Sydney Water

15 – 17 Mona Street
Mona Vale

Preliminary Biodiversity Assessment

December 2020

Alison Hunt and Associates Pty Ltd

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GLOSSARY

Abbreviation	Definition
AH Ecology	Alison Hunt & Associates Pty Ltd
ASL	Above Sea Level
BC Act	NSW *Biodiversity Conservation Act 2016*
°C	Degrees Celsius
CE	Critically endangered
CEMP	Construction Environmental Management Plan
DAWE	Department of Agriculture, Water and the Environment
DECC	NSW Department of Environment and Climate Change (now known as the NSW DPIE)
DoE	Commonwealth Department of the Environment (now known as the DAWE)
DEE	Commonwealth Department of the Environment & Energy (now known as the DAWE)
DPI	NSW Department of Primary Industries
DPIE	NSW Department Planning, Industry & Environment
E	Endangered
EEC	Endangered Ecological Communities
EP	Endangered Population
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation.*
EPA Act	NSW *Environmental Planning and Assessment Act 1979*
ESCP	Erosion and Sedimentation Control Plan
FM Act	NSW *Fisheries Management Act 1994*
LGA	Local Government Area
Mar	Marine
M	Migratory
MNES	Matter of National Environmental Significance.
mm/cm/m/km/ha	Millimetres, centimetres, metres, kilometres, hectares
NSW	New South Wales
NPW Act	NSW *National Parks and Wildlife Act 1974*
OEH	NSW Office of Environment and Heritage (now known as the NSW DPIE)
PMST	EPBC Act Protected Matters Search Tool
RAP	Remediation Action Plan
REF	Review of Environmental Factors
RoTAP	Rare or Threatened Australian Plant
SIS	Species Impact Statement.
TEC	Threatened Ecological Communities
V	Vulnerable

1 INTRODUCTION

1.1 Background

Sydney Water is seeking to rezone surplus land located at 15 – 17 Mona Street, Mona Vale (the 'Site') (Figure 1) (Plates 1 -6). Alison Hunt & Associates Pty Ltd (AH Ecology) was commissioned by Sydney Water to undertake a biodiversity assessment to describe ecological values across the Site and locality (i.e. 10 km radius), and to make a preliminary determination of the likely impacts on endangered ecological communities, endangered populations, threatened species and / or their habitat listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and NSW *Fisheries Management Act 1994* (FM Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.2 General Site Description

The Site comprises two lots: DP 744458 (0.408 ha) (17 Mona Street) and DP 89128 (0.404 ha) (15 Mona Street) which are located at the corner of Mona and Bassett Streets, Mona Vale. Further details of the Site are provided in Table 1.

Table 1 Site details

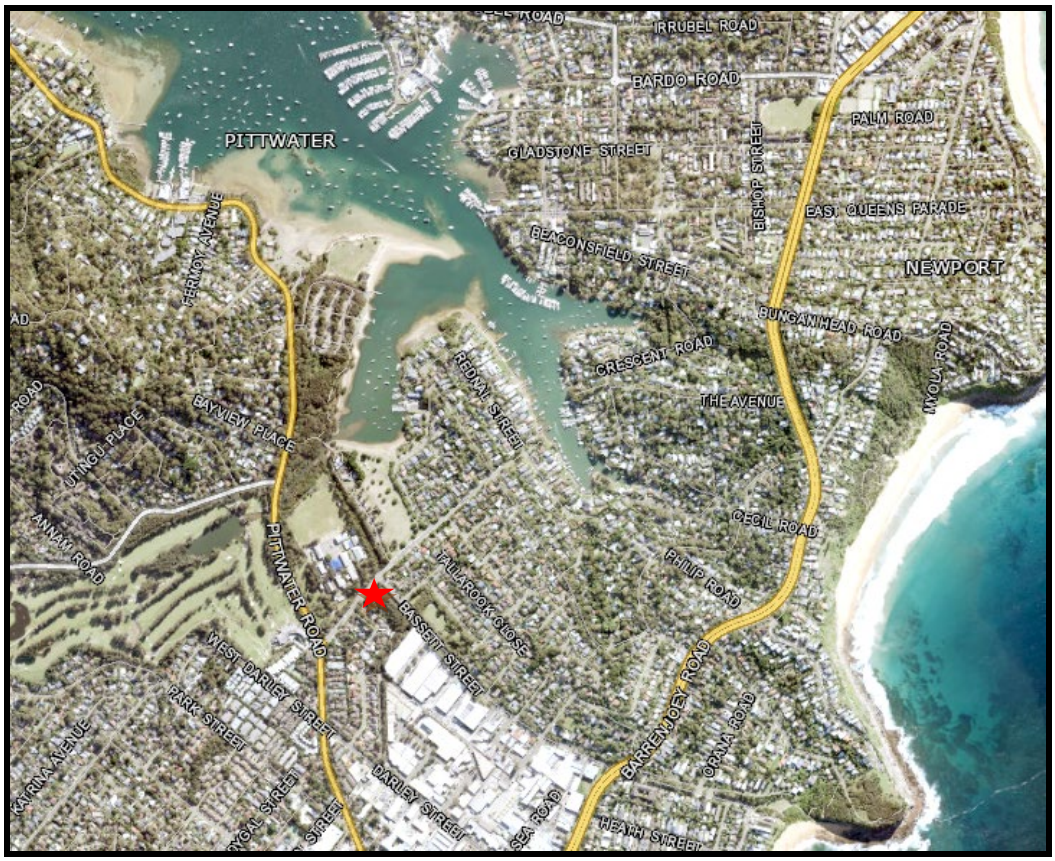
Location	15 – 17 Mona Street, Mona Vale, NSW Corner of Mona & Bassett Streets (Figure **)
Lot / DP	Lot 1 DP 744458 Lot 1 DP 89128
Area	Total area 0.809 ha
Local Government Area	Northern Beaches
Zoning	SP2 Infrastructure
Minimum Lot Size	700 m^2
Grid reference	Easting 342804; Northing 6273196
Elevation	5 m above sea level
Topography	Flat
Meteorological data (average)	Maximum – 27.0 °C (Jan/Feb); Minimum – 7.7 °C (July); Rainfall (annual) – 1147.4 mm
Existing land use within Site & locality	Vegetated area – Sydney Water excess land adjacent to concrete drainage channel. Surrounded by low density residential development.

1.3 Proposal

The Site has been identified by Sydney Water as surplus lands. Sydney Water plans to dispose of the land in the future with the view to it being subdivided into four housing lots along the northern street frontage whilst retaining the remainder of the land as rehabilitated Estuarine Swamp Oak Forest. Figure 2 shows a proposed future subdivision and area retained for rehabilitation. This proposal

would result in a combined total of approximately 0.309 ha of clearing (building footprint and driveways) with the remaining 0.496 ha to be retained as vegetated areas.

Figure 1 Location of the Site



Legend: ★ Site

Source: Northern Beach Council Mapping

Figure 2 Proposed future Site layout

Plate 1 View of Mona Street

Plate 2 View south from parkland along Mona Street

Plate 3 Western boundary

Plate 4 Eastern boundary and concrete channel

Plate 5 Area used as informal camp in the centre of the Site

Plate 6 Trails though the Site

2 ASSESSMENT

2.1 Literature and database review

A review of all readily available literature and database records relating to the ecology and environmental features of the Site and surrounding locality was undertaken.

2.2 On-site assessment

2.2.1 Flora Survey

A flora survey was undertaken by Dr Alison Hunt (BAM Assessor Accreditation No. BAAS 17017) on 7 May 2019 and by botanist, Mr Paul Burcher, on 14 May 2020. The weather was fine, with a light breeze and 21 ^{o}C on 7 May 2019 and dry, slight breeze, 100% cloud cover and 19 ^{o}C on 14 May 2020.

Random meander transects were undertaken across the entirety of the Site;

- Targeting the threatened flora species identified as having potential habitat across the Site;
- Noting plant species along with other factors including soil type and condition, the level of weed invasion and other signs of disturbance; and
- Determining the likely presence of potential habitat for threatened species and endangered ecological communities, and in particular any species or communities listed under the BC Act, FM Act or EPBC Act.

2.2.2 Fauna Survey

Fauna surveys were carried out by zoologist, Deryk Engel (B.Env.Sc.HONS) on 29 May 2020, between 12.40 and 1.40 pm. Weather conditions were dry with a moderate breeze, 50% cloud cover and 24 ^{o}C.

The survey methods used to identify those fauna species present within, or in the vicinity of, the subject site included:

- Habitat identification;
- Direct observation;
- Call identifications, with all calls being identified in the field;
- 20-minute dedicated bird survey using the point count method (DEC 2004);
- The identification of any indirect evidence such as tracks, scats, scratchings and diggings that would suggest the presence of a particular fauna species;
- Data searches conducted prior to conducting the field investigation indicated that the State and Federally listed Southern Brown Bandicoot (*Isoodon obesulus*) is present in the surrounding region. As such, particular attention was given to targeting moist areas such as those present on the northern side of the water main easement, that would be conducive to the foraging requirements of this species; and

- Ground debris, leaf litter and tree bark searches for sheltering reptiles and amphibians (20 person minutes [as per DEC 2004]).

2.3 Limitations

This assessment was aimed at providing an overall assessment of the ecological values of the Site and study area with particular emphasis on the likely presence of threatened species, or ecological matters of interest through integration of data from a number of sources. This permitted an assessment of the likely impact of the proposal on these ecological values of the Site and locality. It was not designed to identify all species, whether resident or transitory to the Site, and it is likely that a number of species not mentioned in this report would also utilise the resources of the Site from time to time, especially given the nearby location of Pittwater.

3 RESULTS

3.1 Landscape Context of Site

The physical characteristics of the Site and its local environs are summarised in Table 2.

Table 2 Physical features of the Site and locality

IBRA bioregion / subregions	Sydney Basin / Pittwater
NSW landscape region	Belrose Coastal Slopes
Vegetation integrity	Site has been disturbed and cleared in the past with man-made fill incorporated into the current landform. Current vegetation has recolonised the Site. Managed parkland across front third of Site. The remainder heavily weed infested, degraded and unmanaged.
River & streams classified according to stream order	Located within Pittwater Catchment Estuary. Approximately 10 m wide concrete drainage channel bordering the east of the Site drains to Pittwater. 1st order (Strahler) stream mapped on Site. Not visible.
Wetlands within, adjacent to and downstream of the Site	NE corner of Site mapped as Coastal Environment Area under the Coastal Management SEPP 2018.
Cleared areas	The majority of the Site has been cleared in the past and the soil landscapes altered through incorporating man-made fill.
Connectivity features	No mapped areas of Threatened and High Conservation Habitat, Wildlife Corridors and Native Vegetation under the Warringah DCP 2011, occurring across the Site. Part of a local corridor that extends from adjacent Bangalow Park to the Site and north to Winnererremy Bay and Pittwater.
Areas of geological significance	Lithology is quaternary Sand deposits (peat, sandy peat & mud) mixed with 'man-made fill' (dredged estuarine sand & mud, demolition rubble, industrial & household waste) (Herbert 1983). Soil landscape identified as 'Disturbed Terrain', i.e. removal or burial of soil, infilling with landfill substrates (Chapman & Murphy 1989).
Native vegetation cover in the landscape	< 10%
Areas of outstanding biodiversity values	None mapped. (BMAT report May & September 2020).

3.2 Previous Mapping

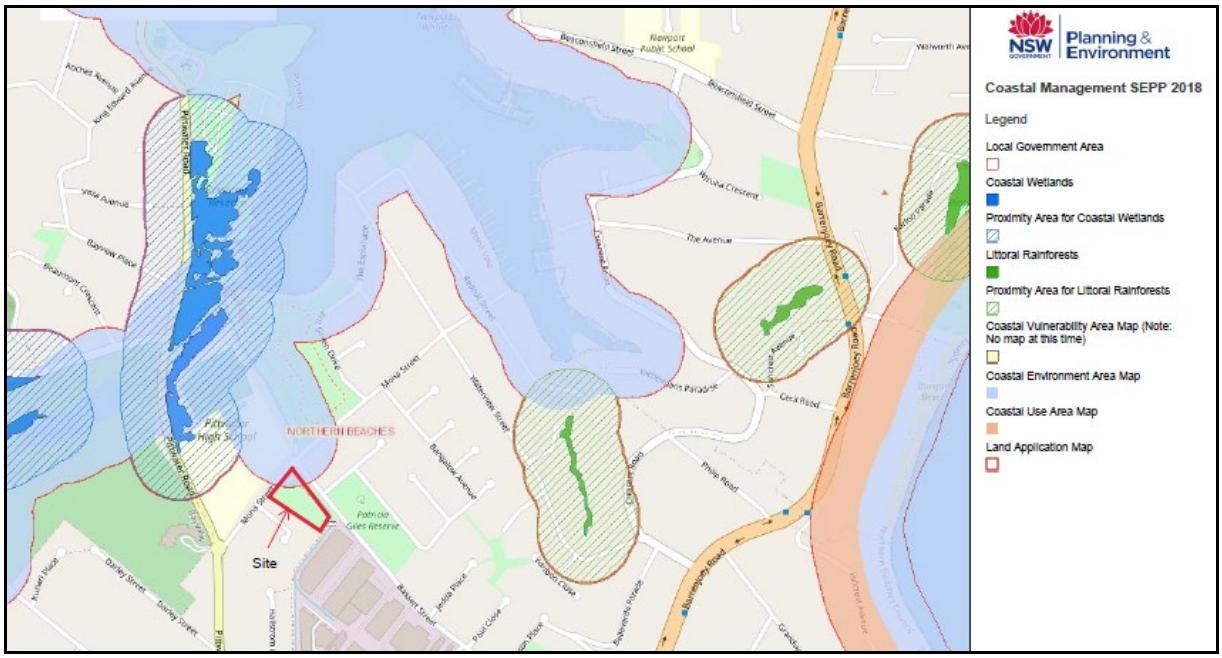
3.2.1 Biodiversity Values Map

The NSW Department of Planning, Industry & Environment (DPIE) (NSW Government 2020) (May 2020) *Biodiversity Values Map* identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing. The Site has **not** been identified as having high biodiversity value.

3.2.2 Coastal Management SEPP 2018

The north-eastern corner of the Site has been mapped as *Coastal Environment Area* (Figure 3) under Division 3, Clause 13 of the *State Environmental Planning Policy (Coastal Management) 2018*, which requires the consent authority to consider whether the proposed development is likely to cause adverse impacts to land designated within the coastal environment area mapping.

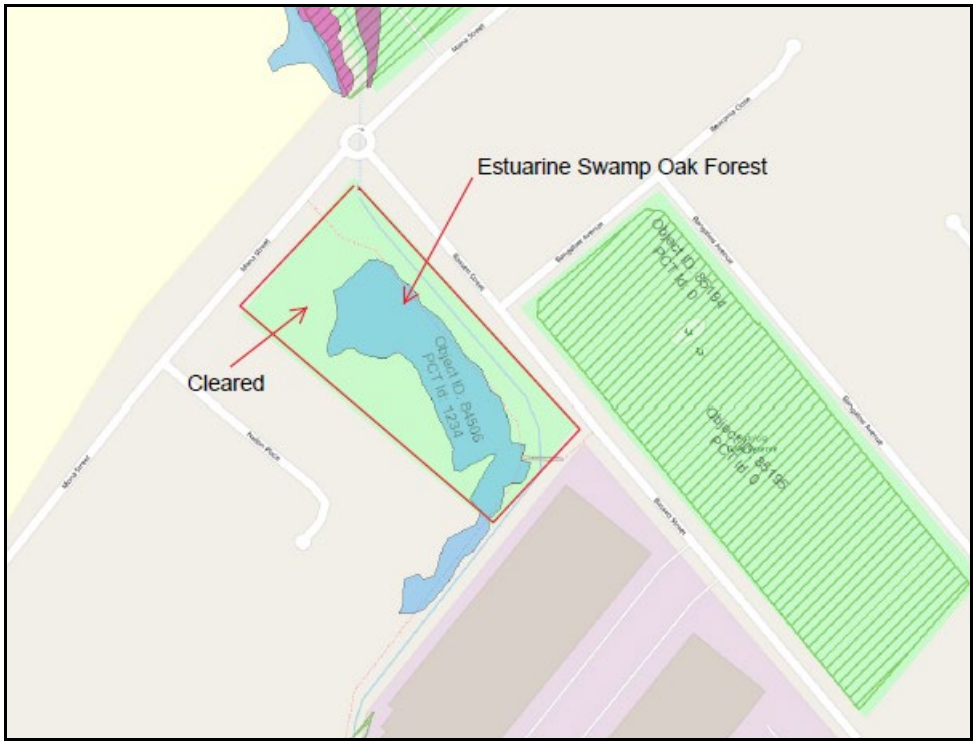
Figure 3 Coast Management SEPP 2018 mapping



3.2.3 Sydney Metropolitan Area Vegetation Mapping

The Sydney Metropolitan Area vegetation mapping undertaken by OEH (2013) shows a portion of the Site as *PCT 1234 Swamp Oak Swamp Forest Fringing Estuaries, Sydney Basin and South East Corner Bioregion* (Estuarine Swamp Oak Forest) which is listed under the BC Act as an Endangered Ecological Community (EEC) and under the EPBC Act as Endangered. The remainder was mapped as *Cleared* (Figure 4).

Figure 4 Sydney Metropolitan Area Vegetation Mapping (OEH 213)



3.2.4 ACS Environmental Pty Ltd

ACS Environmental Pty Ltd (2018) mapped the Site as supporting the EEC, Estuarine Swamp Oak Forest (Figure 5 - yellow polygon).

Figure 5 Distribution of Estuarine Swamp Oak Forest across the Site

ACE Environmental Pty Ltd (2018)

3.3 Current Site Attributes

3.3.1 Flora Species

A total of 65 flora species were recorded across the Site, only 17 (i.e. 26 %) of which were native species and a further 7 species were planted specimens (Appendix A). Forty-eight (i.e. 74 %) were weed species.

Most of the Site is characterised by a canopy of Swamp Oak (*Casuarina glauca*) to 18 m above a very dense cover of Lantana (*Lantana camara*) to 3 m and the introduced scramblers White Jasmine (*Jasminum polyanthum*), Balloon Vine (*Cardiospermum grandiflorum*) and Madeira Vine (*Anredera cordifolia*) which smother the ground and trees. Golden Wreath Wattle (*Acacia saligna*), which is introduced from Western Australia and is a serious environmental weed in the Northern Beaches LGA, is occasional to 6 m and in the middle of the site there is a patch of the *Biosecurity Act 2015* listed weed Giant Reed (*Arundo donax*) to 8 m. Other common weeds include the shrub Green Cestrum (*Cestrum parqui*), the scrambler Turkey Rhubarb (*Acetosa sagittata*) and Panic Veldt Grass (*Ehrharta erecta*). The few native species present include a Cabbage Tree Palm (*Livistona australis*) in the canopy, a small Port Jackson Fig (*Ficus rubiginosa*) and some remnant groundcovers such as Scurvy Weed (*Commelina cyanea*) and Warrigal Greens (*Tetragonia tetragonioides*).

An area at the front of the site stretching about 25 m from the lot boundary also has a canopy of Swamp Oak but below it is regularly slashed lawn dominated by Couch (*Cynodon dactylon*), Kikuyu Grass (*Cenchrus clandestinum*) and Buffalo Grass (*Stenotaphrum secundatum*) along with broad-leaf perennial weeds such as Red-flowered Mallow (*Modiola caroliniana*), Dandelion (*Taraxacum officinale*) and Catsear (*Hypochaeris radicata*) and the native Kidney Weed (*Dichondra repens*). There are scattered, planted specimens of numerous native trees and shrubs including Bangalay (*Eucalyptus botryoides*), Silky Oak (*Grevillea robusta*), Lemon-scented Gum (*Corymbia citriodora*), Paperbarks (*Melaleuca* spp.) and Bottlebrushes (*Callistemon* spp.). A Grey Gum (*E. punctata*) reported by ACS Environmental (2018) has since died.

3.3.2 Vegetation Communities

The vegetation at the site comprises:

- Parkland;
- Disturbed; and
- Estuarine Swamp Oak Forest.

Approximately 25 m from the front boundary of the Site is managed as parkland as although it has a canopy of Swamp Oak it is regularly slashed to maintain a lawn dominated by Couch (*Cynodon dactylon*) and Kikuyu Grass (*Cenchrus clandestinum*).

Areas along the western boundary of the Site have been so extremely altered through ongoing clearing, dumping and weed invasion that it is best described as disturbed as it retains few of the vegetative characteristics of the forested sections of the Site. It is also noted that there are informal access tracks throughout the Site and these appear to be used to traverse the Site and to access an informal ‘camp’ near the centre of Site.

The remainder of the Site, including the majority of No. 17 with lesser sections of No. 15 are considered to be a very degraded form of Estuarine Swamp Oak Forest. Whilst it is likely that this

community would have historically been present across the Site there is evidence to suggest that the Site had been cleared prior to 1940 with ongoing disturbance (Pittwater Council 2003). Therefore, it is likely that this community has colonized this disturbed area in more recent times.

Table 3 Vegetation classification of the Site

Unit	Details
Name	*Estuarine Swamp Oak Forest*
PCT ID	1234
PCT Scientific Name	Swamp Oak Swamp Forest Fringing Estuaries, Sydney Basin and South East Corner Bioregion
Vegetation Formation	Forested Wetlands
Vegetation Class	Coastal Floodplain Wetlands
Landscape position	Sandy saline sediments fringing the high tide mark in coastal estuaries below 5m
Pre-European extent	Estimated 16,800 ha
Current extent	Estimated 840 ha (90% cleared) Sydney
Associated TECs	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
Potential associated Threatened Biodiversity	10 plants, 4 amphibian, 3 reptiles, 10 bats, 27 birds, 8 marsupials, 2 rodents
Threats	Hydrological changes, clearing, frequent fire, unformed trails
Note: TEC = threatened ecological community. **Source**: BioNet Vegetation Classification accessed May 2020	

3.3.3 Weeds

Under the NSW *Biosecurity Act 2015* 'all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.'

Of those introduced plant species recorded, four are listed as 'priority weeds' in the Greater Sydney Local Land Services region (which includes the Northern Beaches LGA) (DPI 2020) (Table 4). Two are also listed as a WoNS (DAWE 2020). The list of WoNS is part of a combined State and Commonwealth initiative to combat invasive species.

Table 4 Weeds of significance recorded on site

Species	Listed	Biosecurity duty
Lantana *Lantana camara*	NSW *Biosecurity Regulation 2017* / WoNS	Prohibition on dealings Must not be imported into the State or sold
Ground Asparagus *Asparagus aethiopicus*	NSW *Biosecurity Regulation 2017* / WoNS	Prohibition on dealings Must not be imported into the State or sold.
Green Cestrum	NSW *Biosecurity*	Regional Recommended Measure

Species	Listed	Biosecurity duty
Cestrum parqui	*Regulation 2017*	Land managers should mitigate the risk of new weeds being introduced to land used for grazing livestock. Land managers should mitigate spread from their land. Plant should not be bought, sold, grown, carried or released into the environment.
Giant Reed *Arundo donax*	NSW *Biosecurity Regulation 2017*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment.

The weeds listed in Table 4 should be controlled to ensure their suppression. In addition, environmental weeds such as Golden Wreath Wattle, Balloon Vine and Trad should also be treated to prevent their spread. Control of weeds would be best addressed through the preparation and implementation of a vegetation management plan.

3.3.4 Fauna

Habitat description

This site is dominated by a *Allocasuarina* woodland, to a maximum height of 18 m. Within the area surveyed there were no mature or hollow-bearing trees present. The middle story ranges from 5 to 10 m in height and is composed of *Allocasuarina* saplings, tall shrubs and a medium to high density layer of Giant Reed towards the north-western portion of the Site, whilst the understory is between 1 and 2 m high. The understorey is composed of exotic shrubs that range in density from sparse to high depending on the past and current land use practices.

The ground layer is 0.5 m tall and is made up of grasses, vines and weeds with the occasional patches of ferns in the eastern portion of the property. The density of this layer is dependent on light penetration, past / current land uses and those maintenance regimes implemented (slashed or mown grass where the property meets Mona Street and backs onto the neighbouring properties). The ground cover is made up of leaf litter and natural debris, bare ground and urban refuse. There were no rock formations to provide crevices or caves suitable for reptiles or other fauna such as bats.

The Site has been disturbed through human activities (e.g. dumping, clearing, introduction of weeds) with portions being maintained by the removal of all understory through the process of a constant mowing or slashing regime. Large occurrences of dumped exotic green waste, building waste and urban refuse was noted. It is also noted that there are small informal access tracks which appear to be used to traverse the Site and to access an informal ‘camp’ near the centre of Site. These tracks appear to be used on a regular basis.

Within the area investigated, no unique fauna habitat were observed.

Fauna Recorded

In total, 23 fauna species were recorded and these included two native mammals, 20 native birds, 1 non-native bird (Appendix B).

Twenty-one bird species were heard and / or observed, all except one of which were native species. The one non-native bird species was the Common Myna (*Sturnus tristis)*. Signs of usage of the Site by two native mammal species were also recorded. Indicative conical diggings of the Long-nosed Bandicoot (*Perameles nasuta*) were recorded across the Site, and it is likely this species is foraging and potentially breeding within the dense weedy shrub and undergrowth. Indicative scratchings similar to those made by the Common Brushtail Possum (*Trichosurus vulpecula*) were also observed on a smooth-barked tree. There were no reptiles or frogs recorded during the dedicated herpetofauna surveys.

4 CONSERVATION SIGNIFICANCE

A number of features of ecological significance occur, or have the potential to occur, within the locality (i.e. 10 km radius). Communities, species and populations known to occur (EPBC Act, FM Act and BC Act), or considered likely to occur (EPBC Act), within the locality are listed at Appendix C and those of particular relevance to this proposal are indicated in bold.

4.1 Threatened Ecological Communities

Northern Beaches LGA supports a wide-range of vegetation communities, some of which are listed as threatened under the EPBC Act and BC Act (Appendix C). This Site supports a very degraded *Estuarine Swamp Oak Forest* which is a form of:

- *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community* which is listed as Endangered under the EPB C Act; and
- *Swamp Oak Swamp Forest Fringing Estuaries, Sydney Basin and South East Corner Bioregion* which is listed as an Endangered Ecological Community (EEC) under the BC Act.

This Site has been cleared in the past and this community has recolonised the Site over time even though there has been disruption of soils and ground levels across the Site, severe weed invasion, dumping and further clearing.

4.2 Threatened Flora and Fauna Species and Populations

Sixteen flora species and ten fauna species listed under the EPBC Act and 17 flora and 68 fauna species listed under the BC Act are known to occur within the locality (refer Appendix C).

No threatened flora species were recorded across the Site during this assessment and none have been recorded in the past. Based on a consideration of the habitat needs of the threatened species, combined with the identification of those habitats present within the Site, it is unlikely that any of these species would occur due to the severely degraded, modified and weed infested condition of the Site.

Of the ten fauna species known from the locality, four are considered to be particularly relevant to the Site (primarily as a forging resource) and these are the White-bellied Sea-eagle (*Haliaeetus leucogaster*), the Southern Myotis (Myotis macropus), Large Bent-winged Bat (Mini*opterus orianae oceanensis*) and Grey-headed Flying Fox (*Pteropus poliocephalus*). Details are provided in Table 5.

Table 5 Threatened species with relevant to the Site

Species	**Status**
White-bellied Sea-eagle (*Haliaeetus leucogaster*)	Mar-EPBC / V-BC
Habitat Requirements	**Comment**
Is found throughout coastal Australia in association with large rivers, fresh and saline lakes, reservoirs, estuaries, coastal seas, islands. Feeding occurs on fish, tortoises, rabbits and nestlings. Breeding occurs between May and	1 individual was observed hawking over Pittwater, 1 km north of the subject site (at E342883, N6274357). No large raptor nests were observed across the Site. It is likely that this species may overfly the Site due to their large home range but

October with nests constructed in inland water systems being located in tall live or dead trees of which River Red Gums, Forest Red Gum and Southern Mahogany are commonly used. Nesting sites are often being repeatedly used over a period of several years.	it is unlikely to use the Site for nesting as habitat is not available.
Species	**Status**
Grey-headed Flying Fox *(Pteropus poliocephalus)*	V-EPBC / V-BC
Habitat Requirements	**Comment**
Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. A canopy-feeding frugivore, blossom-eater and nectarivore. Roosts and breeds communally in 'camps', with these camps containing between 500 to 5,000 individuals. Individuals generally exhibit high fidelity to traditional camps and return annually to give birth and rear offspring. Foraging occurs opportunistically on both native and exotic plants, often at distances between 30 and 70 km from camps.	No active or historic flying-fox camps present within, or close to, subject site. Nearest camp is the Warriewood (#485) flying-fox camp [Department of the Environment 2020] 3 km south of the Site. This species may forage across the Site on occasion.
Species	**Status**
Large Bent-winged Bat *(Miniopterus orianae oceanensis)*	V-BC
Habitat Requirements	**Comment**
Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunts in forested areas, catching moths and other flying insects above the tree tops.	Previously recorded along the concrete channel at the corner of Mona & Bassett Streets and further south along the channel approximately 200 m from the Site. Likely to forage across the Site on occasion. Site unlikely to provide roosting habitat.
Species	**Status**
Southern Myotis (*Myotis macropus*)	V-BC
Habitat Requirements	**Comment**
Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges. Forages over streams and pools catching insects and small fish by raking their feet across the water surface.	Previously recorded along the concrete channel at the corner of Mona & Bassett Streets and further south along the channel approximately 200 m from the Site. Likely to forage along the adjacent concrete channel at high tide. Site unlikely to provide roosting habitat.
Note: BC Act = *Biodiversity Conservation Act 2016*; EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*, V = Vulnerable, E = Endangered, Mar = Marine.	

5 INDICATIVE IMPACTS

5.1 Direct Impacts

5.1.1 Vegetation Removal and Removal of Habitat

The disposal of the Site would not directly result in the clearing of vegetation or disturbance of habitat. However, it is assumed that the disposal of the excess Sydney Water land could eventually result in approximately 0.309 ha of clearing or alteration of vegetation across the proposed lots for the construction of dwellings and associated infrastructure. The lots would be located along the northern street frontage to avoid as majority of the Estuarine Swamp Oak Forest and set back 10 m from the eastern boundary to retain a green corridor for fauna movement along the concrete channel. The location of the proposed lots is largely comprised of a mix of scattered, planted specimens of numerous native trees and shrubs, grading into weed infested emergent Estuarine Swamp Oak Forest.

The removal or alteration of this vegetation would disturb and / or remove fauna habitat and this would nominally reduce fauna habitat in the locality. The Site does not support hollow-bearing trees and or other unique habitats for fauna (e.g. rock outcrops). However, it was noted that the large amount of conical diggings indicates that the Long-nosed Bandicoot is likely to be sheltering and potentially breeding on the Site. Any potential clearing / disturbance of the Site should be undertaken after a targeted trapping campaign to allow relocation of these animals as there are few opportunities for natural dispersal given the fenced concrete channel to the east and residences to the west.

The remaining 0.496 ha would be managed with the aim of rehabilitating and assisting revegetation to better represent Estuarine Swamp Oak Forest, including control of the severe weed infestation, removal of the informal ‘camp’ and other dumped rubbish and formalisation of access tracks through the Site.

5.2 Potential Indirect Impacts

It is likely that there would be impacts associated with potential construction activities including noise, vibration and light but these construction impacts would be temporary. On-going light and noise pollution would occur from built residences but given that the Site is located in an urban environment it is likely that most fauna is conditioned to some noise, vibration and light and hence these indirect impacts are expected to be minimal and could be managed.

There is the potential that Pittwater could be impacted by this proposal if sediments are mobilised during removal of vegetation and earthworks. Special consideration should be given to the preparation of an Erosion and Sedimentation Control Plan to ensure management of this potential for risk to Pittwater and surrounds locality.

5.3 Impacts on Species, Populations and Communities of Conservation Significance

5.3.1 Commonwealth Statutory Assessments

Areas of the Site support Estuarine Swamp Oak Forest considered to be a form of *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community* which is listed as Endangered under the EPB C Act. Some of this vegetation community would be removed and / or modified for this proposal and hence the potential for impacts on this community would need to be considered using the Significant Impact Criteria detailed in the EPBC Act *Administrative Guidelines for Significance* (DoE 2013).

While some of the species listed in Appendix C may over-fly the Site, or use the study area on occasion, only the White-bellied Sea-eagle (*Haliaeetus leucogaster*), the Southern Myotis (Myotis macropus), Large Bent-winged Bat (Mini*opterus orianae oceanensis*) and Grey-headed Flying Fox (*Pteropus poliocephalus*) are considered to be particularly relevant to the Site (primarily as a forging resource) (Table 5). While the White-bellied Sea-eagle is listed as marine under the EPBC Act, the subject site is not located within the Commonwealth marine area (i.e. 3 - 200 nautical miles from the coast) and therefore no assessment using the EPBC Significant Impact Guidelines that are relevant to the Commonwealth marine environment are required for this species.

As the Grey-headed Flying-fox has been recorded within the proximity of the Site, and that the Site provides some foraging habitat, the precautionary principal should be adopted in assessing the potential impacts of this proposal using the Significant Impact Criteria detailed in the EPBC Act *Administrative Guidelines for Significance* (DoE 2013) in the future.

5.3.2 NSW Statutory Assessments

Areas of the Site support Estuarine Swamp Oak Forest considered to be a form of *Swamp Oak Swamp Forest Fringing Estuaries, Sydney Basin and South East Corner Bioregion* which is listed as an Endangered Ecological Community (EEC) under the BC Act. Some of this vegetation community would be removed and / or modified for this proposal and hence the potential for impacts on this community would need to be considered. While some of the species listed in Appendix C may over-fly the Site, or use the study area on occasion, only the White-bellied Sea-eagle (*Haliaeetus leucogaster*), the Southern Myotis (Myotis macropus), Large Bent-winged Bat (Mini*opterus orianae oceanensis*) and Grey-headed Flying Fox (*Pteropus poliocephalus*) are considered to be particularly relevant to the Site (primarily as a forging resource) (Table 5).

These potential for impacts on these matters may need to be considered within the framework provided under the NSW Biodiversity Offsets Scheme as there is the potential that this scheme may be triggered through one of the following:

- The area of native vegetation to be cleared exceeds the clearing threshold associated with the minimum lot size applicable to the property;
- The land to be cleared occurs in the shaded area of the Biodiversity Values Map; and
- The development is likely to significantly affect threatened species or ecological communities, in accordance with the five-part test.

5.4 Threatening Processes

Key threatening processes for threatened and protected matters relevant to this proposal include:

- *Land clearing* (EPBC Act) / *Clearing of native vegetation* (BC Act): The subdivision of this Site will not directly result in the clearing of the land but it is assumed that ultimately the purchase of the lots would result in the clearing of at least some of the Site for a residential dwelling and associated infrastructure.

5.5 Connectivity

The Site is not part of a well-established corridor but instead a small local green corridor that terminates at Hallstrom Place. Nonetheless, the potential subdivision has been set back from the concrete channel by 10 m to allow for a green corridor along the eastern edge of the proposed subdivision. This area would lead into the 0.496 ha of rehabilitated Estuarine Swamp Oak Forest on the remainder of Sydney Water excess land.

5.6 Cumulative Impacts

Cumulative impacts are those that add to the transformation of the ecological values of a Site or locality and generally occur when habitat is removed or altered and / or the natural hydrology of the area is altered through an accumulation and interaction of impacts from past, present and future proposals. The proposed subdivision would ultimately result in the removal of some vegetation. However, the current vegetation across the Site is intensely weed-infested and degraded. It is likely that this proposal would ultimately improve the biodiversity of this Site and provide better quality vegetation and fauna habitat for a range of species within the locality.

6 MANAGEMENT & MITIGATION RECOMMENDATIONS

A number of management and mitigation measures should be incorporated into the design and management of this proposal. The future goals of environmental management are outlined below along with specific considerations for this project.

6.1 Goals

Effective measures would be established with the aim of achieving the following goals:

- Minimisation of impacts on biodiversity values of the Site and locality;
- Protection of biodiversity values across the locality; and
- Protection of the values of important biodiversity resources within the locality.

6.2 General Principles

The goals would be achieved through implementation of the following general principles:

- Avoidance of impacts;
- Minimisation of impacts where avoidance is not possible; and
- Mitigation measures.

These goals and principles should form the basis for environmental management across the Site. Considerations specific to this location would be developed and detailed in a Construction Environmental Management Plan (CEMP) developed at the time. This should include a stringent Erosion and Sedimentation Control Plan (ESCP) to ensure that sediments from the Site are not mobilised and washed downstream into Pittwater.

In addition, a Fauna Management Plan should be developed to protect the Long-nosed Bandicoot which is believed to be resident on the Site. Targeted trapping should be undertaken just prior to any clearing of the Site to allow relocation of these animals.

7 CONCLUSION

The 0.805 ha Site at 15 – 17 Mona Street, Mona Vale, has been identified by Sydney Water as surplus lands. Sydney Water plans to dispose of the land in the future with the view to it being subdivided into four housing lots (totalling 0.309 ha) along the northern street frontage which is largely comprised of a mix of scattered, planted specimens of numerous native trees and shrubs, grading into weed infested emergent Estuarine Swamp Oak Forest. The remainder of the land (i.e. 0.496 ha) would be rehabilitated to Estuarine Swamp Oak Forest and connected to the north of the Site by a 10 m wide green corridor along the concrete channel.

The Site was found to support parkland, disturbed vegetation and Estuarine Swamp Oak Forest. This vegetation community is listed as Endangered under the EPBC Act and BC Act. However, this community and the majority of the Site is heavily weed-infested, degraded through clearing, dumping, tracks and an informal 'camp' to the extent that the Estuarine Swamp Oak Forest retains few features of this EEC (mainly the scattered occurrence of Swamp Oak). It provides few resources for potential threatened flora species as the ground layer, shrub layer and trees are smothered in introduced scramblers, and none were found or considered likely to occur. The Grey-headed Flying-fox, Large Bent-winged Bat, Southern Myotis and White-bellied Sea-eagle, are listed under the EPBC Act and / or BC Act, may on occasion use the resources of the Site. In addition, the density of the smothering weeds is likely to provide habitat for the native Long-nosed Bandicoot as conical diggings typical of this species were recorded on the Site.

While this proposal may ultimately result in the removal of some areas of Estuarine Swamp Oak Forest, it is likely to provide an overall benefit to the EEC on the Site, as it would be rehabilitated from its current severely degraded condition to a functioning vegetation community which would provide good quality flora and fauna habitat typical of an intact Estuarine Swamp Oak Forest community.

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APPENDIX A

15-17 Mona Street, Mona Vale

Plant Species Recorded

Plant Species Recorded
15-17 Mona Street, Mona Vale

14 May 2020

Legend
* introduced species
P – Planted
? – uncertain identification

Family	Scientific Name	Common Name
MAGNOLOPSIDA: MAGNOLIIDAE (Dicots)		
Apiaceae	*Daucus carota**	Wild Carrot
	*Foeniculum vulgare**	Fennel
Asclepiadaceae	*Araujia sericifera**	Moth Plant
Aizoaceae	*Tetragonia tetragonioides*	Warrigal Spinach
Asteraceae	*Bidens pilosa**	Cobblers Pegs
	*Bidens subalternans**	Cobblers Pegs
	Conyza sp.*	Fleabane
	Gamochaeta sp.*	Cudweed
	*Hypochaeris radicata**	Catsear
	*Sonchus oleraceus**	Common Sowthistle
	*Taraxacum officinale**	Dandelion
Basellaceae	*Anredera cordifolia**	Madeira Vine
Brassicaceae	*Brassica* sp.*	
	*Capsella bursa-pastoris**	Shepherd's Purse
Caesalpinaceae	*Senna pendula* var. *glabrata**	Common Cassia
Caprifoliaceae	*Lonicera japonica**	Japanese Honeysuckle
Caryophyllaceae	*Cerastrium* sp.*	Chickweed
	*Paronychia brasiliana**	Chilean Whitlow Wort
	*Stellaria media**	Common Chickweed
Casuarinaceae	*Casuarina glauca*	Swamp Oak
Convolvulaceae	*Dichondra repens*	Kidney Weed
Malvaceae	*Modiola caroliniana**	Red-flowereed Mallow
	*Sida rhombifolia**	Paddys Lucerne
Mimosaceae	*Acacia saligna**	Golden Wreath Wattle
Moraceae	*Ficus rubiginosa*	Port Jackson Fig
Myrtaceae	*Callistemon viminalis* P	Weeping Bottlebrush
	Corymbia citriodora P	Lemon-scented Gum
	Eucalyptus botryoides P	Bangalay
	Eucalyptus ?maidenii P	Southern Blue Gum
	Melaleuca decora P	
	Melaleuca styphelioides P	Prickly-leaved Paperbark
Oleaceae	*Jasminum polyanthemum**	Jasmine
	*Ligustrum lucidum**	Large-leaf Privet
Oxalidaceae	*Oxalis* sp.*	
Passifloraceae	*Passiflora subpeltata**	White Passionflower
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum

Family	Scientific Name	Common Name
Polygonaceae	*Acetosa sagittata**	Turkey Rhubarb
	*Rumex crispus**	Curled Dock
Protecaeae	*Grevillea robusta* [P]	Silky Oak
Rosaceae	*Rubus ellipticus**	Yellow Raspberry
Sapindaceae	*Cardiospermum grandiflorum**	Balloon Vine
Solanaceae	*Cestrum parqui**	Green Poisonberry
	*Solanum lycopersicum**	Tomato
	*Solanum mauritianum**	Tobacco Bush
	*Solanum nigrum**	Black Nightshade
	*Solanum seaforthianum**	
Sterculiaceae	*Brachychiton acerifolius*	Illawarra Flame Tree
Tropaeolaceae	*Tropaeolium majus**	Nasturtium
Verbenaceae	*Lantana camara**	Lantana
	*Verbena bonariensis**	Purple Top
Vitaceae	*Cayratia clematidea*	Slender Grape
MAGNOLOPSIDA: LILIDAE (Monocots)		
Araceae	*Livistona australis*	Cabbage Tree Palm
Asparagaceae	*Asparagus aethiopicus**	Ground Asparagus
Cannaceae	*Canna indica**	Indian Shot Plant
Commelinaceae	*Commelina cyanea*	Scurvy Weed
	*Tradescantia fluminensis**	Trad
Cyperaceae	*Cyperus eragrostis**	Umbrella Sedge
Poaceae	*Arundo donax**	Giant Reed
	Cynodon dactylon	Couch
	*Ehrharta erecta**	Panic Veldt Grass
	*Panicum maximum**	Guinea Grass
	*Pennisetum clandestinum**	Kikuyu
	*Poa annua**	Winter Grass
	*Stenotaphrum secundatum**	Buffalo Grass
Strelitziaceae	*Strelitzia* sp.*	Bird-of-Paradise

APPENDIX B

15-17 Mona Street
Mona Vale

Fauna Species Recorded

Fauna Species Recorded

May 2020

Key
– species listed under the BC Act
* - introduced species

Common Name	Family and Scientific Name	Detection Method
MAMMALS		
	Perameliidae	
Long-nosed Bandicoot	*Perameles nasuta*	Diggings observed
	Phalangeridae	
Common Brushtail Possum	*Trichosurus vulpecula*	Scratching observed
BIRDS		
	Megapodiidae	
Australian Brush Turkey	*Alectura lathami*	Breeding mound observed
	Anatidae	
Pacific Black Duck	*Anas superciliosa*	Observed
	Phalacrocoracidae	
Little Pied Cormorant	*Phalacrocorax melanoleucos*	Observed
Little Black Cormorant	*Phalacrocorax sulcirostris*	Observed
	Pelecanidae	
Australian Pelican	*Pelecanus conspicillatus*	Observed
	Threskiornidae	
Australian White Ibis	*Threskiornis molucca*	Observed
	Accipitridae	
# White-bellied Sea-eagle	*Haliaeetus leucogaster*	Observed
	Falconidae	
Peregrine Falcon	*Falco peregrinus*	Observed
	Laridae	
Silver Gull	*Chroicoephalus novaehollandiae*	Observed
	Cacatuidae	
Little Corella	*Cacatua sanguinea*	Observed
Sulphur-crested Cockatoo	*Cacatua galerita*	Observed
	Psittacidae	
Rainbow Lorikeet	*Trichoglossus haematodus*	Observed
Musk Lorikeet	*Glossopsitta concinna*	Observed
	Pardalotidae	
Spotted Pardalote	*Pardalotus punctatus*	Heard calling
	Meliphagidae	
Noisy Miner	*Manorina melanocephala*	Observed
	Artamidae	
Grey Butcherbird	*Cracticus torquatus*	Heard calling
Australian Magpie	*Cracticus tibicen*	Observed
Pied Currawong	*Strepera graculina*	Observed
	Corvidae	
Australian Raven	*Corvus coronoides*	Observed
	Hirundinidae	
Welcome Swallow	*Hirundo neoxena*	Observed
	Sturnidae	
* Common Myna	*Sturnus tristis*	Observed

APPENDIX C

SPECIES RECORDED AND / OR PREDICATED TO OCCUR WITHIN THE LOCALITY OF THE SITE

SPECIES RECORDED AND / OR PREDICATED TO OCCUR WITHIN THE LOCALITY OF THE SITE

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
FLORA			
Asterolasia elegans		E-BC E-EPBC	Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. Unlikely. Habitat not present.
Chamaesyce psammogeton	Sand Spurge	E-BC	Grows on fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex (*Spinifex sericeus*) and Prickly Couch (*Zoysia macrantha*). Unlikely. No habitat.
Callistemon linearifolius	Netted Bottle Brush	V-BC	This shrub species grows in dry sclerophyll forest on the coast and adjacent ranges. Only 5- - 6 populations remain. Unlikely. Not recorded on Site and habitat not present.
Eucalyptus camfieldii	Camfield's Stringybark	V-BC V-EPBC	Mallee habit. Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Associated species frequently include stunted species of *E. oblonga* Narrow-leaved Stringybark, *E. capitellata* Brown Stringybark and *E. haemastoma* Scribbly Gum. Unlikely. Not recorded on Site and habitat not present.
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V-BC V-EPBC	Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock. Unlikely. Not recorded on Site and habitat not present.
Genoplesium baueri	Bauer's Midge Orchid	E-BC E-EPBC	Terrestrial orchid known from dry sclerophyll forest and moss gardens over sandstone. Unlikely given the disturbed nature of the Site and absence of habitat.
Grammitis stenophylla	Narrow-leaf Finger Fern	E-BC	Moist places, usually near streams, on rocks or in trees, in rainforest and moist eucalypt forest.

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
			Unlikely given the disturbed nature of the Site.
Grevillea caleyi	Caley's Grevillea	CE-BC CE-EPBC	All sites occur on the ridgetop between elevations of 170 to 240m asl, in association with laterite soils and a vegetation community of open forest, generally dominated by *Eucalyptus sieberi* and *E. gummifera*. Unlikely. Not recorded on the Site and absence of habitat.
Kunzea rupestris		V-BC V-EPBC	Grows in shallow depressions on large flat sandstone rock outcrops. Unlikely. Not recorded on the Site and habitat not present.
Lasiopetalum joyceae		V-BC V-EPBC	An erect shrub to 2 m tall. Grows in heath on sandstone. Restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. Unlikely. Not recorded on the Site and habitat not present.
Microtis angusii	Angus's Onion Orchid	E-BC E-EPBC	Currently known from only one site at Ingleside, north of Sydney. It is not easy to define the preferred natural habitat of this orchid as the Ingleside location is highly disturbed. The dominant species occurring on the site are introduced weeds *Hyparrhenia hirta* (Coolatai grass) and *Acacia saligna*. Unlikely. Not known from the area.
Persoonia hirsuta	Hairy Geebung	E-BC E-EPBC	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone. Unlikely. Not recorded across the Site and habitat not present.
Pimelea curviflora var. *curviflora*		V-BC V-EPBC	A much-branched subshrub or shrub 20 to 120cm high with hairy stems. Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park on the Illawarra coastal plain. Unlikely. Not recorded across the Site and habitat not present.
Prostanthera densa	Villous Mint-bush	V-BC V-EPBC	Generally grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea.

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
			Unlikely. Habitat not present.
Rhodamnia rubescens	Scrub Turpentine	CE-BC	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. Unlikely. Not recorded across the Site and habitat not present.
Syzygium paniculatum	Magenta Lilly Pilly	E- BC V-EPBC	On the south coast it occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. Unlikely. Suitable vegetation associations not present.
Tetratheca glandulosa		V-BC	Small, spreading shrub which grows 20 - 50cm in height. Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone, with associated soil landscapes such as Lucas Heights, Gymea, Lambert and Faulconbridge. Unlikely given not a shale-sandstone transition habitat and the degraded and altered landscape.
REPTILES			
Varanus rosenbergi	Rosenberg's Goanna	V-BC	This species is found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in and hence termite mounds are a critical habitat component. Potential. Habitat not recorded.
AMPHIBIAN			
Heleioporus australiacus	Giant Burrowing Frog	V-BC V-EPBC	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types. Unlikely. Habitat type not present.
Pseudophryne australis	Red-crowned Toadlet	V-BC	This small frog occurs in open forests. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings.

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
			Unlikely. Habitat not present.
AVES			
Botaurus poiciloptilus	Australasian Bittern	E-BC E-EPBC	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Unlikely given the adjacent channel is concrete lined and tidal.
Ixobrychus flavicollis	Black Bittern	V-BC	This heron inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Unlikely. No permanent water, on or near the Site.
Burhinus grallarius	Bush Stone-curlew	E-BC	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Unlikely. Habitat not present.
Esacus magnirostris	Beach Stone-curlew	CE-BC	Coastal on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on islands, flats, banks and spits of sand, mud, gravel or rock, and among mangroves. Beach Stone-curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also among open mangroves. Unlikely. Habitat not present.
Numenius madagascariensis	Eastern Curlew	CE-EPBC	Generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Unlikely. Habitat not present.
Hieraaetus morphnoides	Little Eagle	V-BC	Occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia*

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
			woodlands and riparian woodlands of interior NSW are also used. Unlikely. Suitable habitat not present.
Lophoictinia isura	Square-tailed Kite	V-BC	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Unlikely. Suitable habitat not present.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V-BC	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. No evidence of feeding activity across the Site.
Callocephalon fimbriatum	Gang-gang Cockatoo	V-BC	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Unlikely given the disturbed nature of the Site.
Neophema pulchella	Turquoise Parrot	V-BC	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Unlikely. Habitat not present.
Petroica boodang	Scarlet Robin	V-BC	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
			Unlikely. Habitat not present.
Rostratula australis	Australian Painted Snipe	E-BC E-EPBC	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Unlikely. Habitat not present.
Daphoenositta chrysoptera	Varied Sittella	V- BC	A small songbird with a sharp, slightly upturned bill, short tail, barred undertail and yellow eyes and feet. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Unlikely. Habitat not present.
Ninox connivens	Barking Owl	V-BC	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Unlikely due to disturbance of habitat and proximity to residential development.
Ninox strenua	Powerful Owl	V-BC	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Potential. Low grade foraging habitat present.
Tyto novaehollandiae	Masked Owl	V-BC	A forest owl, but often hunts along the edges of forests, including roadsides. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. Unlikely. Habitat unlikely to be suitable.
Ptilinopus regina	Rose-crowned Fruit-Dove	V-BC	Occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful.

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
			Unlikely. Habitat not present.
Ptilinopus superbus	Superb Fruit-Dove	V-BC	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Unlikely. Habitat not present.
Lathamus discolor	Swift Parrot	E-BC CE-EPBC	Migrates to the Australian SE mainland between March and October to areas on the mainland where eucalypts are flowering profusely or where there are abundant lerp infestations. Unlikely due to disturbance of habitat and proximity to residential development.
Anthochaera phrygia	Regent Honeyeater	CE-BC CE-EPBC	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Unlikely. Habitat not present.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V-BC	Mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Unlikely. Habitat not present.S
Glossopsitta pusilla	Little Lorikeet	V- BC	A small bright green parrot which forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
			Unlikely due to disturbance of habitat and proximity to residential development.
Apus pacificus	Fork-tailed Swift	M,Mar-EPBC	In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. Unlikely. Habitat not present.
Hirundapus caudacutus	White-throated Needletail	M,Mar-EPBC	The White-throated Needletail feeds on flying insects, such as termites, ants, beetles and flies. They catch the insects in flight. Birds usually feed in rising thermal currents associated with storm fronts and bushfires and they are commonly seen moving with wind fronts. Potential. Could overfly the study area.
Haliaeetus lecuogaster	**White-bellied Sea-eagle**	**M,Mar-EPBC** **V-BC**	**Found in coastal areas, on islands, estuaries, inlets, large rivers, inland lakes and reservoirs where they forage over water. Builds huge nests of sticks. Recorded hawking approximately 1 km north of the Site.** **Likely to occasionally overfly the Site. No breeding habitat.**
Pluvialis squatarola	Grey Plover	M,Mar-EPBC	Occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. Unlikely. Habitat not present.
MAMMALS			
Cercartetus nanus	Eastern Pygmy-possum	V-BC	Rainforest, sclerophylla forest and woodland to heath – but heath & woodland preferred. Forages on banksias, eucalypts & bottlebrushes. Unlikely. Habitat not present.
Dasyurus maculatus	Spotted-tailed Quoll	V-BC	Recorded across a range of habitat types, including rainforest, open forest, woodland,

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
		E-EPBC	coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites. Unlikely due to disturbance of habitat and proximity to residential development.
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E-BC E-EPBC	Largely crepuscular. They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil. Unlikely. Not known from the area.
Petaurus norfolcensis	Squirrel Glider	V-BC	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Unlikely. Habitat not present.
Phascolarctos cinereus	Koala	E-BC	Inhabits eucalypt forests and woodlands. Habitat suitability is influenced by the: size and species of trees present, soil nutrients, climate, rainfall and the size and disturbance history of the habitat patches. Unlikely. Habitat not present.
Microchiropteran Bats			
Chalinolobus dwyeri	Large-eared Pied Bat	V-BC V-EPBC	Roosts - caves (near their entrances), crevices in cliffs, derelict mines and in the disused, bottle-shaped mud nests of the Fairy Martin frequenting low to mid-elevation dry open forest and woodland close to these features. Unlikely due to disturbance of habitat and absence of habitat.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V-BC	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Unlikely due to disturbance of habitat and absence of habitat.

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V-BC	Dry sclerophylla forest and woodland. Roosts - hollows & under bark or man-made structures. Unlikely due to disturbance of habitat and absence of habitat.
Miniopterus australis	Little Bent-winged Bat	V-BC	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamp. Roosts in caves, tunnels, tree hollows, stormwater drains, culverts.
Miniopterus orianae oceanensis	**Large Bent-winged Bat**	**V-BC**	**Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunts in forested areas, catching moths and other flying insects above the tree tops. Previously recorded along the concrete channel at the corner of Mona & Bassett Streets and further south along the channel approximately 200 m from the Site.** **Likely to forage across the Site on occasion. Site unlikely to provide roosting habitat.**
Myotis macropus	**Southern Myotis**	**V- BC**	**Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges. Forages over streams and pools catching insects and small fish by raking their feet across the water surface. Previously recorded along the concrete channel at the corner of Mona & Bassett Streets and further south along the channel approximately 200 m from the Site.** **Likely to forage along the adjacent concrete channel at high tide. Site unlikely to provide roosting habitat.**
Scoteanax rueppellii	Greater Broad-nosed Bat	V- BC	Occurs in woodland, moist and dry eucalypt forest and rainforest but prefers tall wet forest. Roosts in tree hollows but also buildings. Unlikely due to disturbance of habitat and proximity to residential development.
Vespadelus troughtoni	Eastern Cave Bat	V- BC	A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals.

Scientific Name	Common Name	Status	Habitat Requirements / Records & Likely Occurrence
			Unlikely due to disturbance of habitat and proximity to residential development.
Megachiropteran Bats			
Pteropus poliocephalus	**Grey-headed Flying-fox**	**V- BC** **V-EPBC**	**Subtropical and temperate rainforests, tall sclerophylla forests and woodlands, heaths and swamps.** **Potential foraging habitat present.**
Note: BC Act = *Biodiversity Conservation Act 2016*; EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*, V = Vulnerable, E = Endangered, M = Migratory, Mar = Marine. **Bold** indicates those species particularly relevant to the Site. **Sources**: DAWE (2020), DPIE (2020).			

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