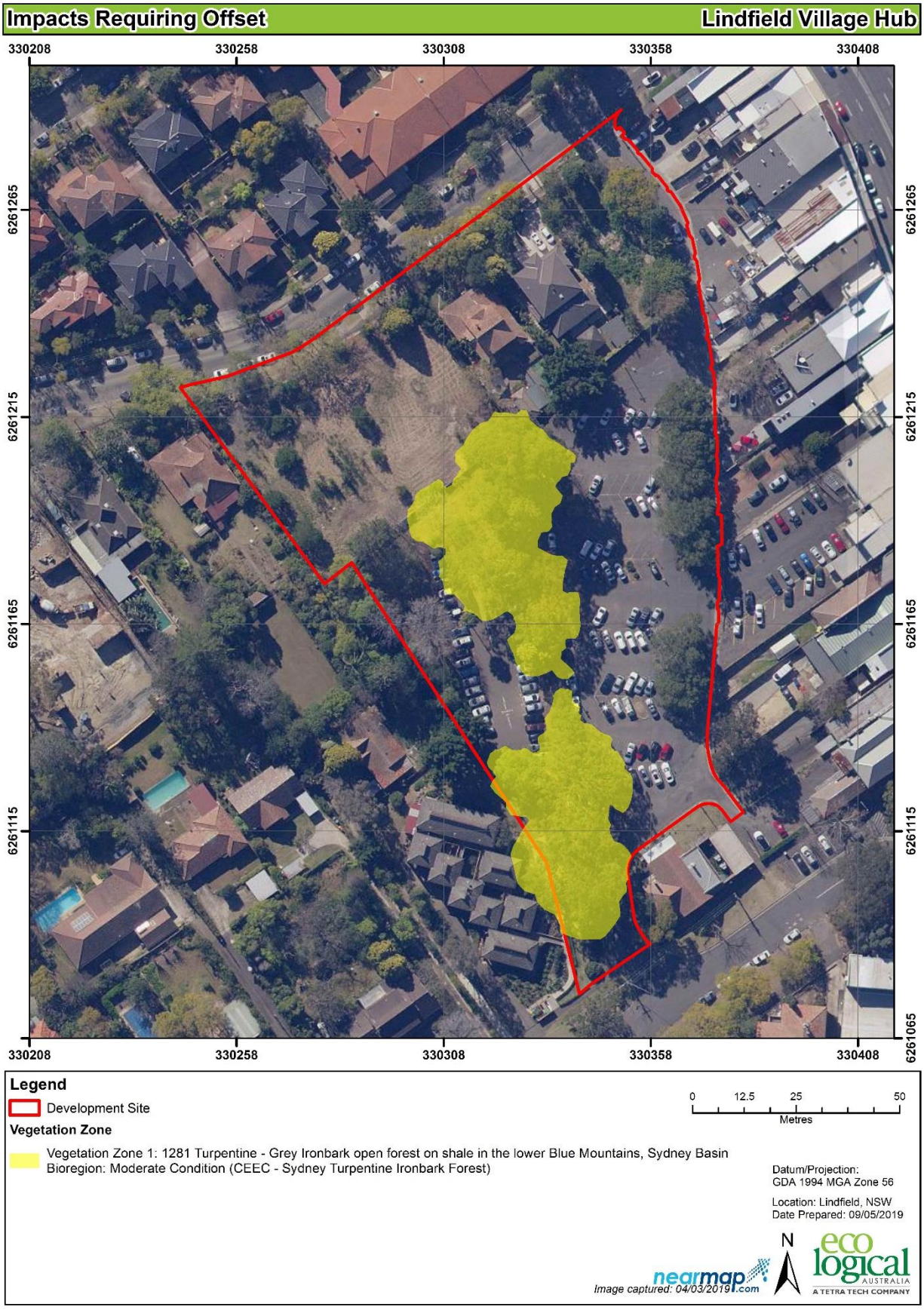

Figure 9: Impacts requiring offset

Figure 10: Impacts not requiring offsets

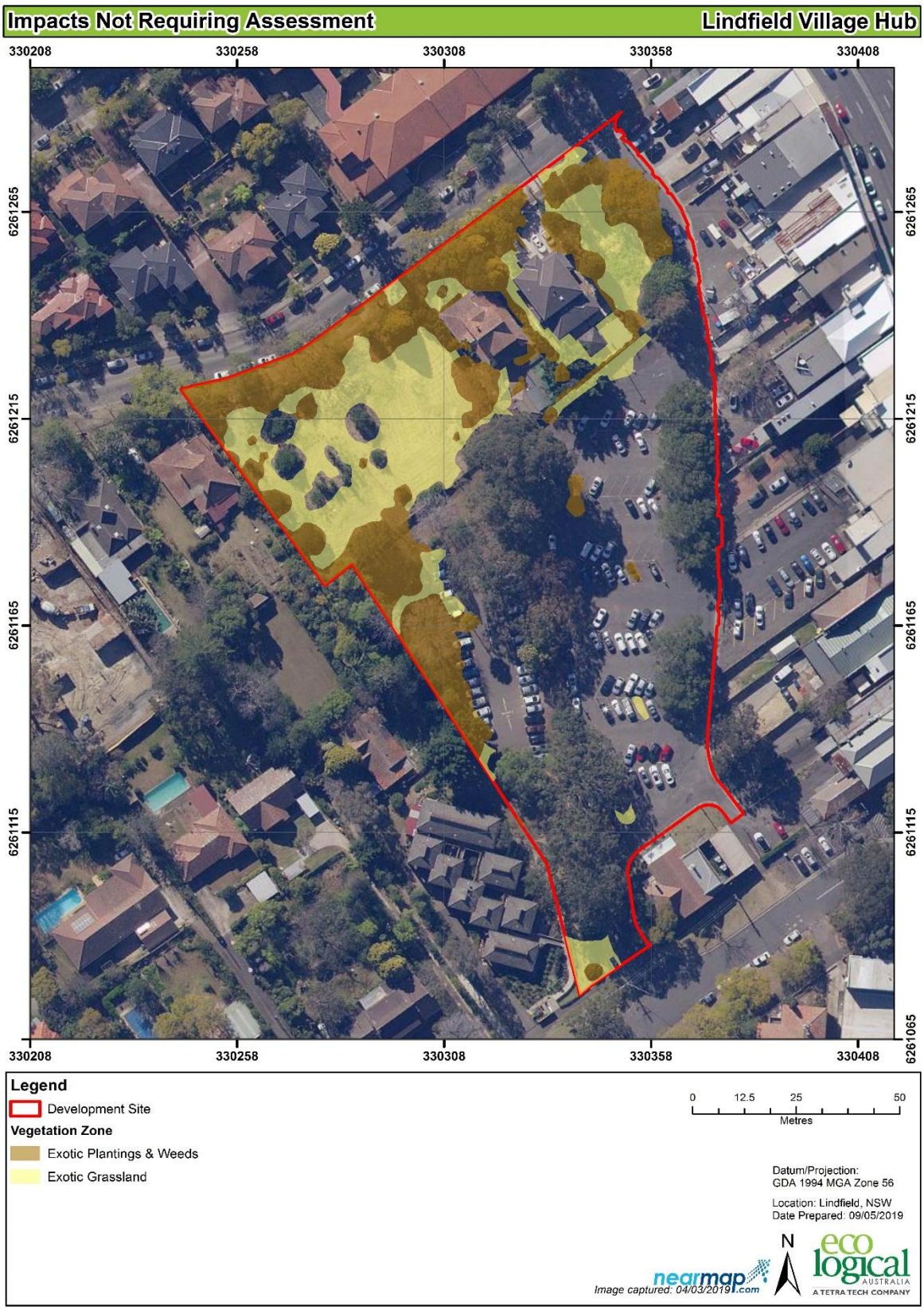

Figure 11: Areas not requiring assessment

2.4 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 2.4.1. Matters relating to Ku-ring-gai Council planning instruments have been addressed in Section 1.2.

2.4.1 *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 the Environment (DotE), which is responsible for administering the EPBC Act (DotE 2014).

The process includes undertaking an Assessment of Significance for listed threatened species and ecological communities that represent a matter of MNES that will be impacted as a result of the proposed action. Significant impact guidelines (DotE 2014) that outline a number of criteria have been developed by the Commonwealth, to provide assistance in conducting the Assessment of Significance and help decide whether or not a referral to the Commonwealth is required.

A habitat assessment and Likelihood of Occurrence was completed and one MNES *Pteropus poliocephalus* (Grey-headed Flying-fox) was assessed under the act (Table 33).

Pteropus poliocephalus (Grey-headed Flying-fox)

The Grey-headed Flying-fox (GHFF) 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 3 km of the development site (OEH 2019b). The vegetation within the development site provides potential seasonal 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 GHFF camps currently occur or have been recorded within the development site (DotE 2019).

Table 33: EPBC Act of Significance for *Pteropus poliocephalus* (Grey-headed Flying-fox)

Criterion	Assessment
Criterion a: lead to a long-term decrease in the size of an important population of a species	The Matters of National Environmental Significance Impact Guidelines 1.1 (Commonwealth of Australia, 2013) defines an important population as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species range No important populations 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 (DotE 2019). The nearest active GHFF camp occurs approximately 3 km to the north of the development site, within Gordon (DotEE 2019).
Criterion b: reduce the area of occupancy of an important population	No important populations have been recorded within the development site. Therefore, the proposed works would not reduce the area of occupancy of an important population.
Criterion c: fragment an existing important population into two or more populations	No important populations have been recorded within the development site. The potential seasonal foraging habitat to be removed is considered marginal relative to nearby potential habitat within the locality. Whilst the potential foraging habitat may contribute as a 'stepping stone' for this highly mobile species to other more substantial foraging habitat sites, this function is unlikely to be significantly inhibited by the proposed works. Furthermore, this species has been recorded in urban environments and is likely to continue to forage adjacent to the site and across the broader locality.
Criterion d: adversely affect habitat critical to the survival of a species	The individual trees to be removed represent a negligible amount of potential foraging resources in the locality. Potential foraging habitat will persist in close proximity to the development site, and in the Lane Cove River National Park (approximately 1.5 km west from the development site) and Garigal National Park/Council reserve approximately 1.1 km north east 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
Criterion 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 (DotE 2019). The nearest active GHFF camp occurs approximately 3 km to the north of the development site, within Gordon (DotEE 2019). Thus, no important population of GHFF occurs within the development site, and the proposed works is 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 adjacent to 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. Furthermore, according to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the development site (DotEE 2019). The nearest active GHFF camp occurs approximately 3 km to the north of the development site, within Gordon (DotEE 2019). Therefore, no known GHFF roosting camps for this species will be impacted by the proposed works.
Criterion g: Result in invasive species that are harmful to a vulnerable species becoming	The proposed works will not result in the establishment of an invasive species that is harmful to GHFF.

Criterion	Assessment
established in the vulnerable species' habitat	
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 GHFF.
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 the species.
Conclusion	In consideration of the above, the proposed works are considered unlikely to have a significant impact on the GHFF.

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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.

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 34: Species matrix (species recorded by plot)

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) Plot 1	Cover (%) Plot 2
G	SG	*Acacia schinoides*			0.1	
		Alternanthera pungens	*	*		0.3
G		*Amaranthus viridis*	*		0.1	0.1
G		*Araujia sericifera*	*	*	0.1	
G		*Asparagus aethiopicus*	*	*	0.1	
G		*Axonopus fissifolius*	*	*	0.2	
G		*Berberis* sp.	*		0.1	0.1
		Bromus catharticus	*			0.1
		Cardiospermum grandiflorum	*	*		0.1
G	GG	*Carex inversa*			3	
G		*Celtis sinensis*	*		0.1	
G		*Cenchrus pennisetiformis*	*	*	1	0.2
G	FG	*Centella asiatica*			0.1	
G	FG	*Commelina cyanea*			0.5	
G		*Conyza bonariensis*	*		0.1	0.1
G	GG	*Cyperus gracilis*			2	1
G	FG	*Dianella caerulea* var. *producta*			0.1	
G	FG	*Dichondra repens*			2	0.1
		Digitaria ciliaris	*			0.1
G		*Ehrharta erecta*	*	*	5	5
G	FG	*Einadia hastata*			1	0.1
	FG	*Einadia trigonos* subsp. *trigonos*				0.1
		Eleusine tristachya	*			0.1
U	TG	*Eucalyptus paniculata* subsp. *paniculata*			30	
U	TG	*Eucalyptus punctata*			10	
M		*Fraxinus* sp.	*		0.1	
G		*Gamochaeta coarctata*	*		0.1	
G	OG	*Glycine microphylla*			1	

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) Plot 1	Cover (%) Plot 2
G	OG	*Glycine tabacina*			1	
G	SG	*Hakea sericea*			0.1	
G		*Hypochaeris glabra*	*		0.1	0.2
G		*Hypochaeris radicata*	*		0.1	
G		*Ipomoea indica*	*	*	0.1	
G		*Lantana camara*	*	*	0.1	0.1
		Lepidium africanum	*			0.1
G		*Ligustrum lucidum*	*	*	0.1	
		Malva neglecta	*			0.2
	SG	*Melaleuca styphelioides*				15
G	GG	*Microlaena stipoides* var. *stipoides*			15	0.5
G		*Modiola caroliniana*	*		0.1	0.1
G		*Ochna serrulata*	*	*	0.1	
G	GG	*Oplismenus aemulus*			1	
G		*Oxalis corniculata*	*		0.1	
G		*Oxalis latifolia*	*		0.1	
G	FG	*Oxalis perennans*			0.1	0.1
G	FG	*Oxalis* sp.			0.1	0.1
G		*Paronychia brasiliana*	*		0.2	0.1
G	GG	*Paspalidium distans*			0.1	
G		*Paspalum dilatatum*	*	*	1	
G		*Passiflora caerulea*	*		0.1	
G		*Phoenix canariensis*	*	*	0.1	
G	FG	*Plantago debilis*			0.1	
G		*Plantago lanceolata*	*		0.1	0.1
	FG	*Portulaca oleracea*				0.1
G	FG	*Pseuderanthemum variabile*			1	
G		*Richardia stellaris*	*		0.1	
G	FG	*Rumex brownii*			0.1	0.1
G	GG	*Rytidosperma racemosum* var. *racemosum*			0.1	0.1
G		*Sida rhombifolia*	*		0.1	0.1
G		*Solanum nigrum*	*		0.1	0.1

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) Plot 1	Cover (%) Plot 2
G		*Soliva sessilis*	*		0.1	0.1
G		*Sonchus oleraceus*	*		0.1	0.1
G		*Sporobolus africanus*	*		0.5	0.1
G		*Stellaria media*	*		0.1	0.1
G		*Taraxacum officinale*	*		0.1	0.1
G		*Trifolium* sp.	*		0.1	
G	FG	*Veronica plebeia*			0.1	
G	FG	*Wahlenbergia* sp.			0.1	

G = Ground, M = Midstorey, U= Understorey TG = Tree, SG = Shrub, GG = Grass & Grasslike, FG = Forb, EG = Fern, OG = Other

Table 35: Vegetation integrity data (Composition, Structure and function)

Plot location data							
Plot no.	PCT	Vegetation Zone	Condition	Zone	Eastings	Northings	Bearing
1	1281	CEEC Moderate	Moderate	56	330323	6261202	128
2	1281	Non CEEC Planted	Planted	56	330364	6261220	154

Composition (number of species)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	2	2	6	12	0	2
2	0	1	3	7	0	0

Structure (Total cover %)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	40	0.2	21.2	5.3	0	2
2	0	15	1.6	0.7	0	0

Function												
Plot no.	Large Trees	Hollow trees	Litter Cover (%)	Length Fallen Logs (m)	Tree Stem 5-9 cm	Tree Stem 10-19 cm	Tree Stem 20-29 cm	Tree Stem 30-49 cm	Tree Stem 50-79 cm	Tree Stem 80+ cm	Tree Regen	High Threat Weed Cover (%)
1	5	1	56	0	0	1	1	1	1	1	0	7.9
2	5	0	62	0	0	0	0	0	1	1	0	5.7

For stem size classes: 0 = Absence, 1 = Presence.

Appendix C: Photos

Plate 1: Left: Start. Right: End.

Plate 2: Left: Start. Right: End.

Appendix D: Other species recorded

Botanic Name	Common Name	Exotic/ Native
Acacia sp.		N
Acer negundo	Box Elder	E
Acer saccharum	Sugar Maple	E
Acmena smithii	Lilly Pilly	N
Agonis flexuosa	Willow Myrtle	N
Alectryon tomentosus	Rambutan	N
Allocasuarina sp.		N
Allocasuarina torulosa	Forest Oak	N
Angophora costata	Sydney Red Gum	N
Archontophoenix sp.	Bangalow Palm	N
Banksia integrifolia	Coastal Banksia	N
Brachychiton acerifolius	Illawarra Flame Tree	N
Callistemon salignus	Willow Bottlebrush	N
Callistemon viminalis	Weeping Bottlebrush	N
Camellia sasanqua	Camellia	E
Celtis occidentalis	Nettleberry	E
Cenchrus clandestinus	Kikuyu Grass	E
Ceratopetalum gummiferum	Christmas Bush	N
Cotoneaster glaucophyllus	Cotoneaster	E
Cryptomeria sp.		E
Cupressus macrocarpa	Golden Monterey Cypress	E
Cupressus sp.	Cypress	E
Eucalyptus microcorys	Tallow-wood	N
Eucalyptus paniculata	Ironbark	N
Eucalyptus pilularis	Blackbutt	N
Eucalyptus punctata	Grey Gum	N
Eucalyptus resinifera	Red Mahogany	N

Botanic Name	Common Name	Exotic/ Native
Eucalyptus scoparia	Wallangarra White Gum	N
Ficus microcarpa var. hillii	Hills Fig	N
Flindersia sp.		N
Glochidion ferdinandi	Cheese Tree	N
Grevillea robusta	Silky Oak	N
Grevillea sp.	Grevillea	N
Hedera helix	English Ivy	E
Howea forsteriana	Kentia Palm	N
Hymenosporum flavum	Native Frangipani	N
Jacaranda mimosifolia	Jacaranda	E
Lagerstroemia indica	Crepe Myrtle	E
Liquidambar styraciflua	Sweet Gum	E
Livistona australis	Cabbage Palm	N
Melaleuca bracteata	Black Tea-tree	N
Melaleuca quinquenervia	Paperbark	N
Melaleuca sp.		N
Melaleuca styphelioides	Prickly-Leaved Tea Tree	N
Melaleuca decora	White-feather Honeymyrtle	N
Metasequoia glyptostroboides	Dawn Redwood	E
Michelia figo	Port Wine Magnolia	E
Monstera deliciosa	Swiss Cheese Plant	E
Plantago lanceolata	Lamb's Tongues	E
Plumeria rubra	Frangipani	E
Sida rhombifolia	Paddy's Lucerne	E
Solanum mauritianum	Wild Tobacco Bush	E
Stenocarpus salignus	Scrub Beefwood	N
Stenotaphrum secundatum	Buffalo Grass	E

Botanic Name	Common Name	Exotic/ Native
Strelitzia sp.	Bird of Paradise	E
Syagrus romanzoffianum	Cocos Palm	E
Syzygium luehmannii	Small-leafed Lilly Pilly	N
Tradescantia fluminensis	Trad	E
Yucca sp.	Agave	E

E = Exotic, N = Native, N

Appendix E: Biodiversity credit report

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00015416/BAAS18077/19/00015417	Lindfield Village Hub_Part 2	14/04/2019
Assessor Name	**Report Created**	**BAM Data version ***
Nicole Helen McVicar	09/05/2019	7
Assessor Number	* 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.	
BAAS18077		

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	Candidate SAII	Ecosystem credits
Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion								
1	1281_NonEEC_planted	15.8	0.1	0.25	High Sensitivity to Potential Gain	2.50		0
							Subtotal	**0**
							Total	**0**

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00015413/BAAS18077/19/00015414	Lindfield Village Hub	14/04/2019
Assessor Name	**Report Created**	**BAM Data version ***
Nicole Helen McVicar	09/05/2019	7
Assessor Number	* 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.	
BAAS18077		

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	Candidate SAII	Ecosystem credits
Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion								
1	1281_EEC_mod	54.0	0.3	0.25	High Sensitivity to Potential Gain	2.00	TRUE	8
							Subtotal	**8**
							Total	**8**

NOTE THAT THE BAM CREDIT CALCULATIONS WERE UNDERTAKEN ON 9 MAY 2019 WHEN *SYDNEY TURPENTINE IRONBARK FOREST* WAS STILL LISTED AS AN ENDANGERED ECOLOGICAL COMMUNITY. THIS COMMUNITY WAS RELISTED TO A CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY ON 31 MAY 2019. THE BAM CALCULATOR (BAMC) WAS ACCESSED ON 10 JULY 2019 TO UPDATE THE CALCULATIONS IN ACCORDANCE WITH THE NEW LISTING, HOWEVER THIS NEW LISTING IS CURRENTLY NOT REFLECTED IN THE BAMC. THESE CALCULATIONS WILL THEREFORE NEED TO BE UPDATED AT THE DEVELOPMENT APPLICATION STAGE.

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