



NARLA
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Flora and Fauna Assessment

461-473 Pacific Highway, Asquith NSW

Report prepared by Narla Environmental Pty Ltd
for CalderFlower Architects

November 2018





NARLA

environmental

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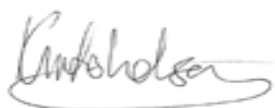
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I, Kurtis Lindsay, certify that:

- this Flora and Fauna Assessment has been prepared in accordance with the brief provided by the client.
- the information presented in this report is a true and accurate record of the study findings in the opinion of the authors.
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1. Introduction

1.1 Project Proposal

Narla Environmental Pty Ltd (Narla) was engaged by CalderFlower Architects (the proponent) to undertake a Flora and Fauna Assessment (FFA) in association with the Development Application (DA) for the proposed development across the following properties:

- 461 Pacific Highway, Asquith, 2077 (Lot 15/-/DP14476)
- 463 Pacific Highway, Asquith, 2077 (Lot 16/-/DP1003192)
- 465 Pacific Highway, Asquith, 2077 (Lot 17/-/DP1003192)
- 467 Pacific Highway, Asquith, 2077 (Lot 18/-/DP1003192)
- 469 Pacific Highway, Asquith, 2077 (Lot 19/-/DP1003912)
- 471 Pacific Highway, Asquith, 2077 (Lot 1/-/DP1003107)
- 473 Pacific Highway, Asquith, 2077 (Lot 1/-/DP120748)

For the purpose of this FFA, the properties were assessed collectively (here forward referred to as 'the Subject Site') (**Figure 2**).

The proposed works involve the demolition of existing dwellings and ancillary structures, and clearing of vegetation on properties 461-473 Pacific Highway for the construction of an aged care centre, within the Subject Site. Narla have produced this report in order to assess any potential impacts associated with the proposed development, and recommend appropriate measures to mitigate any potential ecological impacts in line with the requirements of the Consent Authority, The Hornsby Shire Council.

1.2 Scope of assessment

The objectives of this Flora and Fauna Assessment were to:

- Assess the proposed development against all relevant local government, state and commonwealth policy and legislation.
- Undertake background research to determine the likelihood for State and/or Commonwealth threatened biota to occur within or utilise the Subject Site during a point in their lifecycles
- Establish the likelihood of occurrence of migratory species, threatened species, endangered populations and threatened ecological communities as listed under the New South Wales Biodiversity Conservation Act 2016 (BC Act) and/or the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Assess any potential impacts to species and/ or communities listed under the BC Act and EPBC Act.
- Identify and map the distribution of vegetation communities in the Subject Site and discuss patch size and condition.
- Record presence and the extent of any priority weeds.
- Determine ecological impacts or risks that may result due to the proposed works.
- Recommend any controls or additional actions to be taken to protect or improve environmental outcomes of the proposed works.

1.3 Site Description and Location

The Subject Site is situated on the Pacific Highway, within the suburb of Asquith which is situated in The Hornsby Shire Council Local Government Area (LGA) (**Figure 2**). The Subject Site covers an area of approximately 4,941m². The Subject Site exists on a south-east facing slope of a Wianamatta Shale ridgetop along which Pacific Highway extends. The elevation varies from 176 metres (m) – 180 m above mean sea level. The slope declines a maximum of 4m from Pacific Highway to the southern edge of the Subject Site.

The Subject Site is currently occupied by medium density residential dwellings and associated landscaping. Existing landscaping is comprised of a mixed, urban exotic-native tree, shrub and groundcover assemblage typical of urban Sydney. Tall native trees exist in portions of the Subject Site. While most of these trees have been historically planted, some appear to be remnant, indigenous and representative of the vegetation that once naturally dominated the locality.

1.4 Qualifying for the Biodiversity Offset Scheme

Local development in the Hornsby Shire Council is assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Developments of this nature qualify to be assessed in line with the Biodiversity Offset Scheme (BOS) if:

- the development involves clearing of native vegetation that triggers the BOS threshold (**Table 1**) - the area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).
- or
- the development impacts an area mapped in 'orange' on the Biodiversity Values map published by the Minister for the Environment (**Figure 1**).
- or
- the development is considered likely to significantly affect threatened species based on the test of significance in section 7.3 of the *Biodiversity Conservation Act 2016* (BC Act).

Table 1. Area clearing thresholds table.

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

The proposed development does not trigger the BOS since:

- the proposed development will not involve clearing of vegetation in excess of 0.25 ha, and
- the proposed development will not impact upon an area mapped on the Biodiversity Value Map (**Figure 1**).

Since the BOS is not triggered, a test of significance (5-part test) will be sufficient to assess impacts of the proposed development upon matters listed under the BC Act and its regulations as amended.



Figure 1. Biodiversity Value Map. Approximate location of Subject Site is identified with a blue dot. Note, the Subject Site is not situated near any mapped 'biodiversity value areas' (orange polygons)



Figure 2. Location of the Subject Site on the southern side of Pacific Highway, Asquith, New South Wales

1.5 Relevant Legislation and Policy

The following list of legislation and policy are addressed in this report.

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Action Required
Environmental Planning and Assessment Act 1979 (EP&A Act)	All features	Yes	This Flora and Fauna Assessment Report and all legislation and policy addressed along with subsequent recommendations relevant to the DA
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	No EPBC Act (Commonwealth) Threatened Species or Ecological Communities are represented within the Subject Site. No threatened flora or fauna listed under the EPBC Act were observed on the Subject Site at the time of assessment. Suitable habitat for one EPBC Act (Commonwealth) threatened fauna species is present.	No	None
Biodiversity Conservation Act 2016 (BC Act)	<i>Sydney Turpentine-Ironbark Forest</i> which is listed under BC Act (NSW) as an Endangered Ecological Community is present on the Subject Site. No threatened flora or fauna listed under the BC Act were observed on the Subject Site at the time of assessment. Suitable habitat for a suite of threatened fauna species is present within the Subject Site.	Yes	A test of significance of impact from the proposed DA on BC Act listed threatened species (5-part Test of Impact Significance) pursuant s.7.3 of the BC Act.
Biosecurity Act 2015 (BS Act)	Two weeds listed under the Biosecurity Act in the Greater Sydney Region were observed within the Subject Site. These included Fireweed (<i>Senecio madagascariensis</i>) and Pampas Grass (<i>Cortaderia selloana</i>).	Yes	Follow the Mandatory or Regionally Recommended Measures outlined for each Biosecurity Weed.
State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44)	SEPP 44 does apply to Hornsby Shire Council. However, the Subject Site is less than the 1ha threshold required for this SEPP to apply	No	None
State Environmental Planning Policy No 19 - Bushland in Urban Areas (SEPP 19)	The Subject Site does not directly border any mapped Council Bushland or Reserves.	No	None

1.6 The Hornsby Local Environmental Plan 2013

1.6.1 Zoning

The Subject Site is zoned 'R3 – Medium Density Residential'.

The Hornsby Local Environmental Plan 2013 (LEP) requires that development satisfies the zone objectives of the LEP, which are to:

- To provide for the housing needs of the community within a medium-density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To provide for a variety of housing types.

1.6.2 Terrestrial Biodiversity

Section 6.4 'Terrestrial Biodiversity' of the Hornsby Local Environmental Plan (LEP 2013) is relevant to this proposal. The objective of this clause is to maintain terrestrial biodiversity by protecting native fauna and flora, and protecting the ecological processes necessary for their continued existence, and encouraging the conservation and recovery of native fauna and flora and their habitats.

This clause applies to land identified as "Biodiversity" on the Terrestrial Biodiversity Map.

Before determining a development application for development on land to which this clause applies, the consent authority must consider:

- whether the development is likely to have:
 - any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and
 - any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and
 - any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and
 - any adverse impact on the habitat elements providing connectivity on the land, and
- any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or if that impact cannot be minimised—the development will be managed to mitigate that impact.

1.7 The Hornsby Development Control Plan 2013 (DCP)

1.7.1 Landscaping (Part: 1C.2.9)

Desired Outcomes

- a. Landscaping that integrates the built form with the locality and enhances the tree canopy.
- b. Landscaping that improves the environmental performance of the development.

Prescriptive Measures

- a. Landscaping on site should be incorporated into the site planning of a development to (where appropriate):
 - reinforce the desired future character of the locality,
 - maintain significant landscape features,
 - provide planting within setback zones (setbacks identified within the relevant applicable parts of the DCP),
 - soften the visual impact of buildings, carparks and roads,
 - cater for outdoor recreation areas,
 - separate conflicting uses,
 - screen undesirable elements,
 - and improve the aesthetic quality of the development.
- b. Landscape planting should achieve a mature height in scale with the structures on the site.
- c. Where canopy trees, shrubs and groundcovers are required, preference should be given to incorporating locally indigenous plants.
- d. Street tree planting within public land should comply with Council's Tree Management Plan.
- e. Topsoil and mulch should be included in landscape areas and should contain organic matter to support plant growth.
- f. Where landscaping is provided in a structured environment such as a raised planter box or 'on slab' they should include waterproofing, drainage and automatic irrigation.

The proposed development meets the objectives of this control as the implementation of the corresponding landscape plan (Taylor Brammer 2018) and relevant revegetation recommendations within this report will satisfy both the desired outcomes and prescriptive measures outlined within Part 1C 2.9 of the Hornsby Development control Plan.

1.7.2 Tree and Vegetation Preservation (Part: 1B.6)

1.7.2.1 Tree Preservation (HDCP Part 1B.6.1)

Prescribed Trees

The prescribed trees that are protected by the Vegetation SEPP and/or Clause 5.10 of the HLEP and this Section of the DCP includes:

- a. trees except exempt tree species in Hornsby Shire, as listed in Table 1 or subject to the Biodiversity Offset Scheme,
- all trees on land within a heritage conservation area described within the HLEP,
- and all trees on land comprising heritage items listed within the HLEP.

b. To damage or remove any tree protected under this DCP is prohibited without the written consent of Council, except in accordance with the exemptions prescribed in this part (under the heading 'Exempt Tree Work').

c. For the purposes of this section:

- **Arborist (Project and Consulting)** must have obtained through training and completed Australian Qualification Framework (AQF) Level 5, Diploma of Arboriculture.
- **A tree** is defined as a long lived woody perennial plant with one or relatively few main stems with the potential to grow to a height greater than 3 metres.
- **Native vegetation** has the same meaning as in Part 5A of the Local Land Services Act 2013, with the exclusion of 60B(4) for the purposes of including marine vegetation in the definition of native vegetation. Damage means to impair the value or usefulness, or weaken the health or the normal function of a tree or vegetation.
- **Remove** means to cut down, knock down, kill, lop or destroy.
- **Prune** means to selectively remove branches.
- **Tree Protection Zone** means the area above or below ground at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree.

Table 2: Exempt trees as listed in the Hornsby Shire Council DCP. Tree works are permitted on any of these species (Hornsby Shire Council 2013)

Botanical Name	Common Name
<i>Acacia baileyana</i>	Cootamundra Wattle
<i>Acacia saligna</i>	Golden Wreath Wattle
<i>Acer negundo</i>	Box Elder
<i>Ailanthus altissima</i>	Tree of Heaven
<i>Alnus jorullensis</i>	Evergreen Alder
<i>Arecastrum romanzoffianum</i>	Cocos Palm
<i>Celtis sinensis</i>	Hackberry
<i>Cinnamomum camphora</i>	Camphor Laurel
All edible fruit and nut trees except native species such as <i>Acmena spp</i> (Lilli Pilli), <i>Syzygium spp</i> (Lilli Pilli) <i>Elaeocarpus spp</i> (Blueberry Ash) or <i>Macadamia spp</i> (Macadamia Tree) Fruit and Nut trees	
<i>Cotoneaster spp.</i>	Cotoneaster
<i>Eriobotrya japonica</i>	Loquat
<i>Erythrina spp</i>	Coral tree
<i>Ficus elastica</i>	Rubber tree
<i>Gleditsia triacanthos</i>	Honey Locust
<i>Lagunaria patersonii</i>	Norfolk Island Hibiscus
<i>Ligustrum spp</i>	Privet
<i>Populus spp</i>	Poplar
<i>Pyracantha augustifolia</i>	Firethorn
<i>Robinia pseudoscacia</i>	Golden Robinia
<i>Salix spp</i>	Willow
<i>Schefflera actinophylla</i>	Umbrella Tree
<i>Schinus spp</i>	Peppercorn Tree
<i>Toxicodendron spp</i>	Rhus

1.7.2.2 Natural Environment and Biodiversity (HDCP Part 1C.1 and Part 1C.1.1)

The following controls apply to land with biodiversity value, including land affected by the HLEP provisions.

Desired Outcomes

- a. Development that provides for the conservation of biodiversity including threatened species and populations, endangered ecological communities, remnant indigenous trees, regionally and locally significant terrestrial and aquatic vegetation.
- b. Development that maintains habitat for native wildlife and wildlife corridors to provide for the movement of fauna species.

Prescriptive Measures

General

- a. Development should seek to:
 - avoid potential adverse impact on biodiversity,
 - if that impact cannot be avoided, minimise that impact, or
 - if the impact cannot be minimised, to mitigate the impact.
- b. A flora and fauna assessment is required for development that may impact on:
 - land mapped as Biodiversity on the HLEP Terrestrial Biodiversity Map, or
 - native vegetation which is habitat for species listed in Schedule 1, 1A or 2 of the Threatened Species Conservation Act 1995.
- c. Development should avoid the fragmentation of existing native vegetation.
- d. Development should seek to retain unique environmental features of the site including:
 - rock outcrops,
 - groups of significant trees and vegetation, and
 - mature hollow trees and other fauna habitat features on the site.
- e. Development should incorporate and maintain a buffer zone to significant flora and fauna. Development should not include buildings, structures and earthworks within the required buffer zone prescribed in **Table 3**.

Table 3. Buffer Zones to Vegetation Types (as listed in Hornsby Shire Council DCP 2013)

Significant Vegetation Type	Minimum Buffer Zone (metres)
Endangered ecological communities and regionally significant bushland (as mapped in the HLEP Terrestrial Biodiversity Map)	20m
Populations of threatened flora species, habitat for threatened species, locally significant bushland, groups of remnant indigenous trees	10m

- f. Notwithstanding the buffers presented in Table 2 above, certain native vegetation that is habitat for species listed in the Threatened Species Conservation Act may require larger buffer zones in order to avoid potential adverse impacts on biodiversity.

Land Adjoining Public Open Space

- k. Development within or adjoining land zoned or reserved for public open space should address means to protect and minimise bushland disturbance.
- l. Development should provide buffers for bushfire protection on private land, not on public land.

The proposed development meets the objectives of this control as the implementation of both the prescribed landscape plan (Taylor Brammer 2018) and the compensatory revegetation recommendations outlined within this report will satisfy both of the primary desired outcomes of this clause. The proposed development will result in a net gain in both the prevalence of Sydney Turpentine – Ironbark Forest within the site as well as habitat for native species within the vicinity of the Subject Site.

1.8 Study Limitations

This study was not intended to provide a complete inventory of all species which occur on the Subject Site; rather it was to provide an assessment into the likelihood of occurrence of any significant ecological features (migratory species, threatened species, communities and populations) on the Subject Site, and the potential for impacts from the proposed works on any of those ecological features.

The species inventory provided for the Subject Site was restricted to what was observed during the survey period by the Narla Ecologists. The timing of the survey may not have coincided with emergence times of some species of flora and fauna, such as seasonally flowering ground orchids or seasonal migratory fauna. Likewise, weather conditions may have played a role in the emergence or activity levels of certain species.

To account for those species that could not be identified during the field survey, detailed habitat assessments were combined with desktop research and local ecological knowledge to establish an accurate prediction of the potential for such species to occur on or adjacent the Subject Site.

2. Methodology

2.1 Desktop Assessment and Literature Review

A thorough literature review of local information relevant to the Hornsby Shire Council area was undertaken. Searches utilising NSW Wildlife Atlas (Bionet) and the Commonwealth Protected Matters Search Tool were conducted to identify all current threatened and migratory flora and fauna records within a 10 km² search area centred on the Subject Site. This data was used to assist in establishing the presence or likelihood of any such ecological values as occurring on or adjacent the Subject Site, and helped inform our Ecologist on what to look for during the Subject Site assessment.

The following documents were also reviewed as part of the preparation of this report:

- The Hornsby Local Environmental Plan (LEP) 2013
- The Hornsby Development Control Plan (DCP) 2013
- State Environmental Planning Policy (SEPP) (Seniors Living) 2004

Soil landscape and geological mapping was examined to gain an understanding of the environment on the Subject Site and assist in determining whether any threatened flora or ecological communities may occur there (Chapman & Murphy 1989).

2.2 Ecological Site Assessment

An ecological survey of the Subject Site was undertaken by Narla Ecologist Guy Smith on August 28th 2018.

During the Subject Site assessment, the following activities were undertaken:

- Identifying and recording the vegetation communities present on the Subject Site, with focus on identifying any threatened ecological communities (TEC)
- Recording a detailed list of flora species encountered on the Subject Site, with a focus on threatened species, species diagnostic of threatened ecological communities and noxious weeds.
- Recording opportunistic sightings of any fauna species seen or heard on or within the immediate surrounds of the Subject Site
- Identifying and recording the locations of notable fauna habitat such as important nesting, roosting or foraging microhabitats.
- Targeting the habitat of any threatened and regionally significant fauna including:
 - Tree hollows (habitat for threatened large forest owls, parrots, cockatoos and arboreal mammals)
 - Caves and crevices (habitat for threatened reptiles, small mammals and microbats)
 - Termite mounds (habitat for threatened reptiles and the echidna)
 - Soaks (habitat for threatened frogs)
 - Wetlands (habitat for threatened fish, frogs and water birds)
 - Drainage lines (habitat for threatened fish and frogs)
 - Fruiting trees (food for threatened frugivorous birds and mammals)
 - Flowering trees (food for threatened nectivorous mammals and birds)
 - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals), and
 - Any other habitat features that may support fauna (particularly threatened) species.
- Assessing the connectivity and quality of the vegetation within the Subject Site and surrounding area

3. Results and Discussion

3.1 Topography, geology and soils

The Subject Site is situated on a transitional zone between the Lucas Heights soil landscape and the Glenorie soil landscape (Chapman & Murphy 1989).

Ridge and plateau surfaces on Mittagong Formation. Occurrences are most common in the Macdonald Ranges and on the Hornsby Plateau. Most extensive occurrences are located at Berowra, Forest Glen, Glenorie, Fiddletown, Dural and Glenhaven. Other examples occur at St. Ives, South Turramurra, South Gordon, Beacon Hill, Northbridge, Kogarah and Riverwood. Mittagong Formation - interbedded shale, laminite and fine to medium grained quartz sandstone. The Mittagong Formation is located stratigraphically between the Ashfield Shale and Hawkesbury Sandstone. It is often relatively shallow. Minor areas of Hawkesbury Sandstone and minor areas of Ashfield Shale may occur. Gently undulating plateau, 200-1000 m in width, with level to gently inclined slope gradients of <10%. Local relief is <30 m. Rock outcrop is absent. Extensively cleared to completely cleared low, eucalypt open-forest and low eucalypt woodland with a sclerophyll shrub understorey

The Glenorie soil landscape occurs north of the Parramatta River on the Hornsby Plateau in Baulkham Hills, Hornsby, Ku-ring-gai, and Ryde local government areas. Smaller isolated areas are at Condell Park, Hurstville, and on the Cumberland Lowlands at Rosehill. This soil landscape is underlain by Wianamatta Group Ashfield Shale and Bringelly Shale formations. Low rolling and steep hills. Local relief 50-120 m, slopes 5-20%. Convex narrow (20-300 m) ridges and hillcrests grade into moderately inclined side slopes with narrow concave drainage lines. Moderately inclined slopes of 10-15% are the dominant landform elements. Extensively cleared tall open-forest (wet sclerophyll forest).

3.2 Hydrology

The nearest BOM weather station, Terrey Hills, to Hornsby Shire Council has an annual rainfall of 1089.9mm (BOM 2018). Owing to the topography of the Subject Site, overflow from the Subject Site runs in a south-easterly direction towards the Berowra Creek, of which the Subject Site is situated approximately 7 kilometers (km) South. The Subject Site exists on a south-west – south facing slope of a ridgetop along which Pacific Highway runs. The elevation varies from 68m – 80m above mean sea level. The slope declines a maximum of 12m from Pacific Highway to the southern edge of the Subject Site.

3.3 Vegetation Communities

3.3.1 Historical Vegetation Mapping

Historical, remote-sensing-derived vegetation mapping of the locality undertaken for the Sydney Metropolitan Vegetation Mapping Program (OEH 2016) (**Figure 3**) have not mapped any native vegetation in the Subject Site. The most proximal mapped vegetation is a small parcel of 'WSF09: Sydney Turpentine-Ironbark Forest' located to the south of the Subject Site.

3.3.2 Narla Vegetation Mapping

Narla Environmental confirmed that the majority of the vegetation across the Subject Site was characteristic of unmaintained, over-grown, urban, exotic gardens. The vegetation across the site was generally poor quality with low overall ecological significance. A large portion of the Subject Site was dominated by weeds, including *Cinnamomum camphora* (Camphor Laurel), *Cortaderia selloana* (Pampas Grass), and *Senecio madagascariensis* (Fireweed).

Small portions of the Subject Site contained trees representative of 'Sydney Turpentine-Ironbark Forest' (see **Table 4**).

Upon site assessment, Narla ecologists confirmed the Subject Site contained small, degraded patches of native vegetation matching the description of the vegetation community 'S_WSF09: Sydney Turpentine-Ironbark Forest' (OEH 2016a). This community meets the criteria to be classified as STIF EEC under the BC Act. Narla determined this through the detection of four canopy species, *Angophora costata* (Sydney Red Gum), *Eucalyptus paniculata* (Grey Ironbark), *Eucalyptus resinifera* (Red Mahogany) and *Angophora floribunda* (Rough-barked Apple). STIF EEC within the Subject Site was restricted to eighteen trees characteristic of STIF that, when combined cover a maximum area of approximately 480.3m² (**Figure 4**).

Whilst the vegetation present on the Subject Site is classified as STIF EEC the condition of the patch is in poor quality due to the high number of exotic planted garden ornamentals, and high presence of weeds within the Subject Site that are outcompeting the native Sydney Turpentine-Ironbark Forest species.

3.3.2.1 Vegetation Condition

The total extent of Sydney Turpentine-Ironbark Forest EEC on the Subject Site is restricted to eighteen trees characteristic of the EEC, mostly on the east side of the site (**Figure 4**). This small extent is comprised entirely of remnant canopy trees, situated over urban garden areas that are dominated by exotic shrubs, herbs and grasses with scattered native grasses and herbs. This island of Sydney Turpentine-Ironbark Forest is separated by areas of land that have been historically cleared and replaced with lawns, ornamental garden beds, ornamental exotic/non-indigenous trees, hard landscaping, dwellings and fencelines. No other native vegetation occurred in the Subject Site, other than scattered, planted ornamental native species.

3.3.2.2 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

Only high-quality remnant patches with characteristic native plant species present in all structural layers and that have the following characteristics are part of the Turpentine-Ironbark Forest of the Sydney Basin Bioregion listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth):

- tree canopy cover >10%, patch area > 1 ha, or
- tree canopy cover <10%, patch area > 1 ha and patch is located within native vegetation with an area >5 ha.

The type 1 patches, whose total area is 136 ha, have the greatest conservation value and their size generally makes them most resilient to disturbance (Threatened Species Scientific Committee 2005). The type 2 patches, whose total area is 4 ha, enhance the potential for connectivity and the viability of the ecological community, act as a buffer against disturbance and support gene flow in the plant and animal species associated with the ecological community (Threatened Species Scientific Committee 2005). Occurrences of Turpentine-Ironbark Forest that do not meet the above criteria, although not part of the listed ecological community, still have conservation values as biodiversity reservoirs, faunal corridors etc.

The area of Sydney Turpentine-Ironbark Forest within the Subject Site does not classify for assessment under the EPBC Act as the occurrence on the Subject Site is less than 1 hectare (ha) with no adjoining bushland connectivity, and has low diversity and cover of Sydney Turpentine-Ironbark Forest species present within the Subject Site.

Table 4. Description of Sydney Turpentine-Ironbark Forest in the Subject Site

Sydney Metro (OEH 2016a)	Approximate Area on Subject Site (m ²)	Community Description (OEH 2016a)	Description of Community on the Subject Site	BC Act	EPBC Act
S_WSF09: Sydney Turpentine-Ironbark Forest	510m ²	<p>Sydney Turpentine-Ironbark Forest (Benson and Howell 1990) is a tall open forest found on shale and shale-enriched sandstone soils on the coast and hinterland of Sydney. It has been extensively cleared but was once widely distributed between Sutherland and the Hornsby plateau with outlying examples found on shale-rich deposits at Campbelltown, Menai, Kurrajong and Heathcote. The primary distribution of this forest is in areas receiving between 900 and 1250 millimetres of mean annual rainfall at elevations between 10 and 180 metres above sea level.</p> <p>The forest is characterised by open midstrata of mesic and sclerophyllous shrubs and small trees with a grassy ground cover. The composition of the canopy is variable depending on location and substrate. Typically, it is recognised by a canopy dominated by turpentine, red mahogany and various ironbarks. On the north shore these forests are found on shale-enriched sheltered sandstone slopes where ironbarks are less common and blackbutt is prevalent. In the western suburbs drier forms of this forest are found at Concord, Bankstown and Auburn although remnants are small and highly disturbed.</p>	<p>The occurrence of this community on the Subject Site, is restricted to 18 individual trees comprising 4 species characteristic of Sydney Turpentine-Ironbark Forest around the boundary of the site and 1 tree in the centre of the site.</p> <p>The species present are all canopy species and no shrub or groundcover species characteristic of Sydney Turpentine-Ironbark Forest were found during surveys.</p> <p>Soil across the site is derived from Wianamatta shale.</p>	Endangered	<p>Sydney Turpentine-Ironbark Forest within the Subject Site</p> <p>Does not qualify for listing under the EPBC Act as it fails to meet the relevant condition and area thresholds.</p>





Figure 3. Historical, remote-sensing-derived vegetation mapping of the locality undertaken for the Sydney Metropolitan Vegetation Mapping Program (OEH 2016a).



Figure 4. Narla mapped vegetation types within the Subject Site.

3.4 Flora

A total of 82 plant species were identified within the Subject Site. This was comprised of over 70% exotic ornamental and weed species. Nomenclature follows PlantNet (2018).

A number of non-indigenous native plant species occurred on the Subject Site (i.e. native to NSW but not indigenous to the locality). Including trees and shrubs that are commonly used in landscaping or forestry and had been planted within the Subject Site for ornamental reasons.

Only 11 indigenous, native plant species (i.e. indigenous to the landscape and locality) were found within the Subject Site. Of these, 4 were characteristic of the STIF EEC in accordance with the 'Final Determination' (NSW TSSC 2011). This low number of indigenous species

3.4.1 Threatened Flora Species

No naturally occurring threatened flora were observed during the Ecologist site assessment. Owing to the degree of historical disturbance associated with clearing, landscaping and planting of garden plants across the Subject Site, it was concluded that there was no potential for threatened flora to naturally occur within the Subject Site.

Two commonly propagated, planted species that are regarded as threatened in their natural populations, *Eucalyptus scoparia* (Wallangarra White Gum) and *Macadamia tetraphylla* (Rough-shelled Bush Nut). This *Macadamia* is listed 'vulnerable' under the BC Act and EPBC Act, and the White Gum is listed 'endangered' under the BC Act, and 'vulnerable' under the EPBC Act. The specimens on the Subject Site consisted of historically planted nursery stock of unknown origin and hold little to no conservation significance.

3.4.2 Weeds

A total of 62 exotic flora species were recorded within the Subject Site. This abundance of weeds is typical of established urban gardens within the area.

3.4.2.1 Priority Weeds

Two priority weeds were identified within the Subject Site (Table 5). These weeds must be managed in accordance with the Biosecurity Act 2015.

Table 5. Priority weeds recorded on the Subject Site

Species	Biosecurity Duty (Biosecurity Act 2015)
<i>Cortaderia</i> spp. (Pampas Grass)	<p>General Biosecurity Duty</p> <p>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.</p> <p>Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. The plant should not be bought, sold, grown, carried or released into the environment. The plant or parts of the plant are not traded, carried, grown or released into the environment.</p>
<i>Senecio madagascariensis</i> (Fireweed)	<p>General Biosecurity Duty</p> <p>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.</p> <p>Prohibition on dealings</p> <p>Must not be imported into the State or sold</p>

3.5 Fauna

Only 7 fauna species were encountered on the Subject Site by Narla Environmental during the site survey period. All fauna species encountered were listed as 'protected' under the BC Act, with the exception of two introduced birds.

No threatened fauna listed under the BC Act or EPBC Act were encountered during the Subject Site survey.

All of the fauna encountered were birds including, *Manorina melanocephala* (Noisy Miner), *Cracticus tibicen* (Australian Magpie), *Cracticus torquatus* (Grey Butcherbird) and Red Wattlebird (*Anthochaera carunculata*). All of these species are considered common, urban-adapted birds. The Noisy Miner is an aggressive dominant species and its effects on other bird species have contributed to its listing as a Key Threatening Process (KTP).

3.5.1 Threatened Fauna Habitat

A thorough assessment of fauna habitat availability conducted during the Subject Site visit, provided a better understanding of the fauna species that may potentially occur on the Subject Site during a part of their lifecycle.

The Subject Site displayed fauna habitat values that were typical of an overgrown, old-style garden located in an urban setting. The Subject Site provided foraging, nesting and roosting habitat for a small suite of common, urban-adapted birds, mammals, reptiles, frogs and invertebrates.

Locally indigenous flowering trees included Sydney Red Gum, Red Mahogany, and Turpentine. These trees provide potential foraging habitat that may be utilised by the vulnerable *Pteropus poliocephalus* (Grey-headed Flying Fox)

Representatives of all four STIF characteristic species will be retained on the Subject Site post development. Other nectar-bearing trees on the Subject Site, include planted native *Callistemon spp.*, *Eucalyptus microcorys* (Tallowwood), *Corymbia citriodora* (Lemon-scented Gum) and *Banksia integrifolia* (Coast Banksia). These trees will be retained post development. All of these trees also support psyllid bugs (a small insect) that live on the foliage of *Eucalyptus spp.* and secrete a sugary exudate that attract nectivorous birds, including the critically endangered *Lathamus discolor* (Swift Parrot) and the vulnerable *Glossopsitta pusilla* (Little Lorikeet).

The Subject Site contains marginally suitable habitat for *Pteropus poliocephalus* (Grey-headed Flying-fox), however, no camps were observed during the survey.

The site contains some dense canopy trees which could provide temporary roosting for *Ninox connivens* (Powerful Owl), however, such roosting would only be temporary and used by non-breeding birds only, as there is no suitable nesting habitat (i.e. large, sheltered tree hollows) present on the Subject Site.

There is a single dead stag tree that has potential to be utilised by vulnerable microbats, as no hollows were observed in it, only cracks, it is unlikely these hollows are large enough to support regular roosting or breeding by microbat colonies. Gaps between canopies across the site are likely to provide foraging habitat for threatened microbats and hunting by owl. However, it is unlikely that such habitat would be significant to either fauna groups.

There was no soak, wetland or riparian habitat suitable for threatened frogs, fish or wetland birds.

3.5.2 Threatened Fauna Species and their Potential for Occurrence on the Subject Site

The desktop analysis and site habitat assessment revealed eight threatened fauna had potential to utilise habitat on the Subject Site during all or part of their lifecycles. The total list of threatened species deemed as having potential to occur in the Subject Site is presented (**Table 6**).

Table 6. Threatened flora and fauna recorded within 10km of the Subject Site and an assessment of the likelihood that they could occur the Subject Site during part of their lifecycles

Common name	Scientific name	BC Act status	EPBC Act status	Habitat requirements (OEH 2011-2017)	Likelihood of occurrence (ALA 2018; OEH 2018a)	5 Part Test required
Giant Burrowing Frog	<i>Heleioporus australiacus</i>	Vulnerable	Vulnerable	Found in heath, wet and forests and around swamps.	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area Closest record is 1.8km away from 1983 in Ku-ring-Gai Chase NP 	No
Red-crowned Toadlet	<i>Pseudophryne australis</i>	Vulnerable	---	Found in sandstone country in heath, wet and dry sclerophyll forests especially around seepage lines	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area Closest record is 1.2km away in protected bushland 	No
Green and Golden Bell Frog	<i>Litoria aurea</i>	Endangered	Vulnerable	Found in marshes, dams and stream sides	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area Closest record 4.8km away from 1998 	No
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	Vulnerable	---	Found in heath, open forest and woodland	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area Records at least 3.8km away in Ku- 	No



Common name	Scientific name	BC Act status	EPBC Act status	Habitat requirements (OEH 2011-2017)	Likelihood of occurrence (ALA 2018; OEH 2018a)	5 Part Test required
					ring-Gai Chase NP	
Superb Fruit-Dove	<i>Ptilinopus superbus</i>	Vulnerable	---	Found primarily in rainforest and similar but will forage anywhere with fruit bearing trees	Moderate <ul style="list-style-type: none"> Nomadic fruit eater, could turn up anywhere No records since 1992 	Yes
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Vulnerable	---	Inhabits areas surrounding large areas of open water	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area Only 2 records within 5km of Subject Area 	No
Little Eagle	<i>Hieraaetus morphnoides</i>	Vulnerable	---	Occupies open eucalypt forest or woodlands	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area Most recent record from 2013 is 12.3km away 	No
Square-tailed Kite	<i>Lophoictinia isura</i>	Vulnerable	---	Found in a variety of timbered habitats including dry woodland and open forests	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area Most recent record from 2012 is 1.5km away 	No

Common name	Scientific name	BC Act status	EPBC Act status	Habitat requirements (OEH 2011-2017)	Likelihood of occurrence (ALA 2018; OEH 2018a)	5 Part Test required
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>	Vulnerable	---	Rocky coastlines, beaches and muddy estuaries.	Nil	No
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	Vulnerable	---	Sheltered coastal areas such as sandflats, lagoons and saltmarshes	<ul style="list-style-type: none"> No suitable habitat within Subject Area 	No
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	Vulnerable	---	Found in tall mountain forest moving to lower altitude open eucalypt forest in autumn and winter	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area Most recent local record from 2003 	No
Glossy Black-Cockatoo	<i>Calyptrorhynchus lathami</i>	Vulnerable	---	Found in sclerophyll woodland with presence of <i>Allocasuarina</i> sp.	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area No recent records 	No
Little Lorikeet	<i>Glossopsitta pusilla</i>	Vulnerable	---	Found in open sclerophyll woodland	Likely <ul style="list-style-type: none"> Some suitable habitat within Subject Area Most recent record from 1986 	Yes
Barking Owl	<i>Ninox connivens</i>	Vulnerable	---	Inhabits woodland and open forest, requires dense canopy for roosting.	Likely	Yes

Common name	Scientific name	BC Act status	EPBC Act status	Habitat requirements (OEH 2011-2017)	Likelihood of occurrence (ALA 2018; OEH 2018a)	5 Part Test required
Powerful Owl	<i>Ninox strenua</i>	Vulnerable	---	Found in open and closed sclerophyll woodland and littoral forest in gullies. Generally occurs in areas with large hollow-bearing trees	<ul style="list-style-type: none"> Some suitable habitat within Subject Area May use Subject Area when passing through 	
Masked Owl	<i>Tyto novaehollandiae</i>	Vulnerable	---	Found in dry eucalypt forest and woodland	Low <ul style="list-style-type: none"> Some suitable habitat within Subject Area Possibly use Subject Area as a corridor between habitats 	No
Sooty Owl	<i>Tyto tenebricosa</i>	Vulnerable	---	Found in closed sclerophyll woodland and in littoral forest in gullies. Generally occurs in areas with large hollow-bearing trees		
Regent Honeyeater	<i>Anthochaera phrygia</i>	Critically Endangered	Critically Endangered	Dry open woodland, particularly Box-Ironbark woodland and riparian forest with River Sheoak	Moderate <ul style="list-style-type: none"> Some suitable habitat within Subject Area Highly nomadic 	Yes
Swift Parrot	<i>Lathamus discolor</i>	Endangered	Critically Endangered	Occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.	Moderate <ul style="list-style-type: none"> Some suitable habitat within Subject Area Highly nomadic 	

Common name	Scientific name	BC Act status	EPBC Act status	Habitat requirements (OEH 2011-2017)	Likelihood of occurrence (ALA 2018; OEH 2018a)	5 Part Test required
Grey-Crowned Babbler	<i>Pomatostomus temporalis</i>	Vulnerable	---	Found in Box-Gum woodland, and woodland on fertile soils in coastal regions	Low <ul style="list-style-type: none"> Habitat highly fragmented No recent records 	No
Varied Sittella	<i>Daphoenositta chrysoptera</i>	Vulnerable	---	Often found in open sclerophyll woodland		
Scarlet Robin	<i>Petroica boodang</i>	Vulnerable	---	Usually found in open sclerophyll woodland	Low <ul style="list-style-type: none"> Some suitable habitat within Subject Area High density of Noisy Miners prevents colonisation 	No
Flame Robin	<i>Petroica phoenicea</i>	Vulnerable	---	Usually found in open sclerophyll woodland		
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	Vulnerable	Endangered	Found in closed and open woodland and in littoral rainforest gullies	Low <ul style="list-style-type: none"> Some suitable habitat within Subject Area No recent records 	No
Southern Brown Bandicoot	<i>Isodon obesulus</i>	Endangered	Endangered	Found in heath and open forest with a heathy understorey on sandy or friable soils	Low <ul style="list-style-type: none"> No suitable habitat within Subject Area No recent records 	No
Koala	<i>Phascolarctos cinereus</i>	Vulnerable	Vulnerable	Found in sclerophyll woodland	Low <ul style="list-style-type: none"> Some potential habitat within Subject Area 	No

Common name	Scientific name	BC Act status	EPBC Act status	Habitat requirements (OEH 2011-2017)	Likelihood of occurrence (ALA 2018; OEH 2018a)	5 Part Test required
					<ul style="list-style-type: none"> No recent records 	
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	Vulnerable	---	Found in heathland, and open woodland	Low <ul style="list-style-type: none"> Some potential habitat within Subject Area A small number of records from 1980's less than 1km away 	No
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Vulnerable	Vulnerable	Found in sclerophyll and littoral forests with numerous fruiting plants	High <ul style="list-style-type: none"> Foraging habitat within Subject Area Some of records with the latest from 2004 	Yes
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Vulnerable	Vulnerable	Found in sclerophyll and littoral forests and open areas in between	Low <ul style="list-style-type: none"> Potential foraging, but no roosting habitat within Subject Area 	No
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	Vulnerable	---	Roosts in tree hollows and buildings, forages across a wide range of habitats	High	Yes

Common name	Scientific name	BC Act status	EPBC Act status	Habitat requirements (OEH 2011-2017)	Likelihood of occurrence (ALA 2018; OEH 2018a)	5 Part Test required
Eastern Freetail-bat	<i>Mormopterus norfolkensis</i>	Vulnerable	---	Roosts mainly in tree hollows	<ul style="list-style-type: none"> Potential habitat within Subject Area 	
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	Vulnerable	---	Found in sclerophyll and littoral forests and open areas in between		
Little Bentwing-bat	<i>Miniopterus australis</i>	Vulnerable	---	Roosts in a wide range of locations including tree hollows and buildings		
Eastern Bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	Vulnerable	---	Found in sclerophyll and littoral forests and open areas in between		
Threatened Flora Species	<i>Hibbertia superans</i>	Endangered	---		<p>Low</p> <ul style="list-style-type: none"> Not recorded by Narla ecologist on Subject Site Habitat disturbed by urban land uses and weed infestation, unlikely to support any local threatened flora (other than planted trees) 	No
	<i>Tetratheca glandulosa</i>	Vulnerable	---			
	<i>Acacia bynoeana</i>	Endangered	Vulnerable			
	<i>Acacia gordonii</i>	Endangered	Endangered			
	<i>Acacia pubescens</i>	Vulnerable	Vulnerable			

Common name	Scientific name	BC Act status	EPBC Act status	Habitat requirements (OEH 2011-2017)	Likelihood of occurrence (ALA 2018; OEH 2018a)	5 Part Test required
	<i>Grammitis stenophylla</i>	Endangered	---			
	<i>Haloragodendron lucasii</i>	Endangered	Endangered			
	<i>Lasiopetalum joyceae</i>	Vulnerable	Vulnerable			
	<i>Callistemon linearifolius</i>	Vulnerable	---			
	<i>Darwinia biflora</i>	Vulnerable	Vulnerable			
	<i>Darwinia peduncularis</i>	Vulnerable	---			
	<i>Eucalyptus camfieldii</i>	Vulnerable	Vulnerable			
	<i>Eucalyptus nicholii</i>	Vulnerable	Vulnerable			
	<i>Eucalyptus scoparia</i>	Endangered	Vulnerable			
	<i>Kunzea rupestris</i>	Vulnerable	Vulnerable			
	<i>Leptospermum deanei</i>	Vulnerable	Vulnerable			

Common name	Scientific name	BC Act status	EPBC Act status	Habitat requirements (OEH 2011-2017)	Likelihood of occurrence (ALA 2018; OEH 2018a)	5 Part Test required
	<i>Melaleuca deanei</i>	Vulnerable	Vulnerable			
	<i>Syzygium paniculatum</i>	Endangered	Vulnerable			
	<i>Genoplesium baueri</i>	Endangered	Endangered			
	<i>Genoplesium plumosum</i>	Critically Endangered	Endangered			
	<i>Ancistrachne maidenii</i>	Vulnerable	---			
	<i>Grevillea caleyi</i>	Critically Endangered	Critically Endangered			
	<i>Persoonia hirsuta</i>	Endangered	Endangered			
	<i>Persoonia mollis</i> subsp. <i>maxima</i>	Endangered	Endangered			
	<i>Galium austral</i>	Endangered	---			
	<i>Pimelea curviflora</i> var. <i>curviflora</i>	Vulnerable	Vulnerable			
	<i>Epacris purpurascens</i> var. <i>purpurascens</i>	Vulnerable	---			

The potential for significant impact upon all potentially occurring BC Act listed threatened species was assessed in accordance with section 7.3 of the BC Act ('5-Part Test of Significance').

The potential for significant impact upon all potentially occurring EPBC Act listed threatened species was assessed against under the 'EPBC Act Significant Impact Guidelines'.

It was deemed that the proposed works will have no significant impact such that a local viable population of a species will be placed at risk of extinction. Therefore, no SIS or EPBC Act Referral to Commonwealth are required for the proposed development.

3.5.3 Pest Fauna

The Subject Site is not known to support any pest fauna. However, likely inhabitants of the Subject Site include *Rattus rattus* (Black Rat), *Mus musculus* (House Mouse), *Felis catus* (Feral Cat) and *Vulpes vulpes* (Fox) for all or part of their lifecycles.

3.6 Other State and Federal Conservation Matters

3.6.1 Proximal National Parks and Nature Reserves

As the Subject Site is in a highly urbanised and residential area, the nearest National Park to the Subject Site is Berowra Valley National Park, which lies approximately 0.27 km to the east of the Subject Site. This is the only National Park within close proximity to the Subject Site.

3.6.2 Areas of Outstanding Biodiversity Value

Areas of declared critical habitat under the Threatened Species Conservation Act 1995, (including Little Penguin and Wollemi Pine declared areas), have become the first Areas of Outstanding Biodiversity Value (AOBV) in NSW with the commencement of the BC Act.

The Biodiversity Conservation Regulation 2017 establishes the criteria for declaring AOBVs. The criteria have been designed to identify the most valuable sites for biodiversity conservation in NSW. No AOBV, as declared under the BC Act, occurs within or near the Subject Site.

3.6.3 Matters of National Environmental Significance

A list of seven EPBC Act listed migratory bird species were considered likely to occasionally use habitat within the Subject Site for foraging or passage, these were:

- Satin Flycatcher (*Myiagra cyanoleuca*)
- Black-faced Monarch (*Monarcha melanopsis*)
- Rufous Fantail (*Rhipidura rufifrons*)
- White-throated Needletail (*Hirundapus caudacutus*)
- Fork-tailed Swift (*Apus pacificus*)
- Oriental Cuckoo (*Cuculus optatus*)

Review of the 'Draft referral guideline for 14 birds listed as migratory species under the EPBC Act' (Commonwealth of Australia 2015) it was deemed that the proposed development will have no significant impact on these species. Therefore, an EPBC Act Referral to Commonwealth is not required.

No other EPBC Act MNES were identified as having potential to occur on the Subject Site. Therefore, an EPBC Act Referral to Commonwealth is not required.

3.7 Ecological Impact Summary

3.7.1 Removal of Native Trees

All trees across the Subject Site have been assessed by a qualified AQF Level 5 Arboriculturalist who assessed the health of the trees and their suitability for removal (Urban Arbor 2018). The arborist identified a suite of trees that require removal for three broad reasons:

- the trees were unstable and therefore dangerous to leave standing, or
- the trees would be removed entirely as they were in the way of the proposed development (e.g. proposed dwellings or infrastructure), or
- the health of individual trees would be compromised by proposed built structures (e.g. structures would encroach on TPZ).

The removal of these trees is not likely to impact on the biodiversity of the Subject Site, including the Sydney Turpentine-Ironbark Forest EEC as each tree removed (including non-native trees) will be replaced with three replacement Sydney Turpentine-Ironbark Forest trees. These trees will be planted within the proposed development site. The remainder of the Sydney Turpentine-Ironbark Forest EEC trees on the property will be retained, protected and enhanced through implementation of a VMP.

3.7.2 Removal of Threatened Fauna Habitat

The proposed development will require the removal of some native trees to make way for the dwellings, ancillary structures and hard landscaping. Some of these trees provide potential, intermittent, habitat resources for threatened fauna that may pass through the landscape on occasion. The extent and type of habitat is detailed (**Table 7**). All other threatened fauna habitat that is currently present on the Subject Site, will continue to remain post development. This includes, aerial, foraging habitat for vulnerable microbats and vertebrate prey/hunting space for vulnerable forest owls.

Owing to the isolated, disturbed and urban nature of the Subject Site, it is unlikely that the Subject Site would provide any significant habitat or permanent/breeding populations of any of threatened fauna species.

Table 7. Threatened fauna potential habitat that may be removed to facilitate the development

Tree No.	Tree Species	Habitat Values	Candidate Threatened Fauna Species
	<i>Eucalyptus</i> sp. (stag)	Potential small hollows throughout stag	<ul style="list-style-type: none"> ▪ <i>Falsistrellus tasmaniensis</i> (Eastern False Pipistrelle) ▪ <i>Saccolaimus flaviventris</i> (Yellow-bellied Sheath-tail-bat) ▪ <i>Mormopterus nofolkensis</i> (Eastern Free-tailed Bat) ▪ <i>Miniopterus schreibersii</i> <i>ocenansis</i> (Eastern Bent-wing Bat) ▪ <i>Miniopterus australis</i> (Little Bent-wing Bat)
1 3 11 12 15a 24a 32 44 45 46 53a 56 57 59 60	<i>Eucalyptus resinifera</i> <i>Eucalyptus eugenoides</i> <i>Angophora costata</i> <i>Angophora costata</i> <i>Callistemon viminalis</i> <i>Hakea salicifolia</i> <i>Cyathea cooperi</i> <i>Eucalyptus paniculata</i> <i>Angophora costata</i> <i>Angophora costata</i> <i>Ceratopetalum gummiferum</i> <i>Angophora costata</i> <i>Syncarpia glomulifera</i> <i>Melaleuca linarifolia</i> <i>Eucalyptus microcorys</i>	These 15 native trees (comprising planted and remnant) all may provide intermittent nectar and/or lerp resources to mobile, nomadic, nectarivorous fauna.	<ul style="list-style-type: none"> ▪ <i>Pteropus polocephalus</i> (Grey-headed Flying-fox) ▪ <i>Anthochaera phrygia</i> (Regent Honeyeater) ▪ <i>Glossopsitta pusilla</i> (Little Lorikeet)
3 40 42 44 60 66 68	<i>Eucalyptus eugenoides</i> <i>Eucalyptus resinifera</i> <i>Syncarpia glomulifera</i> <i>Eucalyptus paniculata</i> <i>Eucalyptus microcorys</i> <i>Eucalyptus microcorys</i> <i>Eucalyptus microcorys</i>	These seven (7) native trees all contain dense canopies that may be utilised as occasional roost habitat by Powerful Owl.	<ul style="list-style-type: none"> ▪ <i>Ninox strenua</i> (Powerful Owl) ▪ <i>Ninox connivens</i> (Barking Owl)
	<i>Ligustrum lucidum</i> <i>Ligustrum sinense</i> <i>Citrus</i> spp. <i>Prunus</i> spp. <i>Phoenix canariensis</i>	These five exotic tree species that are present in varying abundance may provide intermittent resources to mobile, nomadic, frugivorous fauna	<ul style="list-style-type: none"> ▪ <i>Ptilinopus superbus</i> (Superb Fruit-Dove)

3.7.3 Loss of Sydney Turpentine-Ironbark Forest

The proposed development will require the removal of eight (8) trees that are characteristic of Sydney Turpentine-Ironbark Forest EEC in accordance with the Scientific Committee Final Determination as amended (NSW TSSC 2011). All of these trees are believed to be remnant. The total loss of Sydney Turpentine-Ironbark Forest EEC characteristic trees caused by the proposed development is presented (**Table 8**). The total loss of Sydney Turpentine-Ironbark Forest EEC area (249m²) is presented (**Table 9**).

During and post development there may be a short term loss of Sydney Turpentine-Ironbark Forest EEC trees from the Subject Site, however, through implementation of the VMP the Subject Site and locality will receive a long-term net gain in overall extent, spread, area (m²) and condition (i.e. improved species richness, diversity, structural complexity) of Sydney Turpentine-Ironbark Forest EEC across the Subject Site as a result of the proposed development (details provided in **section 4**).

Table 8. Summary of Sydney Turpentine-Ironbark Forest trees removed, retained and replaced

Sydney Turpentine-Ironbark Forest-endangered ecological community – characteristic species	Trees Retained (ID numbers)	Number of Trees Retained	Trees Removed (ID numbers)	Number of Trees Removed	Minimum Number of Trees Replaced (advanced nursery stock 200ml-25L)	Minimum Total Number of Sydney Turpentine-Ironbark Forest Trees Remaining Post Development
<i>Angophora costata</i> (Sydney Red Gum)	5	1	11, 12, 45, 46 & 56	5	15	16
<i>Eucalyptus paniculata</i> (Grey Ironbark)	4 & 6	2	44	1	3	5
<i>Eucalyptus resinifera</i> (Red Mahogany)	2, 7, 39 & 40	4	1	1	3	7
<i>Syncarpia glomulifera</i> (Turpentine)	42 & 48	2	57	1	3	5
Totals	Total Remnant Trees Retained	9	Total Remnant Trees Removed	9	Minimum Total Sydney Turpentine-Ironbark Forest Trees Post Development	33

Table 9. Summary of Sydney Turpentine-Ironbark Forest area (m²) removed and replaced

Sydney Turpentine-Ironbark Forest - endangered ecological community	Area (m ²) of Sydney Turpentine-Ironbark Forest on the Subject Site	
	Pre-Development	Post Development
	480.3	1101.5
Net Residual Area (m²) of Sydney Turpentine-Ironbark Forest on the Subject Site	+ 621.2	

4. Impact Mitigation Measures

4.1 Prevention of Harm to Fauna

Before any vegetation is damaged or removed, a qualified Ecologist with fauna survey experience should be assigned to undertake a pre-clearing survey to determine presence of any roosting microbats, nesting birds, sheltering possums or other fauna in the area of the Subject Site due to be cleared. Hollow-bearing, dead trees should not be removed without assessment by a qualified ecologist. The findings of the pre-clearing survey should be compiled in a short report and provided to the proponent before any clearing works commence in this area.

A qualified Project Ecologist with experience in handling wildlife should be present on the Subject Site during all vegetation clearing in order to supervise clearing and to capture and relocate any displaced, healthy animals, or care for / rehabilitate any injured or orphaned animals.

All trees should be felled using a 'slow drop' technique. This involves knocking the trees to encourage any *in situ* fauna to vacate (e.g. using an excavator bucket) before slowly pushing the trees to the ground.

A single dead stag was identified in the Subject area which may contain unobserved hollows. In the event that hollow-bearing trees are removed, all hollows removed should be replaced with augmented hollows (chainsaw hollows or nest boxes) to be installed in suitable locations within retained trees in the Subject area. All hollows lost will be replaced with nest boxes (with similar sized entry holes to the hollows lost) to a ratio of 1:1, or as agreed by the project ecologist.

4.2 Erosion and Sedimentation Controls

The proponent must ensure that adequate erosion and sediment measures are in place at all times during construction activity and will always follow best practice guidelines (Landcom 2004).

4.3 Storage and Stockpiling

All areas of topsoil that exist under the proposed aged care centre, associated landscaping and construction footprint, should be stripped and stockpiled following best practice methodology (Landcom 2004). The soil should be treated of weeds before emplacing anywhere on the Subject Site. Allocate all storage, stockpile and laydown sites away from any native vegetation that is planned to be retained.

4.4 Landscaping and Revegetation

All existing, native trees, shrubs and ground covers that are located outside of the proposed development footprint will be protected and maintained.

All native vegetation (excluding stags) will be replaced within the Subject Site at a ratio of 3:1, with native flora species that provide the same ecological function as that lost.

To mitigate the minimal impacts upon Sydney Turpentine-Ironbark Forest from the removal of fifteen indigenous canopy trees (including nine representatives of Sydney Turpentine-Ironbark Forest EEC) the proponent will replace these trees with at least 24 new advanced native trees (advanced trees in 200mm – 25 Litre pots) within the Subject Site, in an area where no vegetation clearing or construction is proposed. Planting will preferably take place within or immediately adjacent to the mapped Sydney Turpentine-Ironbark Forest patches (Figure 4).

The proposed development will result in no net loss, but rather a long-term net gain in Sydney Turpentine-Ironbark Forest EEC extent, spread, condition, species diversity, structural complexity, and reduced weed infestation. Specifically, the development will result in:

- retention and on-going protection of eleven Sydney Turpentine-Ironbark Forest characteristic trees retained and protected in accordance with the VMP
- the planting of at least 24 advanced (200mm – 25 litre pot size) Sydney Turpentine-Ironbark Forest EEC characteristic trees, comprised of three (3) replacement trees for every one (1) tree removed from the Subject Site. The final species list, ratios and planting locations to be assigned in the VMP
- the complete eradication of all priority weeds and the removal and suppression of all other weeds from within the Sydney Turpentine-Ironbark Forest EEC across the Subject Site, which will be undertaken by qualified Bush Regenerators as guided by the VMP
- increase in overall extent of Sydney Turpentine-Ironbark Forest EEC across the Subject Area through planting of replacement trees at a ratio of 3:1.



Figure 5. Proposed extent of Vegetation in the Subject Site post development.

4.5 Tree Management

Tree protection measures are detailed in the Arboricultural Impact Assessment (Urban Arbor 2018). Tree protection measures must be implemented to protect all trees to be retained within the Subject Site. Implementation of these measure will ensure that retained trees are not damaged during construction.

Tree Protection Zones should be established and adhered to. All tree protection measures must be maintained in good condition during the construction works and kept in place until the completion of works or as otherwise advised by the Project Arboriculturalist. All tree protection measures shall then be removed.

4.6 Managing Weeds

The proponent will implement the VMP which will guide the long-term removal of all listed *Biosecurity Act 2015* 'Priority Weeds' such as Pampas Grass and Fireweed, should be undertaken prior, during and post construction works on the Subject Site. These efforts will also help enhance native Sydney Turpentine-Ironbark Forest vegetation within the Subject Site.

The VMP will also guide the progressive removal of all priority and environmental weeds

Some weeds on the Subject Site may currently provide prey, nectar, fruit or shelter for fauna such as small birds. In order to reduce any potential negative influence on fauna, weeds should be progressively removed and replaced with ecological-equivalent indigenous native indigenous flora species known to occur naturally within the area.

Bushland restoration (weed removal and landscaping) efforts that will be made post construction works on the Subject Site will aim to control the spread of biosecurity and environmental weeds and restore native vegetation communities as effectively as possible. All environmental and priority weeds will be eradicated and continually suppressed from all retained Sydney Turpentine-Ironbark Forest areas.

4.7 Storm-water Management

The proposed development is to be connected to a modern, approved stormwater management and disposal system. It is unlikely there will be any adverse effects to local ecology and biodiversity from this system.

Stormwater flow from the proposed apartment complex and hard surfaces will be directed to existing paths of stormwater runoff. Prior to any release, all stormwater is to be piped through any tanks that may be required by the regulating authorities as detailed in a Stormwater Management Plan.

In the unlikely event of perceived adverse effects from storm water output exacerbated by the proposed development (e.g. confirmed enhanced nutrient enrichment and weed growth or dieback) an Ecologist and Geotechnical Engineer should be consulted to advise the best approach to action.

4.8 Vegetation Management Plan

The proponent will engage a qualified Ecologist and Landscape Designer to prepare a joint Vegetation Management Plan (VMP) for the Subject Site prior to obtaining construction certification.

The main purpose of the VMP will be to formalise the designation of a 'Sydney Turpentine-Ironbark Forest' across the Subject Site that will enhance threatened ecological communities, maintain and enhance wildlife and biodiversity corridor values.

This VMP will address all council and NSW state government requirements for management of vegetation and weeds on the Subject Site. The plan will detail methods for:

- Complete removal of all priority weeds including Pampas Grass and Fireweed.
- On-going removal, suppression and management of all priority and environmental weeds through implementation of a VMP.
- Replacement of all potential fauna habitat tree hollows removed with augmented tree hollows (e.g. nest boxes) to a ratio of 1:1 (one replacement nest box for every tree-hollow removed).
- Replacement of all Sydney Turpentine-Ironbark Forest trees removed from the Subject Site with Sydney Turpentine-Ironbark Forest characteristic tree species with 24 advanced stock (200mm – 25L) planted to a ratio of 3:1 (three replacement trees for every tree removed)
- Replacement of all non-Sydney Turpentine-Ironbark Forest trees removed from the Subject Site with Sydney Turpentine-Ironbark Forest characteristic tree species, planted to a ratio of 3:1 (three replacement trees for every tree removed)
- Ongoing management of Sydney Turpentine-Ironbark Forest within the Subject Site through:
 - protection of retained Sydney Turpentine-Ironbark Forest trees, shrubs and groundcovers;
 - enhancing the condition of the Sydney Turpentine-Ironbark Forest on the Subject Site through active weed removal;
 - enhancing the extent of the Sydney Turpentine-Ironbark Forest on the Subject Site planting and maintaining of a corridor locally indigenous Sydney Turpentine-Ironbark Forest species.
 - Educating residents of the proposed dwellings of the conservation significance of the Sydney Turpentine-Ironbark Forest and the threatened and locally significant fauna that can inhabit it.
- A list of canopy, sub-canopy, shrub and ground cover plant species, along with densities and ratios for all landscaping and revegetation works.
- Annual management actions and performance criteria.
- An ecological monitoring program to monitor all site biodiversity management efforts implemented as per the VMP.

5. Conclusion

The Subject Site is comprised of a row of existing medium-density dwellings, hard landscaping and overgrown and weed-infested, mixed, urban exotic-native ornamental planted gardens. The majority of the proposed development will be situated where the existing dwellings are located. This area has been carefully chosen for development as it is the location of least environmental impact within the Subject Site.

A small extent of Sydney Turpentine-Ironbark Forest endangered ecological community is present on the Subject Site. This is currently restricted to 18 remnant canopy trees, with no native shrub layer, a non-indigenous small tree/shrub understorey and scattered native groundcover grasses and herbs situated amongst dense weed-dominated ground cover. The total extent Sydney Turpentine-Ironbark Forest covers no more than approximately 480.3m² in total.

All trees across the Subject Site have been assessed by a qualified AQF Level 5 Arboriculturalist who assessed the health of the trees and their suitability for retention or removal. This resulted in the recommended removal of eight (8) remnant trees representative of Sydney Turpentine-Ironbark Forest (Urban Arbor 2018) (Table 8).

As part of the proposed development, the proponent will revegetate and maintain vegetated areas consisting of replacement Sydney Turpentine-Ironbark representative species. These areas will contribute to a net gain in overall area of Sydney Turpentine-Ironbark Forest. To improve condition, diversity and structural complexity, the area will be managed of weeds and planted with tree, shrub, groundcover and native species that are characteristic of Sydney Turpentine-Ironbark Forest endangered ecological community. These areas will be managed in perpetuity under a VMP. This restoration effort will contribute to an overall area of 1101.5m² of Sydney Turpentine-Ironbark Forest which will contribute a net gain of at least 600m² of Sydney Turpentine-Ironbark Forest across the Subject Site.

Significant efforts to protect and enhance the biodiversity values across the Subject Site will include:

- Complete removal of all priority weeds including Pampas Grass and Fireweed.
- On-going removal, suppression and management of all priority and environmental weeds through implementation of a VMP.
- Replacement of all potential fauna habitat tree hollows removed with augmented tree hollows (e.g. nest boxes) to a ratio of 1:1 (one replacement nest box for every tree hollow removed).
- Replacement of all Sydney Turpentine-Ironbark Forest trees removed from the Subject Site with Sydney Turpentine-Ironbark Forest characteristic tree species with 12 advanced stock (200mm – 25L) planted to a ratio of 3:1 (three replacement trees for every tree removed)
- Replacement of all non-Sydney Turpentine-Ironbark Forest trees removed from the Subject Site with Sydney Turpentine-Ironbark Forest characteristic tree species, planted to a ratio of 3:1 (three replacement trees for every tree removed)
- Ongoing management of Sydney Turpentine-Ironbark Forest within the Subject Site through:
 - protection of retained Sydney Turpentine-Ironbark Forest trees, shrubs and groundcovers;
 - enhancing the condition of the Sydney Turpentine-Ironbark Forest on the Subject Site through active weed removal;
 - enhancing the extent of the Sydney Turpentine-Ironbark Forest on the Subject Site planting and maintaining of a corridor locally indigenous Sydney Turpentine-Ironbark Forest species.
 - Educating residents of the proposed dwellings of the conservation significance of the Sydney Turpentine-Ironbark Forest and the threatened and locally significant fauna that can inhabit it.
- A list of canopy, sub-canopy, shrub and ground cover plant species, along with densities and ratios for all landscaping and revegetation works.

- Annual management actions and performance criteria.
- An ecological monitoring program to monitor all site biodiversity management efforts implemented as per the VMP.

After carrying-out 5-Part Test Assessments of Significance under the EP&A Act for any potential impacts to BC Act listed threatened species, ecological communities and populations, it was deemed the proposed works will have no significant impact on any threatened species, ecological communities or populations such that a viable local population will be placed at risk of extinction.

Similarly, after carrying out an Impact Assessment under the EPBC Act Significant Impact Guidelines, it was determined that the proposed works will have no significant impact on any MNES (threatened and migratory species).

Narla Environmental Pty Ltd conclude that the proposed development will impose no significant impact upon any of the following entities listed in accordance with the *Biodiversity Conservation Act 2016*:

- Sydney Turpentine-Ironbark Forest - endangered ecological Community
- Potentially occurring threatened fauna including:
 - Powerful Owl (*Ninox strenua*)
 - Barking Owl (*Ninox connivens*)
 - Grey-headed Flying -fox (*Pteropus poliocephalus*)
 - Eastern Bent-wing-bat (*Miniopterus schreibersii oceanensis*)
 - Little Bent-wing-bat (*Miniopterus australis*)
 - Eastern Freetail-bat (*Mormopterus norfolkensis*)

Furthermore, the development and its associated management actions will result a long-term, enhancement and protection of the overall biodiversity in the Hornsby Shire LGA.

Narla Environmental Pty Ltd support this development in principal, subject to effective implementation of the impact mitigation measures proposed.

6. References

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Appendices

Appendix 1 - Subject Site Fauna and Flora Species Lists

Appendix 2 - Biodiversity Conservation Act 2016

Test of Significance (5-Part Test)

Appendix 1

Fauna and Flora Species Lists

Table 10. Fauna observed on the Subject Site during the site assessment by Narla Ecologists

Class	Scientific Name	Common Name
Bird	<i>Acridotheres tristis</i>	Common Myna*
	<i>Manorina melanocephala</i>	Noisy Miner
	<i>Corvus coronoides</i>	Australian Raven
	<i>Cracticus torquatus</i>	Grey Butcherbird
	<i>Anthochaera carunculata</i>	Red Wattlebird
	<i>Cracticus tibicen</i>	Australian Magpie
	<i>Columba livia</i>	Rock Dove*

Table 11. Flora recorded on the Subject Site

Scientific Name	Exotic	Priority Weed	Planted/Naturalised Native	Indigenous to Hornsby Shire	Canopy	Understorey	Shrub	Groundcover	Sydney Turpentine-Ironbark Forest Characteristic Species (NSW TSSC 2011)
1. <i>Acer palmatum</i>	x					x			
2. <i>Acetosa sagittata</i>	x							x	
3. <i>Angophora costata</i>				x	x				x
4. <i>Acacia podylarifolia</i>			x				x		
5. <i>Araucaria heterophylla</i>	x				x				
6. <i>Araujia sericifera</i>	x							x	
7. <i>Agapanthus praecox</i>	x							x	
8. <i>Asparagus aethiopicus</i>	x							x	
9. <i>Banksia integrifolia</i>				x			x		
10. <i>Bouteloua dactyloides</i>	x							x	
11. <i>Bougainvillea</i> sp.	x							x	
12. <i>Callistemon citrinus</i>				x			x		
13. <i>Callistemon viminalis</i>			x						
14. <i>Camellia sasanqua</i>	x						x		

Scientific Name	Exotic	Priority Weed	Planted/Naturalised Native	Indigenous to Hornsby Shire	Canopy	Understorey	Shrub	Groundcover	Sydney Turpentine-Ironbark Forest Characteristic Species (NSW TSSC 2011)
15. <i>Cenchrus clandestinus</i>	x							x	
16. <i>Ceratopetalum gummiferum</i>				x					
17. <i>Chlorophytum comosum</i>	x							x	
18. <i>Cinnamomum camphora</i>	x				x				
19. <i>Citrus spp.</i>	x					x			
20. <i>Cortaderia seloana</i>	x	x						x	
21. <i>Conyza bonariensis</i>	x							x	
22. <i>Cotoneaster glaucophylla</i>	x						x		
23. <i>Corymbia citriodora</i>	x		x		x				
24. <i>Clivia spp.</i>	x							x	
25. <i>Cupressocyparis leylandii</i>	x					x			
26. <i>Cupressus sempervirens</i>	x					x			
27. <i>Cyathea cooperi</i>			x						
28. <i>Cyperus rotundus</i>	x							x	
29. <i>Dietes grandiflora</i>	x							x	

Scientific Name	Exotic	Priority Weed	Planted/Naturalised Native	Indigenous to Hornsby Shire	Canopy	Understorey	Shrub	Groundcover	Sydney Turpentine-Ironbark Forest Characteristic Species (NSW TSSC 2011)
30. <i>Dracaena marginata</i>	x						x		
31. <i>Ehrharta erecta</i>	x							x	
32. <i>Eragrostis curvula</i>	x							x	
33. <i>Erigeron karvinskianus</i>	x							x	
34. <i>Eucalyptus eugenioides</i>				x	x				
35. <i>Eucalyptus haemastoma</i>				x					
36. <i>Eucalyptus microcorys</i>			x						
37. <i>Eucalyptus paniculata</i>				x					x
38. <i>Eucalyptus resinifera</i>				x					x
39. <i>Eucalyptus saligna</i>				x					
40. <i>Eucalyptus scoparia</i>			x						
41. <i>Euonymus japonicus</i>	x							x	
42. <i>Gladiolus undulatus</i>	x							x	
43. <i>Grevillea</i> spp. x	x		x				x		
44. <i>Hakea salicifolia</i>				x					

Scientific Name	Exotic	Priority Weed	Planted/Naturalised Native	Indigenous to Hornsby Shire	Canopy	Understorey	Shrub	Groundcover	Sydney Turpentine-Ironbark Forest Characteristic Species (NSW TSSC 2011)
45. <i>Hydrangea</i> spp.	x						x		
46. <i>Jacaranda mimosifolia</i>	x					x			
47. <i>Ligustrum lucidum</i>	x						x		
48. <i>Ligustrum sinense</i>	x						x		
49. <i>Macadamia</i> spp.			x						
50. <i>Magnolia</i> spp.	x						x		
51. <i>Mangifera indica</i>	x					x			
52. <i>Melaleuca linariifolia</i>			x						
53. <i>Metrosideros excelsa</i>	x					x			
54. <i>Morus nigra</i>	x					x			
55. <i>Murraya paniculata</i>	x						x		
56. <i>Nandina domestica</i>	x						x		
57. <i>Nerium oleander</i>	x						x		
58. <i>Ochna serrulata</i>	x						x		
59. <i>Oxalis</i> sp.	x							x	
60. <i>Parietaria judaica</i>	x							x	
61. <i>Paspalum dilatatum</i>	x							x	

Scientific Name	Exotic	Priority Weed	Planted/Naturalised Native	Indigenous to Hornsby Shire	Canopy	Understorey	Shrub	Groundcover	Sydney Turpentine- Ironbark Forest Characteristic Species (NSW TSSC 2011)
62. <i>Pennisetum clandestinum</i>	x							x	
63. <i>Phoenix canariensis</i>	x					x			
64. <i>Photinia</i> spp.	x						x		
65. <i>Pinus radiata</i>	x				x				
66. <i>Plantago lanceolata</i>	x							x	
67. <i>Plumeria</i> spp.	x					x			
68. <i>Polygala myrtifolia</i>	x						x		
69. <i>Protea</i> spp.	x						x		
70. <i>Prunus</i> spp.	x				x				
71. <i>Schinus molle</i>	x					x			
72. <i>Senecio madagascariensis</i>	x	x						x	
73. <i>Sonchus oleraceus</i>	x							x	
74. <i>Senna pendula</i>	x						x		
75. <i>Sporobolus africanus</i>	x							x	
76. <i>Stellaria media</i>	x							x	
77. <i>Syagrus romanzoffiana</i>	x								

Scientific Name	Exotic	Priority Weed	Planted/Naturalised Native	Indigenous to Hornsby Shire	Canopy	Understorey	Shrub	Groundcover	Sydney Turpentine-Ironbark Forest Characteristic Species (NSW TSSC 2011)
78. <i>Strelizia regina</i>	x							x	
79. <i>Syncarpia glomulifera</i>				x	x				x
80. <i>Tecoma capensis</i>	x					x			
81. <i>Viola odorata</i>	x							x	
82. <i>Washingtonia robusta</i>	x					x			

Appendix 2

Biodiversity Conservation Act 2016 Test of Significance (5-Part Test)

Species	BC Act Status
Flying-foxes	
<i>Pteropus poliocephalus</i> (Grey-headed Flying Fox)	Vulnerable / Migratory
Nomadic Nectivorous Birds	
<i>Glossopsitta pusilla</i> (Little Lorikeet)	Vulnerable
<i>Anthochaera phrygia</i> (Regent Honeyeater)	Critically Endangered
Nomadic Frugivorous Birds	
<i>Ptilinopus superbus</i> (Superb Fruit-Dove)	Vulnerable
Vulnerable Microbats	
<i>Saccolaimus flaviventris</i> (Yellow-bellied Sheathtailed Bat)	Vulnerable
<i>Mormopterus nofolkensis</i> (Eastern Free-tailed Bat)	Vulnerable
<i>Falsistrellus tasmaniensis</i> (Eastern False Pipestrelle)	Vulnerable
<i>Scoteanax rueppellii</i> (Greater Broad-nosed Bat)	Vulnerable
<i>Miniopterus schreibersii oenansis</i> (Eastern Bent-wing Bat)	Vulnerable
<i>Miniopterus australis</i> (Little Bent-wing Bat)	Vulnerable
Vulnerable Owls	
<i>Ninox strenua</i> (Powerful Owl)	Vulnerable
<i>Ninox connivens</i> (Barking Owl)	Vulnerable
Ecological Community	BC Act Status
Sydney Turpentine-Ironbark Forest	Endangered Ecological Community

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Sydney Turpentine-Ironbark Forest

Endangered Ecological Community

Species Ecology

Sydney Turpentine-Ironbark Forest (Benson and Howell 1990) is a tall open forest found on shale and shale-enriched sandstone soils on the coast and hinterland of Sydney. It has been extensively cleared but was once widely distributed between Sutherland and the Hornsby plateau with outlying examples found on shale-rich deposits at Campbelltown, Menai, Kurrajong and Heathcote. The primary distribution of this forest is in areas receiving between 900 and 1250 millimetres of mean annual rainfall at elevations between 10 and 180 metres above sea level.

The forest is characterised by open midstrata of mesic and sclerophyllous shrubs and small trees with a grassy ground cover. The composition of the canopy is variable depending on location and substrate. Typically, it is recognised by a canopy dominated by turpentine, red mahogany and various ironbarks. On the north shore these forests are found on shale-enriched sheltered sandstone slopes where ironbarks are less common and blackbutt is prevalent.

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development 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 – Sydney Turpentine-Ironbark Forest is not a species.

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Sydney Turpentine-Ironbark Forest

Endangered Ecological Community

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development 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,

i) The proposed development is not likely to have an adverse effect on the extent of the Sydney Turpentine-Ironbark Forest such that its local occurrence is likely to be placed at risk of extinction.

The proposed development will require the removal of five *Angophora costata* (Sydney Red Gum), one *Eucalyptus paniculata* (Grey Ironbark), one *Eucalyptus resinifera* (Red Mahogany), and one *Syncarpia glomulifera* (Turpentine) from the fragmented patches of Sydney Turpentine-Ironbark Forest within the Subject Site. The impact of the removal of these trees will be mitigated by the replacement of advanced Sydney Turpentine-Ironbark Forest canopy species within the proposed Subject Site, at a ratio of 3:1 (3 advanced nursery-reared trees to replace each 1 tree removed).

Eleven Sydney Turpentine-Ironbark Forest canopy trees will remain in the Subject Site, three Sydney Red Gums, two Grey Ironbark, four Red Mahogany and two Turpentine.

The overall area of Sydney Turpentine-Ironbark Forest across the Subject Site, will increase from approximately 480m² to 1100m² which is an increase of approximately 620m² and an overall increase of two times the original extent.

ii) The proposed development is not 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 proposed development will require the removal of five *Angophora costata* (Sydney Red Gum), one *Eucalyptus paniculata* (Grey Ironbark), one *Eucalyptus resinifera* (Red Mahogany), and one *Syncarpia glomulifera* (Turpentine) from the patches of Sydney Turpentine-Ironbark Forest within the Subject Site. The impact of the removal of these trees will be mitigated by the replacement of advanced Sydney Turpentine-Ironbark Forest canopy species within the proposed Subject Site, at a ratio of 3:1 (3 advanced nursery-reared trees to replace each 1 tree removed).

Eleven Sydney Turpentine-Ironbark Forest canopy trees will remain in the Subject Site, three Sydney Red Gums, two Grey Ironbark, four Red Mahogany and two Turpentine.

The overall area of Sydney Turpentine-Ironbark Forest across the Subject Site, will increase from approximately 480m² to 1100m² which is an increase of approximately 620m² and an overall increase of two times the original extent.

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Sydney Turpentine-Ironbark Forest

Endangered Ecological Community

<p>(c) in relation to the habitat of a threatened species or ecological community:</p>	<p>(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and</p>	<p>i) The proposed development is not likely to have an adverse effect on the extent of the Sydney Turpentine-Ironbark Forest such that its local occurrence is likely to be placed at risk of extinction.</p> <p>The proposed development will require the removal of five <i>Angophora costata</i> (Sydney Red Gum), one <i>Eucalyptus paniculata</i> (Grey Ironbark), one <i>Eucalyptus resinifera</i> (Red Mahogany), and one <i>Syncarpia glomulifera</i> (Turpentine) from the patches of Sydney Turpentine-Ironbark Forest within the Subject Site. The impact of the removal of these trees will be mitigated by the replacement of advanced Sydney Turpentine-Ironbark Forest canopy species within the proposed Subject Site, at a ratio of 3:1 (3 advanced nursery-reared trees to replace each 1 tree removed).</p> <p>Eleven Sydney Turpentine-Ironbark Forest canopy trees will remain in the Subject Site, three Sydney Red Gums, two Grey Ironbark, four Red Mahogany and two Turpentine.</p>
	<p>(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and</p>	<p>The overall area of Sydney Turpentine-Ironbark Forest across the Subject Site, will increase from approximately 480m² to 1100m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p> <p>ii) The area of habitat is not likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, this is because the habitat is already severely fragmented and the proposed development will not reduce its connectivity any further. The proposed development will result in a significant increase in vegetation representative of the EEC Sydney Turpentine – Ironbark Forest within the Subject Site.</p>
	<p>(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,</p>	<p>iii) The habitat to be removed is not important to the long-term survival of the ecological community in the locality. The development will result in the removal of eight individual native trees. One of the trees, a Sydney Red Gum is considered unstable and should be removed for safety reasons regardless of the development proceeding. All trees removed will be each replaced with three, advanced nursery stock (pot size 200mmL – 25L). The proposed development will result in a significant increase in vegetation representative of the EEC Sydney Turpentine – Ironbark Forest within the Subject Site.</p>
<p>(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),</p>	<p>The proposed development is not likely to have an adverse effect on any AOBV as there are no such areas in the vicinity of the development.</p>	
<p>(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.</p>	<p>The Subject Site is currently being negatively affected by the following KTP:</p> <ol style="list-style-type: none"> 1. Fragmentation – increased edge effects, and lack of genetic diversity, 	

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Sydney Turpentine-Ironbark Forest

Endangered Ecological Community

2. Invasion by 'mixed weeds',
3. Human disturbance from recreational use,
4. Urban run-off, which leads to increased nutrients and sedimentation,
5. Predation from pest species – including cats, foxes and dogs (both domestic and feral),
6. Loss of key fauna habitat through lack of recruitment of large overstorey trees, and
7. Removal of vegetation, including mowing.

The proposed development will reduce the overall impacts of these KTP by active weed removal and native vegetation habitat complexity restoration. This will be achieved through implementation of the VMP.

The following KTP will be temporarily increased as a result of the proposed development, however, the impacts will be mitigated extensively:

1. Clearing and loss of native vegetation
2. Loss of hollow-bearing trees

The proposed development will see the restoration of native vegetation (Sydney Turpentine-Ironbark Forest) across the Subject Site and enhancement of the overall coverage of this ecological community from approximately 480m² to 1100m².

All tree hollows removed will be replaced with augmented tree hollows at a ratio of three (3) replacement hollows for each hollow removed. These hollows will be erected as artificial nest boxes/hollows, or cut into standing trees by Arborists using a chainsaw.

The proposal will not involve the removal of any important coarse woody debris as this habitat feature was lacking across the Subject Site. Trunks of all felled trees will be examined by an Ecologist who will advise their suitability for retention as habitat and locate a suitable position to place such habitat features. This will result in a net gain in such habitat features.

Conclusion

There will be no significant impact on a local occurrence of *Sydney Turpentine-Ironbark Forest* therefore the proposed action should not require any further impact assessments, the application of a Species Impact Statement (SIS) or implementation of the BOS.

References

NSW Office of Environment and Heritage (2018) Sydney Turpentine-Ironbark Forest – profile
<https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10789>

OEH (2017) NSW Office of Environment and Heritage (2017) Saving our Species. Key threatening processes strategy
<https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/key-threatening-processes-strategy-170445.pdf>

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Grey-headed Flying-fox (*Pteropus poliocephalus*)

Vulnerable Species

Species Ecology

Grey-headed Flying-fox forage at night on flowering and fruiting trees. They travel distances up to 30 km from camps, and occasionally up to 60-70 km per night, in response to sparsely distributed food resources. This species is a canopy-feeding frugivore, blossom-eater and nectarivore of rainforests, open forests, woodlands, Melaleuca swamps and Banksia woodlands. As such, it plays an important ecosystem function by providing a means of seed dispersal and pollination for many indigenous tree species. Grey-headed Flying-fox also feed on introduced trees including commercial fruit crops.

Grey-headed Flying-foxes show a regular pattern of seasonal movement. Much of the population concentrates in May and June in northern NSW and Queensland where animals exploit winter-flowering trees such as *Eucalyptus robusta* (Swamp Mahogany), *E. tereticornis* (Forest Red Gum) and *Melaleuca quinquenervia* (Paperbark).

Grey-headed Flying-foxes congregate in large numbers at roosting sites (camps) that may be found in rainforest patches, Melaleuca stands, mangroves, riparian woodland or modified vegetation in urban areas. Individuals generally exhibit a high fidelity to traditional camps and return annually to give birth and rear offspring.

The Subject Site only contained potential foraging habitat for this species. No suitable breeding or roost camps occurred on the Subject Site.

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development 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,

The proposed development is not 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. Grey-headed Flying-fox is a mobile, flying species that is locally abundant. The Subject Site only provides intermittent foraging habitat. No suitable roost habitat or camps occur.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development 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,

Not Applicable

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Grey-headed Flying-fox (*Pteropus poliocephalus*)

Vulnerable Species

<p>(c) in relation to the habitat of a threatened species or ecological community:</p>	<p>(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and</p>	<p>i) The proposed development will require the removal of 15 native flowering trees that could form as potential feed trees. This includes <i>Angophora costata</i> (Sydney Red Gum), <i>Eucalyptus paniculata</i> (Grey Ironbark), <i>Eucalyptus resinifera</i> (Red Mahogany), and <i>Syncarpia glomulifera</i> (Turpentine). The impact of the removal of all 15 trees will be mitigated by the replacement of Sydney Turpentine-Ironbark Forest canopy species within the proposed Subject Site, at a ratio of 3:1 (3 new trees to replace each 1 tree removed). Twenty-three native flowering trees will remain in the Subject Site.</p> <p>The overall area of potential foraging habitat across the Subject Site, will increase from 480m² to 1100 m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p>
	<p>(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and</p>	<p>ii) This species is mobile and not likely to be affected by localised tree loss such that the species will become isolated or suffer long-term impact.</p> <p>The area of habitat is not likely to become more fragmented or isolated from other areas of habitat as a result of the proposed development or activity this is because the habitat is already severely fragmented and the proposed development will not reduce its connectivity any further.</p> <p>The overall area of potential foraging habitat across the Subject Site, will increase from 480.3m² to 1100 m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p>
	<p>(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,</p>	<p>iii) The habitat proposed for removal is not important to the long-term survival of the species in the locality as the species is locally abundant and highly mobile. The feed trees on the Subject Site will only form temporary, intermittent foraging habitat. The proposed development will result in the removal of 15 potential native feed trees. Only eight of these are remnant indigenous, all others are planted ornamentals. One of the trees, a Sydney Red Gum is considered unstable and should be removed for safety reasons regardless of the development proceeding.</p> <p>The overall area of potential foraging habitat across the Subject Site, will increase from 480.3m² to 1100 m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p>

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Grey-headed Flying-fox (*Pteropus poliocephalus*)

Vulnerable Species

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The proposed development is not likely to have an adverse effect on any AOBV as there are no such areas in the vicinity of the development.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The Subject Site is currently being negatively affected by the following KTP:

1. Fragmentation – increased edge effects, and lack of genetic diversity,
2. Invasion by 'mixed weeds',
3. Human disturbance from recreational use,
4. Urban run-off, which leads to increased nutrients and sedimentation,
5. Predation from pest species – including cats, foxes and dogs (both domestic and feral),
6. Loss of key fauna habitat through lack of recruitment of large overstorey trees, and
7. Removal of vegetation, including mowing.

The proposed development will reduce the overall impacts of these KTP by active weed removal and native vegetation habitat restoration. This will be achieved through implementation of the VMP.

The following KTP will be temporarily increased as a result of the proposed development, however, the impacts will be mitigated extensively:

1. Clearing of native vegetation
2. Loss of hollow-bearing trees

The proposed development will see the restoration native vegetation (Sydney Turpentine-Ironbark Forest) across the Subject Site from approximately 480.3m² to 1101.5m²

Conclusion

There will be no significant impact on a viable local population of *Pteropus poliocephalus* therefore the proposed action should not require any further impact assessments, the application of a Species Impact Statement (SIS) or implementation of the BOS.

Reference

NSW Office of Environment and Heritage (2017) Grey-headed Flying-fox (*Pteropus poliocephalus*) – Species Conservation Project <http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10697>

OEH (2017) NSW Office of Environment and Heritage (2017) Saving our Species. Key threatening processes strategy <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/key-threatening-processes-strategy-170445.pdf>

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Large Owls

Barking Owl (*Ninox connivens*)

and

Powerful Owl (*Ninox strenua*)

Vulnerable Species

Species Ecology

The Powerful Owl is found in tall forests across eastern Australia, south of the tropics. It is mostly found east of the Great Dividing Range. The species is not common but it is widespread in NSW. Multiple breeding pairs exist in Sydney. The Species usually requires large tree hollows to nest in. The Powerful Owl nests in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him. Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats, a mere 400 ha can support a pair; where hollow trees and prey have been depleted the owls need up to 4000 ha.

The Barking Owl is most common in open woodlands and riparian forest, but may be found in tall forests across eastern Australia. The species is not common but it is widespread in NSW. Few breeding pairs exist in Sydney, the species mostly occurs in northern and western Sydney as a nomad. The Species usually requires large tree hollows to nest in. The Barking Owl nests in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Barking Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him. Pairs of Barking Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats, a mere 400 ha can support a pair; where hollow trees and prey have been depleted the owls need up to 4000 ha.

No owls, or evidence of owls, were recorded on the Subject Site during the Subject Site survey. It is possible for the Subject Site to exist within the home range of these owl species as individuals or small family groups are likely to live in the surrounding national parks, and may occasionally visit the subject during foraging bouts. However, these species generally require very large permanent territories. The Subject Site provided some potential intermittent roosting habitat for the non-breeding members of these species. It is likely that the species may use the Subject Site for intermittent foraging and/or roosting in native the Eucalyptus sp. or exotic Camphor Laurel within the Subject Site.

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development 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,

The proposed action will not 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. The Subject Site is only expected to provide intermittent foraging habitat, and intermittent roosting habitat for non-breeding individuals. No potential breeding habitat will be impacted.

The proposed action may remove a small area of potential roost habitat for the species caused by loss of dense canopy trees, however, this impact will be mitigated in the long term. Three potential roost trees may be removed as a result of the proposed development; however, they do not provide any potential nesting habitat for the species.

Part of the development proposal includes the revegetation of Sydney Turpentine-Ironbark Forest Restoration on the Subject Site which will increase the overall native vegetation from

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Large Owls

Barking Owl (*Ninox connivens*)

and

Powerful Owl (*Ninox strenua*)

Vulnerable Species

	<p>approximately 480m² to 1100m². In addition, suitable foraging habitat will remain within the Subject Site and surrounding Urban Forest Canopy.</p> <p>There will be no significant effects upon the movement of these highly mobile species across the Subject Site, and between the Subject Site and National Parks and reserves.</p>	
<p>(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:</p>	<p>(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</p> <p>(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,</p>	<p>Not Applicable</p>
<p>(c) in relation to the habitat of a threatened species or ecological community:</p>	<p>(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and</p>	<p>i) The proposed action may remove a small area of potential roost habitat for the species caused by loss of dense canopy trees, however, this impact will be mitigated in the long term. Three potential roost trees may be removed as a result of the proposed development; however, they do not provide any potential nesting habitat for the species.</p> <p>The overall area of Sydney Turpentine-Ironbark Forest across the Subject Site, will increase from 480m² to 1100m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p>

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Large Owls

Barking Owl (*Ninox connivens*)

and

Powerful Owl (*Ninox strenua*)

Vulnerable Species

	<p>(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and</p>	<p>ii) This species is mobile and not likely to be affected by localised tree loss such that the species will become isolated or suffer long-term impact. The area of habitat is not likely to become more fragmented or isolated from other areas of habitat as a result of the proposed development or activity. This is because the habitat is already severely fragmented and the proposed development will not reduce its connectivity any further.</p> <p>The overall area of potential foraging habitat across the Subject Site, will increase from 480.3m² to 1100 m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p> <p>iii) The habitat proposed for removal is not important to the long-term survival of the species in the locality as the species is locally abundant and highly mobile. The feed trees on the Subject Site will only form temporary, intermittent foraging habitat. The proposed development will result in the removal of 15 potential native feed trees. Only eight of these are remnant indigenous, all others are planted ornamentals. One of the trees, a Sydney Red Gum is considered unstable and should be removed for safety reasons regardless of the development proceeding.</p>
	<p>(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,</p>	<p>The overall area of potential foraging habitat across the Subject Site, will increase from 480.3m² to 1100 m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p>
<p>(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),</p>	<p>The proposed development is not likely to have an adverse effect on any AOBV as there are no such areas in the vicinity of the development.</p>	

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Large Owls

Barking Owl (*Ninox connivens*)

and

Powerful Owl (*Ninox strenua*)

Vulnerable Species

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The Subject Site is currently being negatively affected by the following KTP:

1. Fragmentation – increased edge effects, and lack of genetic diversity
2. Invasion by 'mixed weeds',
3. Human disturbance from recreational use,
4. Urban run-off, which leads to increased nutrients and sedimentation,
5. Predation from pest species – including cats, foxes and dogs (both domestic and feral),
6. Loss of key fauna habitat through lack of recruitment of large overstorey trees, and
7. Removal of vegetation, including mowing.

The proposed development will reduce the overall impacts of these KTP by active weed removal and native vegetation habitat restoration. This will be achieved through implementation of the VMP.

The following KTP will be temporarily increased as a result of the proposed development, however, the impacts will be mitigated extensively:

1. Clearing of native vegetation
2. Loss of hollow-bearing trees

The proposed development will see the restoration native vegetation (Sydney Turpentine-Ironbark Forest) across the Subject Site from approximately 480m² to 1100m²

Conclusion

There will be no significant impact on a viable local population of *Ninox strenua* or *Ninox connivens* therefore the proposed action should not require any further impact assessments, the application of a Species Impact Statement (SIS) or implementation of the BOS.

Reference

NSW Office of Environment and Heritage (2017) Powerful Owl *Ninox strenua*– Conservation Projects and Species Profile <http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10562>

NSW Office of Environment and Heritage (2018) Barking Owl *Ninox connivens*– Conservation Projects and Species Profile <http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10561>

NSW Government (2016) Biodiversity Conservation Act 2016 101- Schedule 3: Key Threatening Processes, NSW Legislation <http://www.legislation.nsw.gov.au/#/view/act/1995/101/full>

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Hollow Roosting Microbats

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

Eastern Freetail-bat (*Mormopterus norfolkensis*)

Little Bent-wing Bat (*Miniopterus australis*)

Greater Broad-nosed Bat (*Scoteanax rueppellii*)

Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)

Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*)

Vulnerable Species

Species Ecology

All species: All of these microbats share foraging requirements. They all forage for flying insects at varying heights within woodland and forested areas with open or closed canopies. Each of these species has specific requirements for maternity roosts (breeding sites), but they all require short term roosting habitat when not breeding.

All of these bat species primarily roost within tree hollows, under decorticating bark or occasionally within manmade structures. The habitat used by these species on the Subject Site, includes tree hollows which would most likely only be used for temporary roosting by small groups and individuals.

Foraging habitat that may be used by these microbat species are the spaces between trees that may be used for foraging. Use of the Subject Site by any of these species is expected to be limited, as they are all expected to forage over larger areas.

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Hollow Roosting Microbats

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

Eastern Freetail-bat (*Mormopterus norfolkensis*)

Little Bent-wing Bat (*Miniopterus australis*)

Greater Broad-nosed Bat (*Scoteanax rueppellii*)

Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)

Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*)

Vulnerable Species

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

<p>(a) in the case of a threatened species, whether the proposed development 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,</p>	<p>The proposed development will not 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. The Subject Site is only expected to provide intermittent foraging habitat, and intermittent roosting habitat for non-breeding individuals. No potential breeding habitat will be impacted.</p> <p>The proposed development will remove a stag which is a potential, temporary roost habitat for the species, however, this impact will be mitigated in the long term through replacement of each hollow removed with another three augmented hollows (e.g. chainsaw hollow or nestbox) within the retained Sydney Turpentine-Ironbark Forest area. The implementation of this proposal will result in the net gain of roosting habitat for these species within the Subject Site. There will be no effects to the movement of these highly mobile species across the Subject Site, and between the Subject Site and adjoining areas.</p>	
<p>(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:</p>	<p>(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</p> <p>(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,</p>	
	Not Applicable	

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Hollow Roosting Microbats

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

Eastern Freetail-bat (*Mormopterus norfolkensis*)

Little Bent-wing Bat (*Miniopterus australis*)

Greater Broad-nosed Bat (*Scoteanax rueppellii*)

Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)

Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*)

Vulnerable Species

(c) 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 development or activity, and

i) The proposed development will remove a single stag which contains potential roost habitat for the species, however, this impact will be mitigated in the long term through replacement of each hollow removed with three augmented hollows (e.g. chainsaw hollow or nest box) within the retained Sydney Turpentine-Ironbark Forest area. The implementation of this proposal will result in the net gain of roosting habitat for these species within the Subject Site. There will be no effects to the movement of these highly mobile species across the Subject Site, and between the Subject Site and adjoining areas.

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

ii) These species are mobile and not likely to be affected by localised tree loss such that the species will become isolated or suffer long-term impact. The area of habitat is not likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity. The implementation of this proposal will result in the net gain of roosting habitat for these species within the Subject Site.

(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,

iii) The habitat proposed for removal is not important to the long-term survival of the species in the locality as the species are highly mobile. The trees on the Subject Site will only form temporary, intermittent roosting and hunting habitat. The trees removed are not important to these species and will all be replaced. All potential roost hollows removed will be replaced through installation of three new hollows (augmented hollows such as chainsaw or nestbox) for each removed. The implementation of this proposal will result in the net gain of roosting habitat for these species within the Subject Site.

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Hollow Roosting Microbats

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

Eastern Freetail-bat (*Mormopterus norfolkensis*)

Little Bent-wing Bat (*Miniopterus australis*)

Greater Broad-nosed Bat (*Scoteanax rueppellii*)

Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)

Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*)

Vulnerable Species

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The proposed development is not likely to have an adverse effect on any AOBV as there are no such areas in the vicinity of the development.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The Subject Site is currently being negatively affected by the following KTP:

1. Fragmentation – increased edge effects, and lack of genetic diversity
2. Invasion by 'mixed weeds',
3. Human disturbance from recreational use,
4. Urban run-off, which leads to increased nutrients and sedimentation,
5. Predation from pest species – including cats, foxes and dogs (both domestic and feral),
6. Loss of key fauna habitat through lack of recruitment of large overstorey trees, and
7. Removal of vegetation, including mowing.

The proposed development will reduce the overall impacts of these KTP by active weed removal and native vegetation habitat restoration. This will be achieved through implementation of the VMP.

The following KTP will be temporarily increased as a result of the proposed development, however, the impacts will be mitigated extensively:

1. Clearing of native vegetation
2. Loss of hollow-bearing trees

The proposed development will see the restoration of native vegetation (Sydney Turpentine-Ironbark Forest) across the Subject Site and enhancement of the overall coverage of this ecological community from approximately 480m² to 1100m².

All tree hollows removed will be replaced with augmented tree hollows at a ratio of one (1) replacement hollows for each hollow removed. These hollows will be erected as artificial nest boxes/hollows, or cut into standing trees by Arborists using a chainsaw. The implementation of this proposal will

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Hollow Roosting Microbats

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

Eastern Freetail-bat (*Mormopterus norfolkensis*)

Little Bent-wing Bat (*Miniopterus australis*)

Greater Broad-nosed Bat (*Scoteanax rueppellii*)

Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)

Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*)

Vulnerable Species

result in the net gain of roosting habitat for these species within the Subject Site.

The proposal will not involve the removal of any important coarse woody debris as this habitat feature was lacking across the Subject Site. Trunks of all felled trees will be examined by an Ecologist who will advise their suitability for retention as habitat.

Conclusion

There will be no significant impact on a viable local population of *Falsistrellus tasmaniensis*, *Mormopterus norfolkensis*, *Miniopterus australis*, *Miniopterus schreibersii oceanensis* and *Saccolaimus flaviventris*, therefore the proposed action should not require any further impact assessments, the application of a Species Impact Statement (SIS) or implementation of the BOS.

Reference

NSW Office of Environment and Heritage (2017) Eastern False Pipistrelle *Falsistrellus tasmaniensis* – Conservation Projects and Species Profile <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10331>

NSW Office of Environment and Heritage (2017) Eastern Freetail-bat *Mormopterus norfolkensis*– Conservation Projects and Species Profile <https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10544>

NSW Office of Environment and Heritage (2018) Little Bent-wing Bat *Miniopterus australis* – Conservation Projects and Species Profile <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533>

NSW Office of Environment and Heritage (2017) Eastern Bent-wing Bat *Miniopterus schreibersii oceanensis*– Conservation Projects and Species Profile <https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10534>

NSW Office of Environment and Heritage (2017) Yellow-bellied Sheath-tailed Bat *Saccolaimus flaviventris*– Conservation Projects and Species Profile <https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10741>

NSW Government (2016) Biodiversity Conservation Act 2016 101- Schedule 3: Key Threatening Processes, NSW Legislation <http://www.legislation.nsw.gov.au/#/view/act/1995/101/full>

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Little Lorikeet (*Glossopsitta pusilla*)¹

Swift Parrot (*Lathamus discolor*)²

Regent Honeyeater (*Anthochaera phrygia*)³

¹Vulnerable Species; ²Endangered Species ³ Critically Endangered Species

Species Ecology

The Little Lorikeet mostly occurs in dry, open eucalyptus forests and woodlands where abundant, nectar-eating trees occur. The species does not undergo regular migration, but instead is considered nomadic with irregular large or small influxes of individuals occurring at any time of year. This is usually in response to seasonal variations in food supply. Little Lorikeets often forage in small groups with other species of lorikeet, feeding primarily on nectar and pollen from tall eucalyptus species. The Little Lorikeet may also forage within melaleucas and mistletoes. Breeding activity is known from the western slopes, where birds utilise small hollows (~3cm) within tall, living. Smooth-barked trees.

The Swift Parrot is small parrot about 25 cm long. It is bright green with red around the bill, throat and forehead. Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.

The Regent Honeyeater is a striking and distinctive, medium-sized, black and yellow honeyeater with a sturdy, curved bill. Adults weigh 35 - 50 grams, are 20 - 24 cm long and have a wingspan of 30 cm. The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. 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.

Suitable foraging habitat on the Subject Site includes tall, smooth-barked Eucalyptus spp. when in flower, or Eucalyptus spp. foliage that is infested with lerp (psyllid bugs).

No suitable breeding habitat occurs for these species on the Subject Site.

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development 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,

The proposed development is not likely to have an adverse effect on the life cycle of these species such that a viable local population of the species is likely to be placed at risk of extinction.

The proposed development will require the removal of 15 native flowering trees that could form as potential feed trees. This includes *Angophora costata* (Sydney Red Gum), *Eucalyptus paniculata* (Grey Ironbark), *Eucalyptus resinifera* (Red Mahogany), and *Syncarpia glomulifera* (Turpentine). The impact of the removal of all 15 trees will be mitigated by the replacement of Sydney Turpentine-Ironbark Forest canopy species within the proposed Subject Site, at a ratio of 3:1 (3 new trees to replace each 1 tree removed). Twenty-three native flowering trees will remain in the Subject Site.

The overall area of potential foraging habitat across the Subject Site, will increase from 480m² to 1100 m² which is an increase of approximately 620m² and an overall increase of two times the original extent. Little Lorikeet, Swift Parrot and Regent Honeyeater are nomadic and highly mobile. The Subject Site only provides intermittent foraging habitat. This habitat is of low quality, owing to the infrequency of flowering, the urban setting and the abundance of local aggressive Noisy Miner and Australian Magpie within the Subject Site.

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Little Lorikeet (*Glossopsitta pusilla*)¹

Swift Parrot (*Lathamus discolor*)²

Regent Honeyeater (*Anthochaera phrygia*)³

¹Vulnerable Species; ²Endangered Species ³ Critically Endangered Species

	No suitable nesting habitat occurs.	
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development 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	Not Applicable
	(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,	
(c) 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 development or activity, and	<p>i) The proposed development will require the removal of five <i>Angophora costata</i> (Sydney Red Gum), one <i>Eucalyptus paniculata</i> (Grey Ironbark), one <i>Eucalyptus resinifera</i> (Red Mahogany), and one <i>Syncarpia glomulifera</i> (Turpentine) from the patches of Sydney Turpentine-Ironbark Forest within the Subject Site. The impact of the removal of all 15 trees will be mitigated by the replacement of Sydney Turpentine-Ironbark Forest canopy species within the proposed Subject Site, at a ratio of 3:1 (3 new trees to replace each 1 tree removed). a total of 11 Sydney Turpentine-Ironbark Forest canopy trees will remain in the Subject Site.</p> <p>The overall area of Sydney Turpentine-Ironbark Forest across the Subject Site, will increase from approximately 480m² to 1100m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p>

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Little Lorikeet (*Glossopsitta pusilla*)¹

Swift Parrot (*Lathamus discolor*)²

Regent Honeyeater (*Anthochaera phrygia*)³

¹Vulnerable Species; ²Endangered Species ³Critically Endangered Species

	<p>(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and</p> <p>(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,</p>	<p>ii) This species is mobile and not likely to be affected by localised tree loss such that the species will become isolated or suffer long-term impact. The area of habitat is not likely to become more fragmented or isolated from other areas of habitat as a result of the proposed development or activity, this is because the habitat is already severely fragmented and the proposed development will not reduce its connectivity any further.</p> <p>The overall area of potential foraging habitat across the Subject Site, will increase from 480m² to 1100 m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p> <p>iii) The habitat proposed for removal is not important to the long-term survival of the species in the locality as the species is locally abundant and highly mobile. The feed trees on the Subject Site will only form temporary, intermittent foraging habitat. The proposed development will result in the removal of 15 potential native feed trees. Only eight of these are remnant indigenous, all others are planted ornamentals. One of the trees, a Sydney Red Gum is considered unstable and should be removed for safety reasons regardless of the development proceeding.</p> <p>The overall area of potential foraging habitat across the Subject Site, will increase from 480m² to 1100 m² which is an increase of approximately 620m² and an overall increase of two times the original extent.</p>
<p>(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),</p> <p>(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.</p>		<p>The proposed development is not likely to have an adverse effect on any AOBV as there are no such areas in the vicinity of the development.</p> <p>The Subject Site is currently being negatively affected by the following KTP:</p> <ol style="list-style-type: none"> 1. Fragmentation – increased edge effects, and lack of genetic diversity 2. Invasion by 'mixed weeds', 3. Human disturbance from recreational use, 4. Urban run-off, which leads to increased nutrients and sedimentation, 5. Predation from pest species – including cats, foxes and dogs (both domestic and feral), 6. Loss of key fauna habitat through lack of recruitment of large overstorey trees, and 7. Removal of vegetation, including mowing.

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Little Lorikeet (*Glossopsitta pusilla*)¹

Swift Parrot (*Lathamus discolor*)²

Regent Honeyeater (*Anthochaera phrygia*)³

¹Vulnerable Species; ²Endangered Species ³ Critically Endangered Species

The proposed development will reduce the overall impacts of these KTP by active weed removal and native vegetation habitat restoration. This will be achieved through implementation of the VMP.

The following KTP will be temporarily increased as a result of the proposed development, however, the impacts will be mitigated extensively:

1. Clearing of native vegetation
2. Loss of hollow-bearing trees

There proposed development will see the restoration native vegetation (Sydney Turpentine-Ironbark) across the Subject Site from approximately 480m² to 1100m²

Conclusion

There will be no significant impact on a viable local population of *Glossopsitta pusilla*, *Lathamus discolor* and *Anthochaera phrygia* therefore the proposed action should not require any further impact assessments or implementation of the BOS.

Reference

NSW Office of Environment and Heritage (2017) Little Lorikeet (*Glossopsitta pusilla*) – Species Conservation Project <http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10697>

NSW Office of Environment and Heritage (2017) Swift Parrot (*Lathamus discolor*) – Profile <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10455>

NSW Office of Environment and Heritage (2017) Regent Honeyeater (*Anthochaera phrygia*) – Species Conservation Project <http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10841>

OEH (2017) NSW Office of Environment and Heritage (2017) Saving our Species. Key threatening processes strategy <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/key-threatening-processes-strategy-170445.pdf>

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Superb Fruit-Dove (*Ptilinopus superb*)

Vulnerable Species

Species Ecology	<p>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.</p> <p>Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows and lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn.</p> <p>Breeding takes place from September to January. The nest is a structure of fine interlocked forked twigs, giving a stronger structure than its flimsy appearance would suggest, and is usually 5-30 metres up in rainforest and rainforest edge tree and shrub species.</p> <p>Suitable foraging habitat on the Subject Site includes planted palms and exotic fruit trees.</p> <p>No suitable breeding habitat occurs for either species on the Subject Site.</p>
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(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(a) in the case of a threatened species, whether the proposed development 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,	<p>The proposed development is not 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.</p> <p>Superb Fruit-Doves are nomadic and highly mobile. The Subject Site only provides intermittent foraging habitat. This habitat is of low quality, owing to the infrequency and limited abundance of fruiting. No suitable nesting habitat occurs. All fruit bearing trees to be removed by the proposed development will be replaced with native equivalents as part of the implementation of the corresponding landscape plan. The proposed development will not result in a net loss of habitat for this species.</p>			
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	<table> <tr> <td>(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</td><td rowspan="2">Not Applicable</td></tr> <tr> <td>(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,</td></tr> </table>	(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	Not Applicable	(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,
(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	Not Applicable			
(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,				

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Superb Fruit-Dove (*Ptilinopus superbus*)

Vulnerable Species

(c) 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 development or activity, and

i) The proposed development will require the removal of five *Angophora costata* (Sydney Red Gum), one *Eucalyptus paniculata* (Grey Ironbark), one *Eucalyptus resinifera* (Red Mahogany), and one *Syncarpia glomulifera* (Turpentine) from the patches of Sydney Turpentine-Ironbark Forest within the Subject Site. The impact of the removal of all 15 trees will be mitigated by the replacement of Sydney Turpentine-Ironbark Forest canopy species within the proposed Subject Site, at a ratio of 3:1 (3 new trees to replace each 1 tree removed). 11 Sydney Turpentine-Ironbark Forest canopy trees will remain in the Subject Site.

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

The overall area of Sydney Turpentine-Ironbark Forest across the Subject Site, will increase from 480.3m² to 1100 m² which is an increase of approximately 620m² and an overall increase of two times the original extent.

ii) This species is mobile and not likely to be affected by localised tree loss such that the species will become isolated or suffer long-term impact. The area of habitat is not likely to become more fragmented or isolated from other areas of habitat as a result of the proposed development or activity. This is because the habitat is already severely fragmented and the proposed development will not reduce its connectivity any further.

(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,

iii) The habitat proposed for removal is not important to the long-term survival of the species in the locality as the species is locally abundant and highly mobile. The feed trees on the Subject Site will only form temporary, intermittent foraging habitat. The proposed development will result in the removal of 15 potential native feed trees. Only eight of these are remnant indigenous, all others are planted ornamentals. One of the trees, a Sydney Red Gum is considered unstable and should be removed for safety reasons regardless of the development proceeding.

Biodiversity Conservation Act 2016 – Test of Significance (5-Part Test)

for

Superb Fruit-Dove (*Ptilinopus superb*)

Vulnerable Species

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The proposed development is not likely to have an adverse effect on any AOBV as there are no such areas in the vicinity of the development.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The Subject Site is currently being negatively affected by the following KTP:

8. Fragmentation – increased edge effects, and lack of genetic diversity
9. Invasion by 'mixed weeds',
10. Human disturbance from recreational use,
11. Urban run-off, which leads to increased nutrients and sedimentation,
12. Predation from pest species – including cats, foxes and dogs (both domestic and feral),
13. Loss of key fauna habitat through lack of recruitment of large overstorey trees, and
14. Removal of vegetation, including mowing.

The proposed development will reduce the overall impacts of these KTP by active weed removal and native vegetation habitat restoration. This will be achieved through implementation of the VMP.

The following KTP will be temporarily increased as a result of the proposed development, however, the impacts will be mitigated extensively:

3. Clearing of native vegetation
4. Loss of hollow-bearing trees

The proposed development will see the restoration native vegetation (Sydney Turpentine-Ironbark Forest) across the Subject Site from approximately 480.3m² to 1101.5m²

Conclusion

There will be no significant impact on a viable local population of *Ptilinopus superb* therefore the proposed action should not require any further impact assessments or implementation of the BOS.

Reference

NSW Office of Environment and Heritage (2018) Superb Fruit-Dove (*Ptilinopus superb*) – Species Conservation Project <http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10709>

OEH (2017) NSW Office of Environment and Heritage (2017) Saving our Species. Key threatening processes strategy <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/key-threatening-processes-strategy-170445.pdf>



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