159-167 Darley Street, Mona Vale

Preliminary Ecological Assessment

Intrec

2 July 2021

Final

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

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Approved by:	**David Robertson**
Position:	Director
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Glossary

Term/Abbreviation	Definition
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BC Regulation	*Biodiversity Conservation Regulation 2017*
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offsets Scheme
DA	Development Application
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FFA	Flora and fauna assessment
GIS	Geographic Information System
GPS	Global Positioning System
LEP	Pittwater Local Environmental Plan 2014
LGA	Local Government Area
OEH	Former Office of Environment and Heritage
PCT	Plant Community Type
PWSGF	Pittwater Spotted Gum Forest
Subject site	The lots contained within 159-167 Darley Street, Mona Vale
TEC	Threatened Ecological Community
The project	A planning proposal to amend the zoning for 159-167 Darley Street, Mona Vale from R2 – Low Density Residential to R3 – Medium Density Residential under the Pittwater Local Environmental Plan 2014

1. Introduction

1.1. Purpose

Cumberland Ecology Pty Ltd (Cumberland Ecology) has been commissioned by Intrec to conduct an Ecological Assessment to support a planning proposal to amend the zoning for 159-167 Darley Street, Mona Vale (hereafter referred to as the 'subject site') from R2 – Low Density Residential to R3 – Medium Density Residential under the *Pittwater Local Environmental Plan 2014* (LEP) (see **Figure 1**).

The purpose of this report is to addresses the ecological considerations described in the Department of Planning and Environment's Guide to Preparing Planning Proposals by describing current biodiversity values of the subject site and providing a high level assessment of the potential impacts of the planning proposal on flora and fauna (DPIE 2018). Particular attention is focussed on threatened species, populations and communities that are listed under the New South Wales (NSW) *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The specific objectives of this report are to:

- Describe the vegetation communities on the subject site;
- Describe fauna habitats and fauna usage of the subject site;
- Identify any threatened species, populations or ecological communities (as listed under the BC Act and/or EPBC Act) existing on the subject site;
- Assess the likelihood of occurrence of threatened species, populations or communities (as listed under the BC Act and/or EPBC Act) within the subject site;
- Describe potential future ecological assessment requirements that may apply at the development application (DA) stage;
- Provide a high level assessment of the potential impact of the likely future development on threatened communities, flora and fauna, including the completion of Tests of Significance under Section 7.3 of the BC Act; and
- Where relevant, recommend mitigation measures to reduce the impacts of the planning proposal and subsequent development on biodiversity values.

1.2. Background

1.2.1. Description of the Subject site

The subject site is defined as the land within 159-167 Darley Street, Mona Vale, comprising Lots 1-5, DP 11108. The subject site is 0.62 ha in area and is located wholly within the Northern Beaches Council Local Government Area (LGA). The subject site is situated within the residential suburb of Mona Vale, located approximately 24 km north of the Sydney CBD. The subject site is surrounded by residential properties to the east, west and south. Darley Street separates the subject site from Bayview Golf Club to the north. The subject site is within <1km of a large tract of bushland that bears a small degree of connectivity to vegetation within Ku-ring-gai National Park. The subject site is shown in **Figure 1**.

1.2.2. Description of the Project

The five lots on 159-167 Darley Street West are located at the end of the no-through road and currently zoned R2. This side of Darley Street West is predominantly occupied by 2 storey medium density development (zoned R3) i.e. 2 storey apartment buildings with basement carpark and 2 storey townhouses. The proposed development is consistent with the streetscape character and consists of two 2-storey Residential Flat Buildings and a row of three 2-storey townhouses.

The built forms are to step down the slope to reduce the amount of cut and fill, maximising the northern aspects and views, as well as oriented to the street frontage. They are positioned to allow for landscaped breaks between buildings and retain the overland flow path at the rear of the lots, creating series of buildings within landscaped setting.

Along the front setback area, there will be layering of landscape elements along with clearly defined pedestrian entries and landscaped vehicular entries. The buildings will be well articulated using natural colour scheme, with contemporary and the Northern Beaches coastal character.

1.3. Relevant Legislation

1.3.1. Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), any action (which includes a development, Project or activity) that is considered likely to have a significant impact on Matters of National Environmental Significance (MNES) (including nationally threatened ecological communities and species and listed migratory species) must be referred to the Commonwealth Minister for the Environment. The purpose of the referral is to allow a decision to be made about whether an action requires approval on a Commonwealth level. If an action is considered likely to have a significant impact on MNES, it is declared a "controlled action" and Commonwealth approval is required.

1.3.2. NSW *Environmental Planning and Assessment Act 1979*

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is the overarching planning legislation in NSW that provides for the creation of planning instruments that guide land use. The EP&A Act also provides for the protection of the environment, including the protection and conservation of native fauna and flora species. This includes threatened species, populations and ecological communities, and their habitats, as listed under the BC Act and NSW *Fisheries Management Act 1994*.

1.3.3. NSW *Biodiversity Conservation Act 2016*

The BC Act is the key piece of legislation in NSW relating to the protection and management of biodiversity and threatened species. The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act is supported by regulations, including the *Biodiversity Conservation Regulation 2017* (BC Regulation).

2. Methodology

2.1. Desktop Assessment

Mapping layers from The Native Vegetation of the Sydney Metropolitan Area were reviewed to determine the potential vegetation communities present, including those that align to Threatened Ecological Communities (TECs) listed under the BC Act and/or EPBC Act (OEH 2016).

Database analysis was conducted for the locality on 23 April 2021 using the NSW BioNet Atlas and the Commonwealth EPBC Act Protected Matters Search Tool. The locality is defined as the area within a 5 km radius of the subject site. The NSW BioNet Atlas and the Commonwealth Protected Matters Search Tool were examined for records of any threatened flora and fauna species listed under the BC Act and/or EPBC Act within the locality.

2.2. Field Surveys

2.2.1. Flora Survey

A flora survey was conducted on 24 February 2021 by a botanist and ecologist from Cumberland Ecology. The flora survey consisted of the following:

- A random meander survey across the subject site to compile a species list and to map vegetation communities;
- A plot-based vegetation integrity assessment performed in accordance with the Biodiversity Assessment Method (BAM);
- Targeted searches for threatened flora species identified as being present within the locality and having the potential to be present; and
- Taking photographs of vegetation to provide a visual documentation of Plant Community Types (PCTs) present and their condition.

Identification of the PCTs occurring within the subject site was guided by the findings of the floristic survey. The data collected during surveys of the subject site was analysed in conjunction with a review of the PCTs held within the VIS Classification Database. Consideration was given to the occurrence within the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and Cumberland IBRA Sub-regions. The locations of flora surveys within the subject site are shown in **Figure 3**.

2.2.1.1. Vegetation Mapping

Previous vegetation mapping of the subject site prepared by the former Office of Environment and Heritage (OEH) were reviewed prior to the survey in order to determine vegetation communities that could occur within the subject site (OEH 2016). The vegetation within the subject site was ground-truthed by Cumberland Ecology. Vegetation community boundaries were made using a hand-held Global Positioning System (GPS) and mark-up of aerial photographs. The data collected was analysed and the resultant information was synthesised using a Geographic Information System (GIS) to produce a vegetation map of the subject site.

2.2.1.2. Random Meander

A flora survey was undertaken within the subject site via random meander. Flora species encountered during the random meander were noted to compile a species list for the subject site. The random meander also targeted threatened flora species known from the locality.

2.2.1.3. Vegetation Integrity Assessment

A vegetation integrity assessment was undertaken in the subject site and wider subject site in accordance with the BAM. Surveys included establishment of a single 20 x 50 m plot within which the following data was collected:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within a 20 m x 20 m floristic plot;
- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within a 20 m x 20 m floristic plot;
- Cover of 'High Threat Exotic' weed species within a 20 m x 20 m floristic plot;
    - Assessment of function attributes within a 20 m x 50 m plot, including:
    - Count of number of large trees;
    - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
    - Regeneration based on the presence of living trees with stems <5 cm DBH;
    - The total length in metres of fallen logs over 10 cm in diameter;
- Assessment of litter cover within five 1 m x 1 m plots evenly spread within the 20 m x 50 m plot; and
- Number of trees with hollows that are visible from the ground within the 20 m x 50 m plot.

A single BAM plot was undertaken within the subject site, and its location is shown in **Figure 3**.

2.2.2. Fauna Survey

A fauna habitat assessment was conducted by an ecologist on 24 February 2021. The subject site was assessed for groundcover, shrub/understory cover, canopy cover, tree hollows as well as other habitat features such as bush rock, fallen trees and signs of fauna use such as scats, scratches and scrapings.

The nature and extent of fauna habitats in the subject site were assessed and areas where fauna species could reside or forage were identified. This included consideration of important indicators of habitat condition and complexity including the occurrence of microhabitats such as tree hollows, fallen logs, bush rock and wetland areas such as creeks and soaks.

An assessment of the structural complexity of vegetation, the age structure of the vegetation and the nature and extent of human disturbance throughout the subject site was also undertaken and considered. Tree hollows were used as a general indication of habitat quality for arboreal fauna and hollow-dwelling birds and

bats. Any hollows observed during surveys were recorded and the general vegetation condition and tree maturity was used to predict whether trees on site were likely to contain hollows.

During the habitat assessment, any fauna species seen or heard calling were recorded.

2.2.3. Survey Limitations

The subject site was easily accessible, and a random meander transect was conducted within the extent of vegetation. Despite this, it is unlikely that all flora species present within the subject site have been recorded. However, it is probable that the vast majority of species, and all of the endemic, native species present at the time of the survey were recorded, and that issues including conservation significance of the flora, and ecological constraints of native vegetation on development have been satisfactorily assessed. An assessment of the likelihood of occurrence of all threatened flora species recorded or likely to occur within a 5 km radius of the subject site was undertaken to supplement the threatened flora survey.

Limited fauna surveys were undertaken for this assessment, which mainly relied on database analysis of species recorded within a 5 km radius, and fauna habitat assessment. The data produced by the database analysis and fauna habitat assessment is intended to be indicative of the types of species that could occur within the subject site.

3. Results

3.1. Introduction

The subject site comprises a combination of exotic vegetation, exotic grasslands, highly degraded native vegetation where only the native canopy remains, planted native vegetation and cleared land. Historical imagery analysis indicates that the subject site was predominantly cleared prior to 1955. However, the native vegetation throughout the central and southern extent of the subject site appears to consist of regrowth whilst the remaining vegetation appears to have been planted following 1955. Historical aerial imagery from 1955 covering the subject site is shown in **Figure 4**. The biodiversity values of the subject site are described in more detail in subsequent sections.

3.2. Vegetation Communities

The subject site broadly contains a matrix of remnant native vegetation, planted native vegetation, planted exotic vegetation, exotic dominated grassland and cleared land. The vegetation of the subject site has been mapped by the former OEH as containing Urban Exotic/Native Vegetation under the Native Vegetation of the Sydney Metropolitan Area (OEH 2016).

The composition, structure, and function of the native vegetation within the subject site is highly degraded and modified likely due to historical clearing and residential development. Despite this, the native vegetation contains sufficient native species diversity to be attributed to a naturally occurring Plant Community Type (PCT). This native vegetation generally consists of a native canopy over a highly degraded or absent understorey. The native vegetation within the subject site has been determined to conform to 'PCT 1214 – Pittwater Spotted Gum Forest' (PWSGF) as described below and as shown in **Figure 5**. The attribution of PCT 1214 was made based on the floristic composition of the canopy, being dominated by characteristic species of the PCT (namely *Eucalypytus paniculata* and *Corymbia maculata*) and its occurrence suitable soils.

Descriptions of vegetation communities present in the subject site is provided below and their distribution is shown in **Figure 5**. The area of each vegetation community found within the subject site is shown in **Table 1**.

Table 1 Vegetation communities within the subject site

Vegetation Community	Area (ha)
PCT 1214 - Pittwater Spotted Gum Forest	0.19
Planted Native Vegetation	0.04
Exotic Vegetation	0.17
Exotic Dominated Grassland	0.05
Cleared Land	0.17

3.2.1. PCT 1214 - Pittwater Spotted Gum Forest – Scattered Trees

BC Act Status: Endangered

EPBC Act Status: Not listed

PCT: 1214

This community occurs throughout the subject site as scattered trees of varying maturity over an exotic dominated, highly degraded and managed urban understorey. The PWSGF canopy within the subject site is dominated by *Eucalyptus paniculata* (Grey Ironbark), *Corymbia maculata* (Spotted Gum) and *Eucalyptus punctata* (Grey Gum) with single occurrences of *Corymbia gummifera* (Red bloodwood) and *Eucalyptus pilularis* (Blackbutt). *Livistona australis* (Cabbage Tree Palm) individuals of varying maturity are also scattered throughout the subject site.

Due to the degraded nature of the understory, the native shrub layer is very sparse with occasional instances of a number of native species characteristic to the PWSGF community including *Glochidion ferdinandi* (Cheese tree) and *Pittosporum undulatum* (Mock Orange).

The ground layer is mostly dominated by a maintained cover of exotic grasses such as *Stenotaphrum secundatum* (Buffalo Grass) and to a lesser extent *Ehrharta erecta* (Panic Veldtgrass) Scattered natives *Hydrocotyle sibthorpioides* (Lawn Marshpennywort), and *Oplismenus aemulus* (Australian basket Grass) also occur throughout the site. *Commelina cyanea* (native Commelina) is also present throughout the site, along with occurrences of the native creeping herb *Dichondra repens* (Kidney Weed) circling the base of canopy trees and scattered beneath exotic mowed grasses across the site. This vegetation community is shown in **Photograph 1**.

Photograph 1 PCT 1214 – Pittwater Spotted Gum Forest within the subject site

3.2.1.1. BC Act Listing: Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion

This section provides commentary as to whether the locally native scattered trees within the subject site are consistent with the Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion (PWSGF) BC Act listing. PWSGF is listed as Endangered under the BC Act and is not listed on the EPBC Act.

i. Location

The final determination for PWSGF states the following:

"The ecological community has been recorded from the local government areas of Pittwater and Gosford, within the Sydney Basin Bioregion, and may occur elsewhere in the Bioregion."

The subject site occurs within the former extent of the Pittwater LGA which is consistent with the final determination for PWSGF.

ii. Floristics

A majority of the locally native scattered trees within the subject site are listed as characteristic species of PWSGF including *Corymbia gummifera* (Red Bloodwood), *Corymbia maculata* (Spotted Gum), *Eucalyptus paniculata* (Grey-Ironwood), *Livistonia australis* (Cabbage-Tree Palm), *Glochidion ferdinandi* (Cheese Tree) and *Pittosporum undulatum* (Sweet Pittosporum). Whilst the native understorey of the subject site is absent or highly degraded, some scattered characteristic species are present such as *Cissus hypoglauca* (Native Grape) and *Pratia purpurascens* (White Root).

The final determination for PWSGF states the following:

"The structure of Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion was originally open-forest however, it now exists outside of reserves as woodland or remnant trees with few large stands remaining. Remnant trees may have particular ecological and genetic significance and may be important sources of propagation material for use in rehabilitation projects."

Subsequently, the locally native, scattered trees comprising characteristic species of PWSGF are considered to conform to the TEC, despite the lack of an intact understorey.

iii. Soils

The final determination for PWSGF states the following:

"Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is known to occur on shale-derived soils from Narrabeen series geology (Bell & Stables 2012). The ecological community has been recorded from the local government areas of Pittwater and Gosford, within the Sydney Basin Bioregion, and may occur elsewhere in the Bioregion."

Upon review of soil landscape mapping, the subject site was identified to occur within the "Erina" soil landscape which is a Narrabeen group soil landscape characterised by fine-grained sandstones and shales on undulating low hills (Chapman, Murphy et al. 2005). The soil landscape mapped across the subject site is consistent with that described in the PWSGF final determination. Furthermore, mapped occurrences of PWSGF within 1 km of the subject site also occur on the "Erina" soil landscape.

iv. Conclusion

As described above, the scattered locally native trees within the subject site are consistent with the final determination for PWSGF and as such are considered to comprise the TEC. The location of the TEC within the

subject site is consistent with the distribution of PCT 1214 – Pittwater Spotted Gum forest as shown in **Figure 5.**

3.2.2. Planted Native Vegetation

BC Act Status: None

EPBC Act Status: None

PCT: None

The upper canopy of this community is dominated by likely planted, non-endemic natives that do not conform to PCT 1214, including single individuals of *Eucalyptus saligna* (Blue Gum*),* and *Eucalyptus bicostata* (Southern Blue Gum). Other non-endemic natives such as *Macadamia tetraphylla* (Rough-shelled Queensland Nut), *Macadamia integrifolia* (bush nut), *Brachychiton acerifolius* (Flame tree), *Callistemon citrinus, Callistemon saligna* and *Melaleuca styphelioides* also contribute to this vegetation community. This vegetation community is shown in **Photograph 2**.

Photograph 2 Planted native vegetation within the subject site

3.2.3. Exotic Vegetation

BC Act Status: None

EPBC Act Status: None

PCT: None

This community occurs across the subject site in the form of a diverse array of planted Exotic Trees and shrubs in garden beds and along boundaries. The most numerous canopy species in this community is *Jacaranda mimosa* (Jacaranda) which occurs throughout, with scattered planted individual *Syagrus romanzoffiana* (Cocos Island Palm), *Cinnamomum camphora* (Camphor Laurel), as well as *Ligustrum lucidum* (Large-Leaved Privet) and *Hymenosporum flavum* (Frangipani).

The ground cover within the garden beds are composed of a wide range of domesticated plants; the most populous being *Agapanthus praecox* (Africasn lily), Fishbone fern (*Nephrolepis cordifolia*), *Dietes iridioides* (*African Iris*) and Hedera helix (*English Ivy*). This vegetation community is shown in **Photograph 3**.

Photograph 3 Exotic Vegetation within the subject site

3.2.4. Exotic Dominated Grassland

BC Act Status: None

EPBC Act Status: None

PCT: None

This community occurs within the subject site as mowed lawn areas and overgrown open areas.

The ground layer in the lawn areas are mostly dominated by the exotic lawn grasses *Stenotaphrum secundatum* (Buffalo Grass), *Cenchrus clandestinus* (Kikuyu Grass) with a scattered sublayer of the natives *Oplismenus aemulus* (Australian basket Grass). A number of forbs also occur across the exotic grassland including *Taraxacum officinal*e (Dandelion), *Hypochaeris radicata* (Catsear), *Sida rhombifolia* (Paddy's Lucern) and *Bidens pilosa* (Cobblers pegs).

Photograph 4 Exotic dominated grassland within the subject site

3.3. Flora

3.3.1. General Species

A total of 131 species were recorded within the subject site during field surveys, including 52 native species (40%) and 79 exotic species (60%). Of the native species recorded in subject site, the most frequently recorded plant family was Myrtaceae (15 species), followed by Proteaceae (four species) families. Of the exotic species recorded in the subject site, the most frequently recorded plant family was Poaceae (eight species). A total species list for the subject site is provided in **Appendix A**.

3.3.1.1. Significant Weeds

The subject site contains numerous significant weeds with 11 exotic species listed as weeds of other regional concern, five listed as state priority weeds and one listed as a regional priority weed under the Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022 under the NSW *Biosecurity Act 2015 (Local Land Services 2019)*. The subject site also contains four exotic species listed as weeds of national significance and 13 listed as high threat weeds in accordance with the BAM. Significant weeds that are present within the subject site are shown in **Table 2**.

Table 2 Significant weeds within the subject site

Family	Scientific Name	Common Name	BA Status	High Weed	Threat	WoNS
Alliaceae	*Agapanthus praecox*		OWRC			
Basellaceae	*Anredera cordifolia*	Madeira Vine	SPW	Yes		Yes

Family	Scientific Name	Common Name	BA Status	High Threat Weed	WoNS
Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern	SPW	Yes	Yes
Asparagaceae	*Asparagus asparagoides*	Bridal Creeper	SPW	Yes	Yes
Asparagaceae	*Asparagus setaceus*	Climbing Asparagus Fern	SPW		
Asteraceae	*Bidens pilosa*	Cobbler's Pegs		Yes	
Sapindaceae	*Cardiospermum halicacabum*	Small Balloon Vine	OWRC		
Solanaceae	*Cestrum parqui*	Green Cestrum	RPW	Yes	
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	OWRC		
Poaceae	*Ehrharta erecta*	Panic Veldtgrass		Yes	
Araliaceae	*Hedera helix*	English Ivy		Yes	
Verbenaceae	*Lantana camara*	Lantana	SPW		Yes
Oleaceae	*Ligustrum lucidum*	Large-leaved Privet	OWRC	Yes	
Oleaceae	*Ligustrum sinense*	Small-leaved Privet	OWRC	Yes	
Ochnaceae	*Ochna serrulata*	Mickey Mouse Plant	OWRC	Yes	
Convallariaceae	*Ophiopogon japonicus*	Dwarf lilyturf			
Cactaceae	*Opuntia* spp.			Yes	
Poaceae	*Paspalum dilatatum*	Paspalum		Yes	
Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	OWRC		
Araliaceae	*Schefflera actinophylla*	Umbrella Tree	OWRC		
Fabaceae (Caesalpinioideae)	*Senna pendula*		OWRC		
Arecaceae	*Syagrus romanzoffiana*	Cocos Palm	OWRC		
Commelinaceae	*Tradescantia fluminensis*	Wandering Jew	OWRC	Yes	

Key: BA = Biosecurity Act, WoNS = Weed of National Significance, OWRP = Other weed of regional priority, SPW = State priority weed, RPW = Regional priority weed

3.3.2. Threatened Flora Species

The subject site contains a number of planted *Macadamia tetraphylla* (Rough Shelled Bush Nut) and *Macadamia integrifolia* (Macadamia Nut). *Macadamia tetraphylla* is endemic to areas north of the Clarence River in the Richmond and Tweed Valleys and is listed as Vulnerable under the BC Act and EPBC Act and is commonly planted for its edible nuts. Similarly, *M. integrifolia* is endemic to Queensland and is commonly planted for its edible nuts. It is listed as endangered under the EPBC Act only. These species are not endemic

to the Greater Sydney Region, and the individuals have been planted within a garden context, they are not considered to be natural components of the landscape. Therefore, this species have not been considered further within this assessment.

A total of 19 threatened flora species are known to occur within 5 km of the subject site according to the BioNet Atlas of Australia (EES 2021). No other records of threatened flora species exist within the subject site and no threatened flora species were identified on the subject site during surveys. Two species were identified as having the potential to occur, *Rhodamnia rubescens* (Scrub Turpentine) and *Syzygium paniculatum* (Magenta Lilly Pilly) but were not detected during surveys. *Rhodamnia rubescens* is listed as Critically Endangered under the BC Act and *Syzygium paniculatum* is listed as Endangered under the BC Act and as Vulnerable under the EPBC Act.

Rhodamnia rubescens has been recorded 30 times within the locality and *Syzygium paniculatum* has been recorded 20 times within the locality. The vast majority of these records are located within larger tracts of native dominated vegetation located approximately 1 km or further from the subject site. This vegetation will remain and continue to provide habitat for the threatened species with potential to occur in the subject site. Consequently, the likely future development is not expected to have a significant impact on threatened flora species, and they have not been considered further within this assessment.

3.4. Fauna

3.4.1. Fauna Habitat

The primary habitat for native fauna within the subject site consists of the existing native and exotic vegetation. This vegetation within the subject site is likely to comprise foraging habitat to be utilised on an occasional and opportunistic basis by highly mobile or aerial fauna species as part of a larger foraging range.

Habitat features recorded within the subject site are summarised below and shown in **Figure 5**. Specific habitat features are described in **Table 3**.

- Hollow-bearing trees and arboreal termite nests (**Photograph 5**): provide roosting/breeding habitat for birds, reptiles, bats and arboreal mammals; and
- Nectar-producing trees: foraging habitat for insects, blossom-dependant birds, arboreal mammals and megachiropteran bats (flying-foxes).

Table 3 Habitat features within the subject site

Habitat Feature	Habitat Category	Tree Species (if applicable)	Notes
1	Hollow-bearing Tree (5-15 cm)	*Eucalyptus pilularis*	Bears a ~15 cm diameter hollow. May offer suitable nesting/roosting habitat for birds and arboreal mammals.
2	Hollow-bearing Stag (>15 cm)	Deceased Tree	Bears a ~20 cm diameter hollow and multiple small hollows. May offer suitable

Habitat Feature	Habitat Category	Tree Species (if applicable)	Notes
			nesting/roosting habitat for birds and arboreal mammals and microchiropteran bats.
3	Hollow-bearing Tree (>15 cm)	*Eucalyptus bicostata*	Bears a ~20 cm diameter vertical hollow. May offer suitable nesting/roosting habitat for birds and arboreal mammals.
4	Hollow-bearing Tree (<5 cm)	*Eucalyptus punctata*	Vertical fissures and dead branches with small openings. May offer suitable roosting/refuge habitat for microchiropteran bats.
5	Arboreal Termite Nest	*Eucalyptus paniculata*	Termite nest with large opening
6	Arboreal Termite Nest	*Eucalyptus paniculata*	Termite nest with large opening
7	Hollow-bearing Tree (5-15 cm)	*Fraxinus angustifolius*	Bears a ~15 cm diameter hollow at chest height. May offer lower quality nesting/roosting habitat for birds and arboreal mammals due to its low height.

Photograph 5 Hollow-bearing tree within the subject site

3.4.2. General Species

Seven vertebrate fauna species have been recorded from the subject site during surveys. A fauna species list for the subject site is provided in **Table 3**.

Table 4 Fauna species list

Family	Common Name	Scientific Name	Detection Method
Aves			
Cacatuidae	Sulphur-crested Cockatoo	*Cacatua galerita*	O/W
Alcedinidae	Kookaburra	*Dacelo novaeguineae*	O/W
Psittaculidae	Rainbow Lorikeet	*Trichoglossus moluccanus*	O/W
Meliphagidae	Noisy Miner	*Marinora melanocephala*	O/W
Corvidae	Australian Raven	*Corvus coronoides*	O/W
Reptilia			
Colubridae	Australian Tree Snake	*Dendrelaphis punculatus*	O

Detection Method: O = Observed, W = Heard

3.4.3. Threatened Fauna Species

In total, 66 threatened fauna species (excluding marine species) have been recorded within the locality of the subject site according to the BioNet Atlas of Australia (EES 2021). The BioNet Atlas does not hold any records of threatened fauna species within the subject site. No threatened fauna species were detected during the current surveys.

Several highly mobile or aerial threatened fauna species are known to occur within a 5 km radius of the subject site and may occasionally and opportunistically forage within the available habitat as part of a larger foraging range. Sessile or immobile threatened fauna species would be unlikely to utilise the habitat within the subject site due to a lack of habitat connectivity. The threatened fauna species with the greatest likelihood of occurrence are listed below:

- Large Forest Owls including:
    - Barking Owl (*Ninox connivens*);
    - Powerful Owl (*Ninox strenua*);
- Microchiropteran bats including:
    - Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*);
    - Eastern False Pipistrelle (*Falsistrellus tasmaniensis*);
    - Large Bent-winged Bat (Miniopterus orianae oceanensis);
    - Large-eared Pied Bat (*Chalinolobus dwyeri*);
    - Little Bent-winged Bat (*Miniopterus australis*); and
- Grey-headed Flying-fox (*Pteropus poliocephalus*);

3.4.4. Significance of Available Habitat

The subject site is not considered to constitute significant breeding habitat for threatened fauna. The groups of fauna most likely to utilise the habitat within the subject site include Large Forest Owls, microchiropteran bats and the Grey-headed Flying Fox. These species are all aerial and highly mobile and would be anticipated to utilise the foraging resources within the subject site on a seasonal, occasional or opportunistic basis as part of a larger foraging range. No threatened fauna species would be solely reliant on the habitat within the subject site.

3.4.4.1. Large Forest Owls

The large forest owls species known to occur within the locality would utilise the subject site as breeding habitat due to its highly urbanised setting and a lack of suitably sized hollows. According to the Recovery Plan for Large Forest Owls, hollows with an entry diameter of 40 cm wide and greater than 100 cm deep are required for breeding for the Powerful Owl, Barking Owl and Masked Owl (DEC (NSW) 2006). Subsequently, the subject site is considered to constitute foraging habitat for Large Forest Owls.

3.4.4.2. Microchiropteran Bats

The majority of locally occurring microchiropteran bats breed in maternity caves and would not utilise the subject site as breeding habitat. Cave breeding species known to the locality include the Large Bent-winged Bat, the Little Bent-winged Bat and the Large-eared Pied Bat. The Eastern False Pipistrelle and the Eastern Coastal Free-tailed Bat utilise tree-hollows as roosting habitat and subsequently, the hollow-bearing trees within the subject site may constitute roosting habitat for these species. All of the aforementioned microchiropteran bats would be expected to forage for insects in the native canopy of the subject site.

3.4.4.3. Grey-headed Flying Fox

The subject site does not contain a Grey-headed Flying Fox camp and would therefore only constitute foraging habitat. The Grey-headed Flying Fox would be expected to forage within the subject site on a seasonal or opportunistic basis most likely when the native canopy is in bloom.

4. Discussion

4.1. Potential Ecological Impacts

This chapter considers the potential ecological impacts of likely future development on the biodiversity values within the subject site. The ecological impacts of likely future development will involve the direct disturbance of vegetation and associated habitat loss. The likely future development is located within the area of the subject site currently occupied by existing dwelling and associated cleared land, exotic grasslands and planted native and exotic vegetation. The likely future development is also anticipated to result in the partial removal of the PCT 1214 within the subject site. Areas within the subject site that are proposed to be impacted as a result of likely future development are provided in **Table 4**. The likely future development within the subject site may additionally result in indirect impacts are also relevant and are discussed below.

Table 5 Potential impacts of the likely future development

Vegetation Community	Subject Site (ha)	Indicative Impacts (ha)	Indicative Retention (ha)	Indicative Retention (%)
PCT 1214 - Pittwater Spotted Gum Forest	0.19	0.09	0.09	47%
Planted Native Vegetation	0.04	0.04	0.00	0%
Exotic Vegetation	0.17	0.11	0.06	35%
Exotic Dominated Grassland	0.05	0.04	0.01	20%
Cleared Land	0.17	0.16	0.01	6%
Total	**0.62**	**0.44**	**0.17**	**27%**

**Due to rounding, numbers presented in this table and throughout this document may not add up precisely to totals shown.*

4.1.1. Direct Impacts

The direct impacts of the likely future development includes clearing within the development footprint, and removal of associated habitat. The extent of impacts from the proposed development on vegetation communities within the subject site will not extend beyond the indicative development footprint. These impacts are proposed to be ameliorated through the retention of native vegetation outside of the development footprint and re-establishment of native understorey within the retained Pittwater Spotted Gum Forest. It is also noted that two significant trees associated with PWSGF are proposed to be retained within the indicative development footprint as shown in **Figure 5**.

4.1.1.1. Vegetation Removal within the Development Footprint

The earthworks and construction of new dwellings will result in localised soil disturbance and the removal of vegetation and associated habitat within the indicative development footprint as shown in **Figure 5.** The area proposed for development has been historically cleared and the native trees within the subject site do not have an intact understorey. Subsequently, the project will involve direct impacts to a 0.09 ha area of PCT 1214 and a 0.04 ha area of Planted Native Vegetation.

4.1.1.2. Habitat Feature Removal

The likely future development will require the removal of nectar-producing trees and shrubs which may constitute foraging habitat for insects, blossom-dependant birds, arboreal mammals and megachiropteran bats (flying-foxes). The likely future development may result in the removal of up to four habitat trees. These habitat features may represent potential habitat for tree hollow roosting microchiropteran bats and small birds. This impact can be ameliorated through the installation of nest-boxes throughout retained vegetation as described in *Section 4.7*.

4.1.2. Indirect Impacts

The indirect impacts of the likely future development are anticipated to occur in areas throughout the subject site situated directly adjacent to the indicative development footprint.

4.1.2.1. Edge Effects

Edge effects are impacts that occur at the interface between natural habitats, especially forests and disturbed or developed land (Yahner 1988). When an edge is created between woodland and a cleared area, changes to ecological processes within the vegetation can extend between 10 m and 100 m from the edge (Yahner 1988). These include microclimatic changes in light, temperature, humidity and wind, which can favour a suite of different species and therefore cause significant changes to the ecology of the patch (Lindenmayer and Fischer 2006). Edge effects can also result from the increase in noise and artificial light from a project.

The likely future development is not considered likely to result in significant edge effects to vegetation due to the currently degraded condition of the available habitat within the subject site.

4.1.2.2. Construction Impacts

A number of indirect impacts relevant to the construction phase of the likely future development have the potential to impact the remaining ecological values of the subject site, such as those relating to dust, noise, light and erosion.

4.1.2.3. Noise

Noise can affect animal physiology and behaviour, and if it becomes an ongoing stress, it can be injurious to an animal's energy budget, reproductive success and long-term survival. There are other potential impacts that include habitat loss through avoidance, reduced reproductive success and a retreat away from favourable habitats (AMEC 2005).

It is likely that most animal species will habituate to the periodic noise disturbance (AMEC 2005), and the construction phases of the likely future development are likely to cause only temporary disturbance only to occurring fauna. It is unlikely that noise levels will have a significant, long-term, impact on any wildlife populations.

4.1.2.4. Light

The likely future development has the potential to increase the level of artificial light in the natural environment. Increased light levels may adversely impact wildlife by direct glare, chronic or periodic increased illumination and temporary unexpected fluctuations in light levels (Saleh 2007, Longcore and Rich 2010).

While the likely future development will have some effect on the surrounding environment, the impacts from light pollution are likely to be minimal. The subject site is located in an urban environment that is currently subject to high levels of artificial light. Any minimal increase in light levels is expected to be localised to the subject site. Light pollution from the Likely future development is unlikely to have a significant or long-term impact on any fauna species.

4.1.2.5. Sedimentation and Erosion

During the construction of the proposed likely future development the retained vegetation can be impacted by sedimentation and erosion. Cutting and filling of the subject site for foundations is likely to increase potential erosion. Eroded sediment can smother retained vegetation if appropriate control measures are not implemented. Smothering can reduce regeneration of groundcover species and enter drainage lines. Sediment and eroded material can also contain weed matter and nutrients, and movement of this material into the retained vegetation can facilitate the spread of weeds. Increased weed invasion can result in changes to community composition. With the implementation of appropriate sediment control methods, the risk of sedimentation is considered to be minor and manageable.

4.1.3. Indirect impacts upon Threatened Fauna Species

The likely future development has the potential to result in a number of direct and indirect impacts to the habitat of potentially occurring threatened fauna species within the subject site. In addition to the direct removal of habitat within the subject site, potential indirect impacts to fauna habitat include:

- Habitat disturbance during the construction phase of the likely future development (e.g. changes in noise);
- Erosion and sedimentation; and
- Modification of microhabitat features resulting from long and short-term edge effects (e.g. changes in light filtration).

A number of these impacts are already present within the subject site due to previous clearing and residential land use. The potential changes to the adjoining habitat resulting from indirect impacts are expected to be localised and overall are not considered to cause a substantial change in the habitat of the potentially occurring threatened fauna species. A number of indicative mitigation measures are provided in *Section 4.2* to minimise impacts upon threatened fauna for the likely future development.

4.2. Avoidance and Mitigation Measures

The purpose of this section is to outline a suite of indicative avoidance and mitigation measures that are proposed to minimise the impacts of the likely future development upon the biodiversity values of the subject site and subject site. As demonstrated in previous chapters, despite the subject site being highly modified as a result of previous development, it provides foraging habitat for threatened species. As a result, it is anticipated that there will be a need to implement measures to minimise impacts to these entities. These measures will be described in further detail within the relevant biodiversity assessment at the DA stage.

4.2.1. Vegetation Retention

A 0.09 ha area of PCT 1214 is proposed to be retained within the subject site. This area is comprised of a 0.07 ha area of PCT 1214 entirely outside of the indicative development footprint and a further 0.02 ha area within the development footprint earmarked for retention, subject to further arborist assessment and approval at the DA stage of the project. It is noted that the PCT 1214 to be retained is located along the southern boundary of the subject site, bearing connectivity to the native vegetation within the adjacent lot. Out of the native vegetation occurrence throughout the subject site, the area of PCT1214 to be retained is of the highest ecological retention value and will serve to maintain a degree of linkage throughout the urban landscape.

The area of vegetation to be retained is proposed to be further enhanced with the establishment of understorey replanting and the replacement of a 0.08 ha area of land comprising Exotic Vegetation, Exotic Dominated Grassland and Cleared Land with native landscape plantings as described in *Section 4.2.6*.

4.2.2. Inductions

Site inductions are to be given by the civil contractor to ensure all site workers and visitors are aware of ecological issues associated with the subject site and the location of any restricted access areas.

4.2.3. Access Restrictions

To avoid unnecessary removal or damage to vegetation to be retained adjacent to the subject site, the clearing area should be clearly demarcated and signed to ensure no vegetation beyond these boundaries is removed. Clearing works and equipment should be excluded from areas outside the clearing area.

4.2.4. Erosion, Sedimentation and Pollution Control

To reduce sedimentation on the construction site, erosion control measures should be implemented. This includes minimising the amount of exposed soils on the site at any given time. All soil stockpiles should be adequately covered when not in use to prevent erosion through heavy rainfall.

Sediment fences should be established around the perimeter of the development area to prevent the impacts of sedimentation on adjoining vegetation and the adjacent drainage line. During development, precautions should be taken to ensure that no pollution, such as petrochemical substances or water containing suspended solids, escapes the construction site. Pollution traps and efficient removal of pollution to an off-site location would help to minimise pollution impacts.

4.2.5. Pre-clearing and Clearing Surveys

Pre-clearing surveys are to be undertaken by a suitably qualified ecologist if trees are to be removed as a result of the likely future development. Pre-clearing surveys will include the provision of a report following the completion of a pre-clearing survey, detailing the location and type of each habitat feature.

To minimise impacts to native fauna species, clearing is to be undertaken in the following two-stage process under the supervision of a suitably qualified ecologist:

- The initial phase of clearing will involve clearing around identified habitat features and leaving the features overnight; and

- The second stage will involve clearing of the habitat features left overnight followed by an inspection.

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

- All persons working on the vegetation clearing will be briefed about the possible fauna present and should avoid injuring any present;
- Animals disturbed or dislodged during the clearance but not injured should be assisted to move to the adjacent bushland; and
- If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal.

4.2.6. Landscaping and Understorey Replanting

The landscaping area of the proposed development presents an opportunity for revegetation of the subject site with characteristic species of the Pittwater Spotted Gum Forest TEC. For any landscaping works to be undertaken, it is recommended that characteristic species of Pittwater Spotted Gum Forest be utilised where possible. A 0.17 ha area of land within the subject site has been earmarked for landscaping. This area is comprised of a 0.09 ha area of PCT 1214 indicated for retention, and the remaining 0.08 ha area of land outside of the development footprint currently occupied by Exotic Vegetation, Exotic Dominated Grassland and Cleared Land.

For landscape areas outside of the area indicated for drainage works, flora species for planting are recommended to be selected from the characteristic species listed in the PWSGF final determination (EES 2013). For landscape areas within the area indicated for drainage works, native flora species adapted to periodic inundation, known from the Northern Beaches LGA are recommended to be chosen for planting.

All plants to be planted should be of local provenance (if possible, from within a 10 km radius of the subject site) and sourced from nurseries that specialise in growing seedlings of native plants with seed sourced from bushland within the locality. This is to avoid planting of cultivars that are human created, and not genetically representative of species as they naturally occur in the locality. All plants will be disease and pest-free, hardened off and well-watered at the time of planting. All plants are to be provided in a healthy condition. They must have good root development and a sturdy shoot system.

The proposed understorey plantings will restore the floristic diversity and associated habitat that has been absent since the subject property was cleared. This will result in enhanced habitat values in the longer term for locally native fauna groups including small birds, microchiropteran bats, arboreal mammals and reptiles.

4.2.7. Weed Control Measures

Significant weed species occurring within the subject site should be managed in order to prevent further spread. As such, it is recommended that all exotic vegetation removed from the subject site should be disposed of appropriately as identified in the Regional Strategic Weed Management Plan. Specific weed management practices must be applied to the significant weeds listed in **Table 2**.

4.2.8. Nest-box Installation

The total number of tree hollows removed by the proposed development will be recorded during pre-clearance surveys. In order to compensate for the loss of tree hollows, an equal or greater number of nest boxes will be installed to the number of tree hollows removed within areas of nearby habitat proposed to be retained. All nest boxes should be installed under the supervision of an ecologist in appropriate locations prior to undertaking clearing works. This will allow for any rescued fauna to be placed into installed nest boxes if the individual(s) are deemed to be uninjured during the clearing works. Provision of a report following the installation of nest boxes will be provided detailing the total number installed, their locations and number/type of species relocated. This report may form part of the clearing report detailed above.

4.3. Future Assessment Requirements

4.3.1. EPBC Act Requirements

Threatened species, populations and communities listed under the EPBC Act that are considered to be directly or indirectly impacted by the proposed development should be assessed in accordance with the *Matters of National Environmental Significance Significant Impact Guidelines 1.1* (DoE, 2013). If a development is considered to significantly impact any MNES, then a referral would be required to be submitted.

Based on the known ecological values of the subject site, it is unlikely that a proposed development would result in a significant impact to any MNES. As such, no referral would be required for the proposed development.

4.3.2. BC Act Requirements

4.3.2.1. Biodiversity Offsets Scheme Entry Thresholds

To determine the type of assessment required for a future development under Part 4 (Local Development) of the EP&A Act, it is necessary to determine whether the proposed development triggers the BOS. For the proposed development to trigger the BOS, it would need to be considered as likely to significantly affect threatened species, which could occur as follows:

- It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test of significance in Section 7.3 of the BC Act;
- It exceeds the biodiversity offsets scheme threshold according to Clause 7.1 of the BC Regulation, with the thresholds being:
    - The clearing of native vegetation of an area above a prescribed threshold based on the minimum lot size; or
    - The clearing of native vegetation, or other prescribed action, on land included on the Biodiversity Values Map.
- It is carried out in a declared area of outstanding biodiversity value (AOBV).

A test of significance, for PWSGF and potentially occurring threatened fauna species, in accordance with Section 7.3 of the BC Act has been undertaken for the likely future development and is provided in **Appendix C**. This assessment of significance concluded that a significant impact would not occur as a result of the development. Notwithstanding this conclusion, any future development application lodged for the future development of the subject site would need to prepare a test of significance in accordance with Section 7.3 of the BC Act in the event that the BOS was not triggered by another mechanism.

The subject site comprises Lots 1-5, DP 11108, which have a minimum lot size of 700 m^2 (0.07 ha). Based on the areas of clearing thresholds outlined within the BC Regulation, and reproduced in **Table 6**, the BOS would be triggered if the proposed development cleared ≥0.25 ha of native vegetation. If the clearing of native vegetation for a proposed development was <0.25 ha, then the BOS would not be triggered by this mechanism. As the subject site contains a total of 0.23 ha of native vegetation, of which, 0.13 ha is indicated to be impacted, the BOS will not be triggered by this mechanism, taking into consideration the 0.09 ha area of native vegetation to be retained.

Table 6 Area of clearing thresholds

Minimum Lot Size of Land	Area of Clearing
Less than 1 hectare	**0.25 hectares or more**
Less than 40 hectares but not less than 1 hectare	0.5 hectares or more
Less than 1,000 hectares but not less than 40 hectares	1 hectare or more
1,000 hectares or more	2 hectares or more

The subject site is not currently mapped on the Biodiversity Values Map as of 2 July 2021. Therefore, the BOS is not currently triggered by this mechanism. As the Biodiversity Values Map is subject to regular updates, it would need to be consulted during the development application process.

The subject site is not currently mapped as an AOBV. Therefore, the BOS is not currently triggered by this mechanism. Although unlikely to be included in the near future, the list of AOBVs would need to be consulted during the development application process.

i. Conclusion

The impacts of project are proposed to be assessed in greater detail at the DA stage with a Flora and Fauna Assessment (FFA), prepared by a suitably experienced and qualified ecological consultant.

5. Conclusion

This report supports a planning proposal seeking to amend the LEP to change the zoning for the subject site from R2 – Low Density Residential to R3 – Medium Density Residential to facilitate a higher density development. The biodiversity values of the subject site and potential ecological impacts of likely future development have been assessed at a high level.

The subject site currently contains 0.19 ha of PCT 1214 Pittwater Spotted Gum forest, consistent with the Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion, listed as endangered under the BC Act. The remainder of the subject site is comprised of Planted Native Vegetation (0.04 ha), Exotic Vegetation (0.17 ha), Exotic Dominated Grassland (0.05 ha) and Cleared Land (0.17 ha). The likely future development is anticipated to result in impacts to a 0.09 ha of PCT 1214, 0.04 ha of Planted Native Vegetation, 0.11 ha of Exotic Vegetation and 0.04 ha of Exotic Dominated Grassland.

The PWSGF vegetation throughout the subject site comprises potential foraging habitat for several aerial and highly mobile threatened fauna species as part of a broader habitat range. These species are unlikely to be dependent on the resources present in the subject site. A Test of Significance has been prepared for Pittwater Spotted Gum Forest which indicated that a significant impact is unlikely to occur based on the indicative footprint of the likely future development. This preliminary ecological assessment indicates that issues relating to threatened species and threatened ecological communities are manageable and not significant. Notwithstanding this, a suite of mitigation measures are proposed to minimise the impacts on biodiversity values for the likely future development. The impacts of the likely future development and any applicable mitigation measures will need to be re-evaluated at the DA stage of the project.

A 0.09 ha area of PCT 1214 is proposed to be retained. This area of vegetation is located along the southern boundary of the subject site, bearing connectivity to the native vegetation within the adjacent lot. Out of the native vegetation occurrence throughout the subject site, the area of PCT1214 to be retained is of the highest ecological retention value and will serve to maintain a degree of linkage throughout the urban landscape. The area of vegetation to be retained is proposed to be further enhanced with the establishment of understorey replanting and the replacement of a 0.08 ha area of Exotic Vegetation, Exotic Dominated Grassland and Cleared Land with native landscape plantings with characteristic species of the Pittwater Spotted Gum Forest TEC.

It is unlikely that future development of the subject site will trigger the Biodiversity Offsets Scheme and require the preparation of a Biodiversity Development Assessment Report in accordance with the Biodiversity Assessment Method and no referral to the commonwealth is required. The impacts of the project are proposed to be assessed in detailed within a Flora and Fauna Assessment at the Development Application stage by a suitably qualified and experienced ecologist.

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APPENDIX A :
Flora Species List

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Table 7 Flora Species List

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Exotic	RMS 1	RMS 2	RMS 3	RMS 4	RMS 5	P1 Cover	P1 Abundance
Acanthaceae	*Hypoestes phyllostachya*				*				x			
Agavaceae	*Agave* spp.				*	x						
Alismataceae	*Sagittaria* spp.				*				x			
Alliaceae	*Agapanthus praecox*				*	x				x		
Amaranthaceae	*Alternanthera* spp.	Joyweed					x					
Amaryllidaceae	*Clivia spp.*				*		x				0.1	1
Anthericaceae	*Chlorophytum comosum*	Spider Plant			*	x						
Apiaceae	*Centella asiatica*	Indian Pennywort								x		
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery			*				x			
Apocynaceae	*Nerium oleander*	Oleander			*	x						
Apocynaceae	*Plumeria rubra*	Frangipani			*	x	x			x		
Araceae	*Monstera deliciosa*	Fruit Salad Plant			*	x					0.1	1
Araceae	*Syngonium spp.*				*						1	30
Araliaceae	*Hedera helix*	English Ivy			*	x						
Araliaceae	*Schefflera actinophylla*	Umbrella Tree			*		x					
Araliaceae	*Schefflera arboricola*				*					x	0.1	1

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Exotic	RMS 1	RMS 2	RMS 3	RMS 4	RMS 5	P1 Cover	P1 Abundance
Arecaceae	*Livistona australis*	Cabbage Palm				x	x			x		
Arecaceae	*Phoenix canariensis*	Canary Island Date Palm			*				x	x		
Arecaceae	*Syagrus romanzoffiana*	Cocos Palm			*				x	x	0.2	3
Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern			*	x						
Asparagaceae	*Asparagus asparagoides*	Bridal Creeper			*					x		
Asparagaceae	*Asparagus setaceus*	Climbing Asparagus Fern			*		x	x				
Aspleniaceae	*Asplenium australasicum*	Bird's Nest Fern					x					
Asteraceae	*Bidens pilosa*	Cobbler's Pegs			*		x		x		0.5	20
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane			*	x					0.2	10
Asteraceae	*Conyza sumatrensis*	Tall fleabane			*					x	0.1	6
Asteraceae	*Hypochoeris radicata*	Catsear			*						0.1	20
Asteraceae	*Sonchus asper*	Prickly Sowthistle			*					x		
Asteraceae	*Sonchus oleraceus*	Common Sowthistle			*			x	x		0.1	6
Asteraceae	*Taraxacum officinale*	Dandelion			*	x					0.1	20
Basellaceae	*Anredera cordifolia*	Madeira Vine			*		x	x	x		0.25	5
Bignoniaceae	*Jacaranda mimosifolia*	Jacaranda			*	x			x	x	0.2	1

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Exotic	RMS 1	RMS 2	RMS 3	RMS 4	RMS 5	P1 Cover	P1 Abundance
Cactaceae	*Cereus uruguayanus*	Apple Cactus			*	x						
Cactaceae	*Opuntia* spp.				*	x						
Campanulaceae	*Pratia purpurascens*	whiteroot									0.1	30
Caprifoliaceae	*Abelia x grandiflora*				*	x						
Caricaceae	*Carica papaya*	Papaya, Pawpaw			*	x						
Casuarinaceae	*Casuarina glauca*	Swamp Oak				x						
Commelinaceae	*Commelina cyanea*	Native Wandering Jew				x			x		1	20
Commelinaceae	*Tradescantia fluminensis*	Wandering Jew			*		x		x		2	100
Convallariaceae	*Ophiopogon japonicus*	Dwarf lilyturf			*	x						
Convolvulaceae	*Dichondra repens*	Kidney Weed						x			8	200
Cucurbitaceae	*Cucumis* spp.							x			5	5
Cunoniaceae	*Ceratopetalum gummiferum*	Christmas Bush				x	x					
Cyperaceae	*Cyperus aggregatus*				*				x		2	100
Cyperaceae	*Cyperus gracilis*	Slender Flat-sedge					x		x		5	200
Davalliaceae	*Nephrolepis cordifolia*	Fishbone Fern				x						
Fabaceae (Caesalpinioideae)	*Senna pendula*				*	x				x		

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Exotic	RMS 1	RMS 2	RMS 3	RMS 4	RMS 5	P1 Cover	P1 Abundance
Fabaceae (Faboideae)	*Trifolium* spp.				*			x				
Geraniaceae	*Geranium homeanum*										0.5	200
Iridaceae	*Dietes bicolor*				*				x		0.1	1
Iridaceae	*Iris* spp.				*	x						
Lamiaceae	*Mentha* spp.							x				
Lauraceae	*Cinnamomum camphora*	Camphor Laurel			*	x						
Lythraceae	*Lagerstroemia indica*				*	x	x					
Magnoliaceae	*Magnolia grandiflora*	Southern Magnolia			*	x	x					
Malvaceae	*Brachychiton acerifolius*	Illawarra Flame Tree								x		
Malvaceae	*Hibiscus* spp.					x	x	x				
Malvaceae	*Malva parviflora*	Small-flowered Mallow			*						0.1	10
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow			*				x			
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne			*			x	x		0.5	50
Meliaceae	*Melia azedarach*	White Cedar					x					
Moraceae	*Ficus benjamina*	Weeping Fig			*	x						
Moraceae	*Ficus coronata*	Creek Sandpaper Fig					x				0.2	2
Moraceae	*Ficus lyrata*				*			x				
Moraceae	*Morus alba*	White Mulberry			*				x	x	2	1

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Exotic	RMS 1	RMS 2	RMS 3	RMS 4	RMS 5	P1 Cover	P1 Abundance
Musaceae	*Musa* spp.	Banana			*		x	x			0.2	1
Myrtaceae	*Callistemon citrinus*	Crimson Bottlebrush					x					
Myrtaceae	*Callistemon salignus*	Willow Bottlebrush				x						
Myrtaceae	*Callistemon* spp.					x						
Myrtaceae	*Corymbia citriodora*	Lemon-scented Gum			*				x			
Myrtaceae	*Corymbia maculata*	Spotted Gum							x			
Myrtaceae	*Eucalyptus paniculata*	Grey Ironbark					x	x			40	3
Myrtaceae	*Eucalyptus pilularis*	Blackbutt				x					20	1
Myrtaceae	*Eucalyptus punctata*	Grey Gum					x	x				
Myrtaceae	*Eucalyptus saligna*	Sydney Blue Gum				x						
Myrtaceae	*Leptospermum petersonii*	Lemon-scented Teatree					x					
Myrtaceae	*Lophostemon confertus*	Brush Box				x						
Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved Paperbark				x						
Myrtaceae	*Melaleuca* spp.					x	x					
Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree				x						
Myrtaceae	*Syzygium australe*	Brush Cherry					x					
Nandinaceae	*Nandina domestica*	Japanese Sacred Bamboo			*		x			x		

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Exotic	RMS 1	RMS 2	RMS 3	RMS 4	RMS 5	P1 Cover	P1 Abundance
Nyctaginaceae	*Bougainvillea* spp.				*	x						
Ochnaceae	*Ochna serrulata*	Mickey Mouse Plant			*	x	x					
Oleaceae	*Fraxinus angustifolia*	Desert Ash			*					x		
Oleaceae	*Jasminum* spp.					x						
Oleaceae	*Ligustrum lucidum*	Large-leaved Privet			*	x				x		
Oleaceae	*Ligustrum sinense*	Small-leaved Privet			*					x		
Orchidaceae	*Dendrobium speciosum*	Rock Lily					x					
Orchidaceae	*Epidendrum ibaguense*	Crucifix Orchid			*		x					
Oxalidaceae	*Oxalis perennans*							x			8	400
Oxalidaceae	*Oxalis* spp.										0.5	20
Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree				x						
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum				x				x		
Poaceae	*Bouteloua dactyloides*	Buffalo Grass			*	x		x	x		80	1000
Poaceae	*Bromus catharticus*	Praire Grass			*					x		
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass			*				x			
Poaceae	*Cynodon dactylon*	Common Couch				x					0.5	100
Poaceae	*Ehrharta erecta*	Panic Veldtgrass			*				x	x	10	200
Poaceae	*Lolium perenne*	Perennial Ryegrass			*						3	200

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Exotic	RMS 1	RMS 2	RMS 3	RMS 4	RMS 5	P1 Cover	P1 Abundance
Poaceae	*Oplismenus aemulus*						x				10	50
Poaceae	*Paspalum dilatatum*	Paspalum			*	x						
Poaceae	*Pennisetum clandestinum*	Kikuyu Grass			*	x						
Poaceae	*Sporobolus elongatus*	Slender Rat's Tail Grass						x				
Poaceae	*Zea mays*	Maize			*			x	x			
Polygonaceae	*Rumex sagittatus*	Rambling Dock			*	x						
Polygonaceae	*Rumex* spp.	Dock						x			0.1	20
Proteaceae	*Banksia integrifolia*	Coast Banksia				x						
Proteaceae	*Grevillea robusta*	Silky Oak				x			x			
Proteaceae	*Macadamia integrifolia*	Macadamia Nut		V						x		
Proteaceae	*Macadamia tetraphylla*	Rough-shelled Bush Nut	V	V			x			x		
Rhamnaceae	*Alphitonia excelsa*	Red Ash					x					
Rosaceae	*Potentilla indica*	Indian Strawberry			*				x		0.1	20
Rosaceae	*Prunus* spp.				*	x						
Rosaceae	*Rosa* spp.				*	x						
Rosaceae	*Rubus* spp.								x			
Rubiaceae	*Gardenia* spp.				*	x						
Rutaceae	*Citrus x limon*	Rough Lemon			*					x		

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Exotic	RMS 1	RMS 2	RMS 3	RMS 4	RMS 5	P1 Cover	P1 Abundance
Rutaceae	*Murraya paniculata*				*	x						
Sapindaceae	*Cardiospermum halicacabum*	Small Balloon Vine			*	x			x		0.2	20
Solanaceae	*Cestrum parqui*	Green Cestrum			*		x					
Solanaceae	*Solanum* spp.					x						
Solanaceae	*Solanum* spp.							x	x			
Strelitziaceae	*Strelitzia nicolai*				*	x	x					
Strelitziaceae	*Strelitzia reginae*				*	x	x					
Theaceae	*Camellia sasanqua*	Sasanqua Camellia			*	x						
Verbenaceae	*Lantana camara*	Lantana			*	x						
Vitaceae	*Cissus antarctica*	Water Vine					x					
Zamiaceae	*Macrozamia* spp.						x					
Zingiberaceae	*Zingiber* spp.	Ginger			*	x			x	x		

Key: V = Vulnerable

APPENDIX B :
Threatened Species in the Locality

Table 8 Threatened flora species records from the 5km locality

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	No. of records
Rutaceae	*Asterolasia elegans*		E	E	1
Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V		3
Euphorbiaceae	*Chamaesyce psammogeton*	Sand Spurge	E		401
Ericaceae	*Epacris purpurascens var. purpurascens*		V		1
Myrtaceae	*Eucalyptus camfieldii*	Camfield's Stringybark	V	V	3
Myrtaceae	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V	V	3
Orchidaceae	*Genoplesium baueri*	Bauer's Midge Orchid	E	E	1
Grammitidaceae	*Grammitis stenophylla*	Narrow-leaf Finger Fern	E		1
Proteaceae	*Grevillea caleyi*	Caley's Grevillea	E	CE	2268
Myrtaceae	*Kunzea rupestris*		V	V	1
Malvaceae	*Lasiopetalum joyceae*		V	V	2
Proteaceae	*Macadamia integrifolia*	Macadamia Nut	E	E	4
Orchidaceae	*Microtis angusii*	Angus's Onion Orchid	E	E	4183
Proteaceae	*Persoonia hirsuta*	Hairy Geebung	V	V	1
Thymelaeaceae	*Pimelea curviflora var. curviflora*		V	V	1
Lamiaceae	*Prostanthera densa*	Villous Mint-bush	E		1
Myrtaceae	*Rhodamnia rubescens*	Scrub Turpentine	E	V	30
Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	V		20
Elaeocarpaceae	*Tetratheca glandulosa*		V		85

Key: V = Vulnerable, E = Endangered, CE = Critically Endangered

Table 9 Threatened fauna species records from the 5km locality

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	No. of Records
Amphibia					
Myobatrachidae	*Heleioporus australiacus*	Giant Burrowing Frog	V	V	360
Hylidae	*Litoria aurea*	Green and Golden Bell Frog	E	V	2
Myobatrachidae	*Pseudophryne australis*	Red-crowned Toadlet	V		79

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	No. of Records
Aves					
Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	E	E	3
Rostratulidae	*Rostratula australis*	Australian Painted Snipe	E	E	3
Strigidae	*Ninox connivens*	Barking Owl	V		29
Scolopacidae	*Limosa lapponica*	Bar-tailed Godwit		M	7
Ardeidae	*Ixobrychus flavicollis*	Black Bittern	V		14
Diomedeidae	*Thalassarche melanophris*	Black-browed Albatross	V	V	1
Meliphagidae	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V		1
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew	E		17
Laridae	*Hydroprogne caspia*	Caspian Tern		M	7
Laridae	*Anous stolidus*	Common Noddy		M	1
Laridae	*Sterna hirundo*	Common Tern		M	1
Laridae	*Thalasseus bergii*	Crested Tern		M	20
Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V		2
Accipitridae	*Pandion cristatus*	Eastern Osprey	V		28
Apodidae	*Apus pacificus*	Fork-tailed Swift		M	6
Cacatuidae	*Callocephalon fimbriatum*	Gang-gang Cockatoo	V		3
Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V		96
Charadriidae	*Pluvialis squatarola*	Grey Plover		M	2
Diomedeidae	*Thalassarche chrysostoma*	Grey-headed Albatross		E	1
Scolopacidae	*Gallinago hardwickii*	Latham's Snipe		M	1
Fregatidae	*Fregata ariel*	Lesser Frigatebird		M	1
Accipitridae	*Hieraaetus morphnoides*	Little Eagle	V		7

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	No. of Records
Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V		48
Tytonidae	*Tyto novaehollandiae*	Masked Owl	V		4
Cuculidae	*Cuculus optatus*	Oriental Cuckoo		M	2
Charadriidae	*Charadrius veredus*	Oriental Plover		M	1
Strigidae	*Ninox strenua*	Powerful Owl	V		671
Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	E	CE	67
Columbidae	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V		2
Petroicidae	*Petroica boodang*	Scarlet Robin	V		2
Procellariidae	*Ardenna tenuirostris*	Short-tailed Shearwater		M	26
Diomedeidae	*Thalassarche cauta*	Shy Albatross	V	V	3
Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher	V		9
Procellariidae	*Ardenna grisea*	Sooty Shearwater		M	3
Accipitridae	*Lophoictinia isura*	Square-tailed Kite	V		3
Columbidae	*Ptilinopus superbus*	Superb Fruit-Dove	V		3
Psittacidae	*Lathamus discolor*	Swift Parrot	E	CE	37
Scolopacidae	*Xenus cinereus*	Terek Sandpiper	V	M	2
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V		3
Diomedeidae	*Diomedea exulans*	Wandering Albatross	E	E	1
Procellariidae	*Ardenna pacifica*	Wedge-tailed Shearwater		M	1
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V		44
Apodidae	*Hirundapus caudacutus*	White-throated Needletail		M	66
Mammalia					
Otariidae	*Arctocephalus pusillus doriferus*	Australian Fur-seal	V		1

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	No. of Records
Vespertilionidae	*Vespadelus troughtoni*	Eastern Cave Bat	V		1
Molossidae	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V		20
Vespertilionidae	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V		3
Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V		297
Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V		7
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	V	164
Balaenopteridae	*Megaptera novaeangliae*	Humpback Whale	V	V	5
Phascolarctidae	*Phascolarctos cinereus*	Koala	V	V	9
Phascolarctidae	*Phascolarctos cinereus*	Koala in the Pittwater Local Government Area	V	V	8
Miniopteridae	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V		113
Vespertilionidae	*Chalinolobus dwyeri*	Large-eared Pied Bat	V	V	15
Miniopteridae	*Miniopterus australis*	Little Bent-winged Bat	V		45
Muridae	*Pseudomys novaehollandiae*	New Holland Mouse		V	1
Peramelidae	*Isoodon obesulus obesulus*	Southern Brown Bandicoot (eastern)	E	E	13
Vespertilionidae	*Myotis macropus*	Southern Myotis	V		51
Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V	E	10
Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V		6
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V		1

Family	Scientific Name	Common Name	BC Act Status	EPBC Act Status	No. of Records
Reptilia					
Varanidae	*Varanus rosenbergi*	Rosenberg's Goanna	V		37

Key: V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory

APPENDIX C :
Test of Significance

C.1. Pittwater and Wagstaffe Spotted Gum Forest

Pittwater Spotted Gum Forest typically has the form of an open forest but may now exist as woodland or remnant trees (DPIE 2021). The community occurs on shale derived soils on hillslopes derived from the Narrabeen Group – Newport Formations (DPIE 2021). Pittwater Spotted Gum Forest is listed as an Endangered Ecological Community under the BC Act

This community occurs in the subject site as scattered trees dominated by *Eucalyptus paniculata, Corymbia maculata* and *Eucalyptus punctata*. A native shrub layer is absent from the occurrence within the subject site and the ground layer is highly dominated by exotic grass species.

a. In the case of a threatened species, whether the proposed upgrades or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Not Applicable.

a. In the case of an endangered ecological community or critically endangered ecological community, whether the proposed upgrades or activity—

   i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The total area of Pittwater Spotted Gum Forest within the subject site is 0.19 ha. The proposed action will result in the removal of 0.09 ha of Pittwater Spotted Gum Forest within the subject site. 0.09 ha of the community will remain in the subject site with the majority to be restored with understorey plantings. As a large proportion of the community is proposed to be retained and enhanced within the subject site, it is not expected that the removal a minor area of the community in sub-optimal condition is likely to have an adverse effect on the extent of the vegetation community such that its local occurrence will be placed at risk of extinction. Additionally, the area of the TEC to be retained is located along the southern boundary of the subject site, bearing connectivity to the native vegetation within the adjacent lot. Out of the native vegetation occurrence throughout the subject site, the area of the TEC to be retained is of the highest ecological retention value and will serve to maintain a degree of linkage throughout the urban landscape.

The removal of the community within the Subject site is not considered to modify the remaining extent of this community such that its local occurrence is likely to be placed at risk of extinction. The species present within the Subject site are all present within adjacent areas of Pittwater Spotted Gum Forest to be retained and likely occur commonly throughout the patches within the locality. All native species recorded within the Subject site are common, Pittwater Spotted Gum Forest species, and no threatened or rare plants are proposed to be impacted.

a. In relation to the habitat of a threatened species or ecological community—

i. the extent to which habitat is likely to be removed or modified as a result of the proposed upgrades or activity, and

ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed upgrades or activity, and

iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

Approximately 0.09 ha of habitat for Pittwater Spotted Gum Forest will be removed as a result of the proposed action.

The Pittwater Spotted Gum Forest to be removed is part of a network of degraded, fragment patches throughout the locality. The area to be removed is a small area on the southern periphery of the existing distribution of the community and will not exacerbate fragmentation (OEH 2016). No areas of the community are expected to become further isolated as a result of the proposed action as the area of the TEC to be retained bears connectivity to adjacent vegetation located outside of the subject site.

The habitat to be removed is not expected to be important to the long-term survival of the ecological community in the locality due to the small amount of degraded vegetation in a suburban context.

a. Whether the proposed upgrades or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

There is no critical habitat for Pittwater Spotted Gum Forest currently listed by the by the Coordinator-General of the Environment Energy and Science group of DPIE.

a. Whether the proposed upgrades or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following key threatening process is relevant to Pittwater Spotted Gum Forest occurring within the Subject site:

- 'Clearing of native vegetation' as this reduces the area habitat available for this community
- The primary key threatening process relevant to the proposed development is the clearing of native vegetation, as 0.09 ha of Pittwater Spotted Gum Forest will be removed within the subject site. The proposed development is not likely to significantly exacerbate this key threating process due to the small area of vegetation to be removed in the local context.

Conclusion

The proposed development is expected to impact on the removal of a small area (0.09 ha) of Pittwater Spotted Gum Forest. The current state of the community on the subject site is highly degraded due to long term management of the understorey within a residential lot. The area of the TEC to be retained is considered to be of highest ecological retention value of the vegetation throughout the subject site, providing connectivity to

native vegetation outside of the subject site. The proposed development is not considered likely to significantly impact the Pittwater Spotted Gum Forest within the locality.

FIGURES

Legend

Subject Site

Indicative Development Footprint

Image Source:
Image © Nearmap (2021)
Dated: 25/01/2021

Data Source:
Spatial Services (2021)
NSW Department of
Finance and Services

Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 50 100 m

I:\...\21032\Figures\RP1\20210510\Figure 1. Location_subject site

Figure 1. Location of the subject site

GFA

BUILDING A: 1748 M²
BUILDING B: 1518 M²
THREE 2-STOREY TOWNHOUSES (BUILDING C,D,E): 417 M²

TOTAL FSR: 0.6:1

0 2m 5m 10m 20m 50m
SCALE 1:500

C	2021.06.29	ISSUED FOR SUBMISSION
B	2021.05.26	ISSUED FOR SUBMISSION
A	2021.04.30	ISSUED FOR SUBMISSION

Level 1, 1 Chandos Street
ST LEONARDS NSW 2065
Giles Tribe Pty Ltd
P 61 2 9264 5035
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ABN 50 001257 507
Nominated Architects: Mark G Bradley [5828] Stuart D Hill [4458]

GILES TRIBE

Project:
CONCEPT PLAN
159-167 DARLEY STREET WEST
MONA VALE

Status:
PLANNING PROPOSAL
Job Ref: 19016
Scale: 1:500 @A3
Date: 10/09/19
Drawn: Author

Drawing:
GROUND FLOOR PLAN
Drawing No: A02 Rev: C

C:\Users\Yuling\Documents\19016 - 159-167 Darley St West, Mona Vale_41 Units_New_yuling.liu@gilestribe.com.au.rvt

I:\...\21032\Figures\RP1\20210701\Figure 2. The project layout

Figure 2. The project layout

Image Source: Giles Tribe (2021)

Figure 3. Survey locations

Figure 4. Historical aerial photography (1951) of the subject site

Figure 5. Vegetation communities and habitat features within the subject site