Flora and Fauna Constraints Report

Proposed Seniors Housing Site Compatibility Certificate

Fox Hills Golf Course

14 March 2021

Report:	**Flora and Fauna Report** Proposed Seniors Housing Site Compatibility Certificate Fox Hills Golf Course
Prepared for:	Report prepared by Land Eco Consulting for Fox Hills Golf Club c/- Integrated Developments
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Report Certification

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Glossary

Acronym/ Term	Definition
AOBV	Areas of Outstanding Biodiversity Value section 7.2(1)(c) of the BC Act 2016
BC Act	New South Wales Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
CEEC	Critically Endangered Ecological Community
DA	Development Application
DCP	Development Control Plan
Development	The use of land, and the subdivision of land, and the carrying out of a work, and the demolition of a building or work, and the erection of a building, and any other act, matter or thing referred to in section 26 that is controlled by an environmental planning instrument but does not include any development of a class or description prescribed by the regulations for the purposes of this definition (Environmental Planning and Assessment Act 1979).
DPIE	Department of Planning Industry and Environment
EEC	Endangered Ecological Community
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
Ha	Hectares
Km	Kilometre
KTP	Key Threatening Process (as listed in the BC Act)
LEP	Local Environmental Plan
LGA	Local Government Area
Locality	The area within a 10km radius of the Study area. The same meaning when describing a local population of a species or local occurrence of an ecological community.
M	Metres
Mm	Millimetres
NPWS	NSW National Parks and Wildlife Services
NSW	New South Wales
OEH	Office of Environment and Heritage (now the Department of Planning Industry and Environment)
Proposal	The development, activity or action proposed.
ROTAP	Rare or Threatened Australian Plants
SEPP	State Environmental Planning Policy
Site Compatibility Certificate	The site compatibility certificate process is a mechanism to ensure that any additional uses or redevelopment of these sites is in keeping with (vis. compatible with) the surrounding land use.
SIS	Species Impact Statement pursuant to s. 5A of the Environmental Planning and Assessment Act 1979
study area	Location of the proposed seniors housing development on the subject property.
subject property	Fox Hills Golf Club, 55 Fox Hills Crescent, Prospect NSW 2148 (Lot 2/-/DP794271).
Threatened species, populations and ecological communities	Species, populations and ecological communities specified in Schedules 1, 1A and 2 and *threatened species, population or ecological community* means a species, population or ecological community specified in any of those Schedules.
TPZ	Tree Protection Zone

Executive Summary

Land Eco Consulting was engaged by Integrated Projects Pty Ltd on behalf of Fox Hills Golf Club to conduct a Flora and Fauna Constraints Assessment for a study area located at 55 Fox Hills Cres, Prospect NSW 2148 (**Figure 1**). The assessment provides and understanding of the biodiversity values and constraints of the study area in relation to a Site Compatibility Certificate application under the *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004*.

Fox Hills Golf Club (FHGC) covers a total area of is approximately 31.25 ha all in one lot (Lot 2/-/DP794271) located within in the Blacktown City Council local government area. The golf club currently consists of an 18-hole golf course; licenced club house; pro shop; green keeper and maintenance buildings and outdoor recreation areas; as well as parking facilities. FHGC is bounded in the East by Prospect Road, in the South by the Great Western Highway and in the West, and North by privately owned, small-lot residential land.

The study area covers approximately 8.5ha of the western half of FHGC and consists of a mosaic of maintained grassed fairway areas, remnant isolated trees / forest - woodland areas, and planted non-indigenous native and exotic ornamental trees. Two threatened ecological communities occur in the study area, *River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions Endangered Ecological Community* and *Cumberland Plain Woodland in the Sydney Basin Bioregion Critically Endangered Ecological Community*. The overall condition of the vegetation across the study area was poor as a result of historical clearing and weed infestation.

The study area was found to provide potential habitat for several threatened fauna species and only one threatened flora species. Where any threatened species occur in the study area it is considered unlikely that any such species will be significantly impacted by a future development of the study area.

Fox Hills Golf Club is seeking a Site Compatibility Certificate for a proposed Seniors Housing development at the site. A future development application would then be lodged to build and operate this Seniors Housing proposal.

Land Eco is of the opinion that the natural environment and biodiversity values of the study area are of low condition and/or overall significance. It is considered that Seniors Housing development would be a suitable and compatible land use for this site.

1. Introduction

1.1 Background and Project Proposal

Land Eco Pty Ltd (Land Eco) was engaged by Fox Hills Golf Club c/- to deliver a Flora and Fauna Constraints Assessment Report for a proposed development application (DA) at 55 Fox Hills Crescent, Prospect, NSW 2148 (Lot 2/-/DP794271) (the subject property).

1.1.1 Proposed Development

It is the intention of the proponent The proposed development includes the construction of three dwellings across two buildings under the *New South Wales State Environmental Planning Policy (Housing for Seniors or People with a Disability)* on the subject property (**Figure 1**). The proposed development includes demolition works, the construction of the senior housing, a bowling green and ancillary site works including car parking, stormwater works and public footpath connections.

1.1.2 Proposed Impact

The proposed development will result in the clearing/alteration of approximately 8.5 hectares of golf course grounds, which is mostly comprised of exotic dominated grassland (fairways, rough and greens) as well as historically planted and partially cleared, weed-infested native vegetation including small, fragmented patches of locally occurring threatened ecological communities.

1.1.3 Site Description and Location

The study area is located on Fox Hills Crescent in the suburb of Prospect. The prevailing land use consists of low-density urban residential landholdings. Most landholdings contain a front and extended rear garden with established mature exotic and native trees. There are no native bushland reserves adjoining the study area.

The study area is zoned as:

- RE2: Private Recreation over most of the golf course grounds, and
- SP2: Infrastructure over the drainage line that enters the north-western corner of the study area.

1.1.4 Soils and Geology

Two distinct Soil Landscapes underlie the subject property (Bannerman & Hazelton 2011):

- Blacktown
- South Creek

Blacktown Soil Landscape is characterised by gently undulating rises on Wianamatta Shale with local relief 10–30 m and slopes generally >5% but occasionally up to 10%. Crests and ridges are broad (200–600 m) and rounded with convex upper slopes grading into concave lower slopes. Ashfield Shale consisting of laminite and dark grey siltstone, Bringelly Shale which consists of shale with occasional calcareous claystone, laminite and infrequent coal, and Minchinbury Sandstone consisting of fine to medium-grained quartz lithic sandstone.

South Creek Soil Landscape is characterised by Quaternary alluvium derived from Wianamatta Group shales and Hawkesbury Sandstone forming flat to gently sloping alluvial plain with occasional terraces or levees providing low relief. Slopes <5%. Floodplains, valley flats and drainage depressions of the channels on the Cumberland Plain. Usually flat with incised channels.

It is understood that much of the original soil surface has been altered to fabricate the golf course with extensive areas of altered topography and imported fill.

1.1.5 Hydrology

The development is located in the 'Girraween Creek' sub-catchment of the Parramatta River catchment. An engineered stormwater channel enters the study area in the north-western corner of the study area. Several large, ponded waterbodies occur within the study area. One of these in the far south of the study area is 'mapped waterbody' as presented on the 1:25,000 scale Blacktown topographic map.

Figure 1. The proposed development at the study area (Image: Integrated Protects Altis Architecture 2020)

1.2 Matters for Consideration

The following list of legislation and policy are addressed in this report (**Table 1**).

Table 1. Relevant legislation and policy addressed

Legislation/ Policy	Triggered	Action Required
Environmental Planning and Assessment Act 1979 (EP&A Act)	Yes	The future development of the site may require removal of native trees, habitat for threatened species or threatened ecological communities which could trigger the need for a Test of Significance under section 7.3 of the BC Act, as required for a DA under Part 4 of the EP&A Act.
Blacktown Local Environmental Plan 2015 (LEP)	Yes	The future development of the site will require address of the relevant sections under the LEP that relate to biodiversity assessment. Such would be undertaken in the form of an Ecological/Flora and Fauna Impact Assessment Report.
Blacktown Development Control Plan 2015 (DCP)	Yes	The future development of the site will require address of the relevant sections under the DCP that relate to biodiversity assessment. Such would be undertaken in the form of an Ecological/Flora and Fauna Impact Assessment Report.
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	No	The future development of the site may require a referral to the Commonwealth in order to assess potential impacts to threatened ecological communities that occur on the site.
Biodiversity Conservation Act 2016 (BC Act)	Yes	The future development of the site may require removal of native trees, habitat for threatened species or threatened ecological communities which could trigger the need for a Test of Significance under section 7.3 of the BC Act, as required for a DA under Part 4 of the EP&A Act.
Biosecurity Act 2015 (Bio Act)	Yes	Management actions during and post construction will be addressed in a Vegetation Management Plan or Biodiversity Management Plan which will be produced to accompany a future development application.
Water Management Act 2000 (WM Act)	No	The proposed development contains a small area of 'waterfront land' defined under the WM Act as any land that is located within 40 metres of a mapped watercourse or waterbody (**Figure 2**). Where the proposed development enters waterfront land, any impacts to a 'Vegetated Riparian Zone' will need to be mitigated under a Vegetation Management Plan.
State Environmental Planning Policy No 19 - Bushland in Urban Areas (SEPP 19)	No	There is no SEPP19 controlled bushland in or adjoining the site. No further action.
State Environmental Planning Policy (Coastal Management) 2018	No	There is no SEPP Coastal Management land in or adjoining the site. No further action is required.
State Environmental Planning Koala Habitat Protection 2019	No	Blacktown City Council is not included in the list of Councils for which SEPP Koala Habitat Protection applies. No further action is required.
Environmentally Sensitive lands: Land identified in another environmental planning instrument by any of the following descriptions or by like descriptions or by descriptions that incorporate any of the following words or expressions—		
(a) coastal protection,	No	The subject property is not located in a coastal protection area.
(b) conservation (but not land identified as a heritage conservation area in another environmental planning instrument),	No	The subject property is freehold and contains no designated conservation areas
(c) critical habitat,	No	The subject property contains no 'critical habitat' or 'areas of outstanding biodiversity value'
(d) environment protection,	No	The subject property contains no land designated for 'environmental protection'
(e) open space,	No	The subject property contains open space which is available for usage for members and their guests. It is not public open space.
(f) escarpment,	No	There are no natural escarpments on the subject property.
(g) floodway,	No	There are stormwater drains and retention basins but no floodways as such.
(h) high flooding hazard,	No	The location of the proposed development on the subject property is not identified as a high flooding hazard
(j) (Repealed)	-	-
(i) natural hazard,	No	The location of the development within the subject property contains areas mapped as having risk of 'Salinity' however, there are no mapped flood prone lands, acid sulphate soils or bushfire prone lands.
(k) scenic (but not land that is so identified if— (i) the land is within a residential zone in which development of two storeys or more in height is permitted, or (ii) an adjacent residential zone, also identified as scenic, permits development of two storeys or more in height),	NA	Not applicable to this report
(l) water catchment,	No	The development is located in the 'Girraween Creek' sub-catchment of the Parramatta River catchment but is not located in a drinking water catchment.
(m) natural wetland.	No	There are artificial waterbodies and stormwater drains on the subject property, but no mapped 'natural wetlands'.

Figure 2. Mapped watercourses in proximity to the Study area

1.3 Qualifying for the NSW Biodiversity Offset Scheme

The requirements of the BC Act and Biodiversity Conservation Regulation 2017 are mandatory for all development applications assessed pursuant to Part 4 of the EP&A Act submitted in the Blacktown ward of the Northern Beaches Local Government Area.

The BC Act and its regulations stipulate native vegetation clearing 'area threshold' values that determine whether a development is required to be assessed in accordance with the 'Biodiversity Offset Scheme' (BOS). Minimum entry thresholds for native vegetation clearing depend 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). Vegetation clearing includes all lopping, felling, slashing, or mowing of native trees, shrubs, or groundcover for the purpose of construction, landscaping, excavation or bushfire Asset Protection Zone (APZ) works. There is no minimum lot size prescribed by Blacktown LEP to the Study area. The actual size of the subject property exceeds 3 hectares. To avoid triggering the Biodiversity Offset Scheme the proponent must avoid the clearing/management of native vegetation in excess of 0.5ha (**Table 2**).

Clearing that has a significant impact on endangered ecological communities or threatened species in accordance with section 7.2(1)(a) of the BC Act is another potential trigger of the BOS. This will need to be assessed by an Ecologist applying the 'Test of Significance' at the DA stage.

Developments that trigger the BOS will require a 'Biodiversity Development Assessment Report' (BDAR) that addresses the Biodiversity Assessment Method and the purchasing of Biodiversity Credits.

Table 2. Biodiversity Offset Scheme Entry Thresholds

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 Study area has not been mapped as containing biodiversity values within the Biodiversity Values Map (NSW DIPE 2019) (**Figure 3**).

Clearing of Areas of Outstanding Biodiversity Value (AOBV) in accordance with section 7.2(1)(c) of the BC Act is a potential trigger for the BOS, however no such AOBV occur in the study area. Therefore this is not relevant to this proposal.

If a Seniors Housing development occurred in the study area that required the clearing of native vegetation, it is the opinion of Land Eco Consulting that the principles of Avoid, Minimise and Offset can be applied to the study area. Owing to the poor condition of the native vegetation in the study area, offsetting is a suitable impact mitigation strategy.

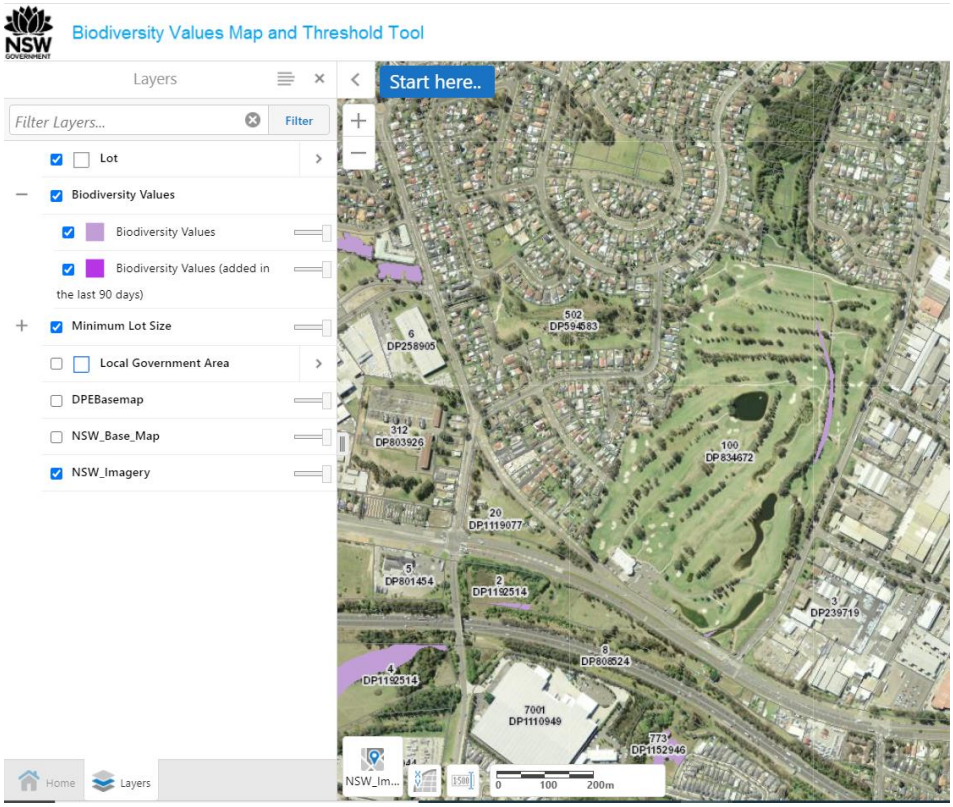

Figure 3. The Subject Property in relation to mapped biodiversity values (DPIE 2020b)

2. Methods

2.1 Ecological Site Assessment

The following sections of this report detail the site assessments undertaken by Land Eco including the survey methods and the weather conditions experienced in the lead-up and during each assessment.

2.1.1 General Survey

Site assessment was undertaken by Land Eco Consulting Ecologist on 9th November 2020. During the site assessment, the following activities were carried out:

- Identifying and recording the vegetation communities present on the Study area, with focus on identifying any threatened ecological communities (TEC);
- Searching for threatened species, species diagnostic of threatened ecological communities;
- Recording opportunistic sightings of any fauna species seen or heard on or within the immediate surrounds of the Study area;
- Mapping 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 and dragonflies);
    - 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 nectarivores 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 Study area and surrounding area; and
- Identifying the species and habitat values of all trees proposed to be removed.

2.1.2 Vegetation Community Assessment

Land Eco examined local satellite imagery, geological mapping, soil landscape mapping and topographic mapping, in addition to existing vegetation mapping (Sydney Metropolitan Vegetation Mapping [OEH 2016a; 2016b]) in order to stratify the Study area and guide the site assessment survey efforts.

The vegetation community was determined based on desktop and field analysis of the geomorphology and geology of the Study area, in addition to a quantitative analysis of the 'positive diagnostic' flora species (OEH 2016b) identified within the Study area.

This data was compared against a suite of Sydney Metropolitan Vegetation Mapping 'positive diagnostic tests' (OEH 2016a; 2016b) to determine the vegetation community occurring within the Study area against a suite of possible/candidate communities.

3. Native Vegetation

3.1 Historical Vegetation Mapping

Historical mapping by Office of Environment and Heritage NSW (OEH 2016a; 2016b) *Native Vegetation of the Sydney Metropolitan Area* indicates the presence of one vegetation community within the Study area 'Urban Exotic/Native'. This mapping was found to be severely inaccurate.

3.2 Confirmed Vegetation

Upon examining the species assemblage, Land Eco identified three vegetation community assemblages within the Study area. Some of these correspond to Plant Community Types (PCT) while others are random assemblages of planted specimen trees and not representative of any known PCT:

- PCT 849 Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (Cumberland Shale Plains Woodland)
- PCT 835 Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (Cumberland Riverflat Forest)
- Mixed Native Ornamental Planting (no PCT)
- Exotic Dominant Planting (no PCT)
- Exotic Dominant Grassland (no PCT)

The condition of the native vegetation across the study area was poor and typical of a historically cleared, landscaped and manicured golf course. All of the vegetation in the study area consisted of sparse regrowth or historically planted trees, over a sparse, weed-infested shrub layer and exotic-dominated ground layer.

A map and description of each vegetation community assemblage in the study area is presented (**Figure 4;Table 3**).

Table 3. Descriptions of the Vegetation communities in the Study Area

Vegetation Community Assemblage	Example Photograph	Area (ha) Present in Study Area	Description of Vegetation Community Assemblage in the Study Area	Threatened Status
PCT 849 Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (Cumberland Shale Plains Woodland)		0.35	This vegetation community was represented by scattered regrowth and planted canopy trees over a sparse tall shrub layer and a ground layer of mixed native-exotic grasses, sedges and herbs. It occurred close to drainage lines and depressions. The dominant canopy species were *Eucalyptus tereticornis and Eucalyptus amplifolia* with infrequent occurrences of *Eucalyptus fibrosa, Eucalyptus saligna and Casuarina glauca*. A tall shrub layer of *Melaleuca decora* and *Melaleuca styphelioides* occurred on occasion. The ground layer contained scattered occurrences of native species including *Bolboschoenus fluviatilis, Typha orientalis, Dichondra repens, Einadia nutans subsp. nutans, Einadia hastata, Senecio quadridentatus, Wahlenbergia gracilis, Dactyloctenium radulans, Lachnagrostis filiformis, Juncus usitatus* and *Cynodon dactylon*. Specimens of *Callistemon salignus, Melaleuca quinquinervia, Callistemon rigidus* and *Melaleuca armillaris* had been historically planted into this community, but do not form a natural part of the community. Mixed stands of planted indigenous *Casuarina glauca* and/or *Casuarina cunninghamiana* occurred away from watercourses and drainage areas. These native trees are commonly planted on golf courses to form screens or windbreaks. When they are located away from watercourses or drainage areas, they do not form part of this vegetation community.	All occurrences of this community in the study area meet the final determination criteria to form part of the following threatened ecological community: '*River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions Endangered Ecological Community (EEC)*' See **Table 4** for a description of how this EEC was determined as occurring in the study area.

Vegetation Community Assemblage	Example Photograph	Area (ha) Present in Study Area	Description of Vegetation Community Assemblage in the Study Area	Threatened Status
PCT 835 Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (Cumberland Riverflat Forest)		0.23	This vegetation community was represented by scattered mature remnant, regrowth and planted canopy trees over a sparse tall shrub layer and a ground layer of mixed native-exotic grasses, sedges and herbs. It occurred on flat or undulating lands away from drainage lines and depressions. The dominant canopy species were *Eucalyptus molucanna, Eucalyptus tereticornis* and *Corymbia maculata, Eucalyptus fibrosa* and *Melaleuca decora*. The study area contained few large, mature or hollow-bearing trees, the largest specimens were two mature, remnant *Corymbia maculata* which were growing on the road verge *the south-western corner of the study area.* The ground layer contained scattered occurrences of native species including *Dichondra repens, Einadia nutans subsp. nutans, Einadia hastata, Senecio quadridentatus, Wahlenbergia gracilis, Lachnagrostis filiformis, Juncus usitatus, Sporobolus creber* and *Cynodon dactylon.* Specimens of *Acacia binervia*, *Callistemon salignus, Melaleuca quinquinervia, Callistemon rigidus* and *Melaleuca armillaris* had been historically planted into this community, but do not form a natural part of the community.	All occurrences of this community in the study area meet the final determination criteria to form part of the following threatened ecological community: '*Cumberland Plain Woodland in the Sydney Basin Bioregion Critically Endangered Ecological Community (CEEC)*' See **Table 5** for a description of how this EEC was determined as occurring in the study area.

Vegetation Community Assemblage	Example Photograph	Area (ha) Present in Study Area	Description of Vegetation Community Assemblage in the Study Area	Threatened Status
Mixed Native Ornamental Planting (no PCT)		0.74	The vegetation community was dominated by a random assortment of historically planted ornamental trees which are native to NSW but not indigenous to the locality they were growing in. Typical species included *Eucalyptus camaldulensis, Eucalyptus parramattensis, Eucalyptus sideroxylon, Eucalyptus melliodora, Eucalyptus robusta, Eucalyptus nicholii, Eucalyptus pilularis, Eucalyptus macrocarpa, Casuarina cunninghamiana, Casuarina glauca, Melaleuca quinquinervia, Callistemon salignus.*	Nil

Vegetation Community Assemblage	Example Photograph	Area (ha) Present in Study Area	Description of Vegetation Community Assemblage in the Study Area	Threatened Status
Exotic Dominant Planting (no PCT)		0.03	Historically planted specimen trees and garden beds dominated by species that are non-indigenous to NSW.	Nil

Vegetation Community Assemblage	Example Photograph	Area (ha) Present in Study Area	Description of Vegetation Community Assemblage in the Study Area	Threatened Status
Exotic Dominant Grassland (no PCT)		Not quantified	This 'vegetation community' forms the majority of the study area and consists of exotic-grass dominated monocultures and mosaics of *Cenchrus clandestinum, Paspalum dilatatum, Cynodon dactylon,* and *Poa annua*. As this vegetation comprises more than 50% exotic species, it does not need to be quantified for any future biodiversity assessments.	Nil

Table 4. Determination of Riverflat Eucalypt Forest in the Study Area (NSW Scientific Committee 2011)

Endangered Ecological Community Final Determination Criteria (NSW Scientific Committee 2011)	Characteristics of the Occurrence on the Study area
River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions is the name given to the ecological community associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. Floodplains are level landform patterns on which there may be active erosion and aggradation by channelled and overbank stream flow with an average recurrence interval of 100 years or less	The geology and soil observed on the study area are derived from Wianamatta Group geology (Bannerman & Hazelton 2011).
The structure of the community may vary from tall open forests to woodlands, although partial clearing may have reduced the canopy to scattered trees….	The trees exist in a fragmented open woodland structure
River-Flat Eucalypt Forest on Coastal Floodplains generally occurs below 50 m elevation but may occur on localised river flats up to 250 m above sea level in the NSW North Coast, Sydney Basin and South East Corner bioregions.	The community typically occurs between 40m and 50m in the study area
River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions is known from parts of the Local Government Areas of Port Stephens, Maitland, Singleton, Cessnock, Lake Macquarie, Wyong, Gosford, Hawkesbury, Baulkham Hills, Blacktown, Parramatta, Penrith, Blue Mountains, Fairfield, Holroyd, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Sutherland, Wollongong, Shellharbour, Kiama, Shoalhaven, Eastern Capital City Regional, Eurobodalla and Bega Valley	The study area is in the Blacktown Local Government Area.
River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include Eucalyptus tereticornis (forest red gum), E. amplifolia (cabbage gum), Angophora floribunda (rough-barked apple) and A. subvelutina (broad-leaved apple). Eucalyptus baueriana (blue box), E. botryoides (bangalay) and E. elata (river perppermint) may be common south from Sydney, E. ovata (swamp gum) occurs on the far south coast, E. saligna (Sydney blue gum) and E. grandis (flooded gum) may occur north of Sydney, while E. benthamii is restricted to the Hawkesbury floodplain. Other eucalypts including Eucalyptus longifolia (woollybutt), E. moluccana (grey box) and E. viminalis (ribbon gum) may be present in low abundance or dominant in limited areas of the distribution. A layer of small trees may be present, including Melaleuca decora, M. styphelioides (prickly-leaved teatree), Backhousia myrtifolia (grey myrtle), Melia azaderach (white cedar), Casuarina cunninghamiana subsp. cunninghamiana (river oak) and C. glauca (swamp oak). Scattered shrubs include Bursaria spinosa subsp. spinosa (blackthorn), Solanum prinophyllum (forest nightshade), Rubus parvifolius (native raspberry), Breynia oblongifolia (coffee bush), Ozothamnus diosmifolius, Hymenanthera dentata (tree violet), Acacia floribunda (white sally) and Phyllanthus gunnii. The groundcover is composed of abundant forbs, scramblers and grasses including Microlaena stipoides (weeping grass), Dichondra repens (kidney weed), Glycine clandestina, Oplismenus aemulus, Desmodium gunnii, Pratia purpurascens (whiteroot), Entolasia marginata (bordered panic), Oxalis perennans and Veronica plebeia (trailing speedwell). The composition and structure of the understorey is influenced by grazing and fire history, changes to hydrology and soil salinity and other disturbance, and may have a substantial component of exotic shrubs, grasses, vines and forbs.	The extents of this community mapped in the study area are dominated by *Eucalyptus tereticornis, Eucalyptus amplifolia* and *Eucalyotus saligna* along with scattered occurrences and patches of *Melaleuca decora, M. styphelioides (Prickly-leaved Teatree), Backhousia myrtifolia (Grey Myrtle), Melia azaderach (White Cedar), Casuarina cunninghamiana subsp. cunninghamiana (River Oak) and C. glauca (Swamp Oak).*
Conclusion	Owing to a combination of landscape characteristics and dominant canopy species, it was determined that approximately 0.35 hectares of vegetation in the study area corresponds to Coastal River-flat Forest EEC.

Table 5. Determination of Cumberland Plain Woodland in the Study Area (NSW Scientific Committee 2009)

Critically Endangered Ecological Community Final Determination Criteria (NSW Scientific Committee 2009)	Characteristics of the Occurrence on the Study area
Cumberland Plain Woodland is the name given to the ecological community in the Sydney Basin bioregion associated with clay soils derived from Wianamatta Group geology, or more rarely alluvial substrates, on the Cumberland Plain	The geology and soil observed on the study area are derived from Wianamatta Group geology (Bannerman & Hazelton 2011).
It has the structural form predominantly of open forest…	The trees exist in a fragmented open forest due to the low-density residential housing dominating the local area.
The community typically occurs on flat to undulating or hilly terrain up to about 350 m elevation but may also occur on locally steep sites and at slightly higher elevations	The community occurs between 40m and 60m in the study area.
Cumberland Plain Woodland is restricted to the Sydney Basin Bioregion (sensu Thackway and Cresswell) and is currently known to occur within the local government areas of Auburn, Bankstown, Baulkham Hills, Blacktown, Camden, Campbelltown, Fairfield, Hawkesbury, Holroyd, Liverpool, Parramatta, Penrith and Wollondilly,	The study area is in the Blacktown Local Government Area.
Cumberland Plain Woodland is characterised by an assemblage of species and typically comprises an open tree canopy, a near-continuous groundcover dominated by grasses and herbs, sometimes with layers of shrubs and/or small trees. Shrubs may sometimes occur in locally dense stands. Less disturbed stands of the community may have a woodland or forest structure. ***Cumberland Plain Woodland is characterised by an upper-storey that is usually dominated by Eucalyptus moluccana (Grey Box) and E. tereticornis (Forest Red Gum), often with E. crebra (Grey Ironbark), E. eugenioides (Narrow-leaved Stringybark), Corymbia maculata (Spotted Gum) or other less frequently occurring eucalypts, including Angophora floribunda, A. subvelutina (Broad-leaved Apple), E. amplifolia (Cabbage Gum) and E. fibrosa (Broad-leaved Ironbark).***	The extents of this community mapped in the study area are dominated by *Eucalyptus molucccana and/or Eucalyptus tereticornis, Eucalyptus fibrosa* and *Corymbia maculate.*
Conclusion	Owing to a combination of landscape characteristics and dominant canopy species, it was determined that approximately 0.23 hectares of vegetation in the study area corresponds to Cumberland Plain Woodland CEEC.

Figure 4. Vegetation Mapping of the study area by Land Eco Consulting

4. Threatened Species

One threatened fauna species was identified in the study area by Land Eco. A small flock of the BC Act listed vulnerable *Glossopsitta pusilla* (Little Lorikeet) (a small nectivorous parrot) was observed foraging in the study area.

No threatened flora were found on the study area during the site assessment by Land Eco.

4.1 Threatened Flora

The NSW Wildlife Atlas online survey tool (DPIE 2020c) was used to obtain a list of threatened flora previously recorded within a10km radius of the study area. The habitat requirements of each species were assessed (DPIE 2020d) in order to determine the likelihood of species occurrence and/or impact from the proposed development. Due to lack of remnant native vegetation within the site, no threatened flora species were identified in the desktop assessment as having potential to occur on the Study area (**Table 6**).

Table 6. List of threatened flora that may occupy the Study area at some stage of their lifecycles as identified by BioNet (DPIE 2020c)

Species	BC Act	EPBC Act	Habitat Suitability and Likelihood of Occurrence within the Study area
Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	Endangered Population	-	This vine species exists across a small area of Western Sydney. It can occur in many woodland types, typically on Wianamatta Shales. It can occur in disturbed areas, however it is easy to identify if present. A thorough search was carried out across the study area and no individuals of this species were found. While there is potential for this species to occur in the seed bank, the likelihood of its presence is low.
Isotoma fluviatilis subsp. fluviatilis	Not Listed	Extinct	This herb species is believed to be either extinct, or a misidentification. This species is not likely to occur.
Pultenaea parviflora	Endangered	Vulnerable	This shrub species be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland. The study area contains no suitable habitat. Site inspections revealed no individuals of this distinct perennial shrub species in the study area. This species is not likely to occur.
Acacia pubescens	Vulnerable	Vulnerable	This shrub species is known to occur in a wide range of vegetation types on Wianamatta Shales and gravel alluvial soils in Western Sydney. Site inspections revealed no individuals of this distinct perennial shrub species in the study area. This species is not likely to occur.
Eucalyptus nicholii	Vulnerable	Vulnerable	This tree species is native to the New England Tablelands of NSW. It has been commonly planted as an ornamental tree, particularly on street verges and in golf courses and schools. One individual of this species was identified in the study area. As this individual was planted and outside of its natural range, its presence is of no significance.
Syzygium paniculatum	Endangered	Endangered	This tree species naturally occurs in littoral rainforests and gullies in coastal New South Wales. It has been widely cultivated. There is no suitable habitat for this species in the study area. No individuals of this tree were identified in the study area. This species is not likely to occur.
Pterostylis saxicola	Endangered	Endangered	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. There are very few known populations and they are all very small and isolated. Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where *Pterostylis saxicola* occurs are sclerophyll forest or woodland on shale/sandstone transition soils or shale soils. No suitable habitat occurs in the study area. This species is not likely to occur.
Grevillea juniperina subsp. juniperina	Vulnerable	Not Listed	Endemic to Western Sydney, centred on an area bounded by Blacktown, Erskine Park, Londonderry and Windsor with outlier populations at Kemps Creek and Pitt Town. Grows on reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium (often with shale influence), typically containing lateritic gravels. Recorded from Cumberland Plain Woodland, Castlereagh Ironbark Woodland, Castlereagh Scribbly Gum Woodland and Shale/Gravel Transition Forest. Site inspections revealed no individuals of this distinct perennial shrub species in the study area. This species is not likely to occur.
Pomaderris prunifolia (a shrub) population, Parramatta, Auburn, Strathfield and Bankstown local government areas	Endangered Population	-	Known from only three sites within the listed local government areas, at Rydalmere, within Rookwood Cemetery and at The Crest of Bankstown. Site inspections revealed no individuals of this distinct perennial shrub species in the study area. This species is not likely to occur.
Pimelea spicata	Vulnerable	Vulnerable	On the Cumberland Plain it occurs on shale-derived soils associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland). It is possible that this species occurs in the study area as habitat is suitable. Appropriately timed surveys would be required to confirm its absence.

4.2 Threatened Fauna

Only one species of threatened fauna was observed in the study area by Land Eco, this being the Little Lorikeet. No other threatened fauna or evidence thereof were identified within the study area by Land Eco during the one (1) day site assessment.

A map and table of the most significant habitat features in the study area is presented (**Figure 5;Table 7**). The map identifies that habitat features which occur in the study area. The most significant habitat features were hollow-bearing trees, artificial culverts, bridges, waterbodies and stormwater drains. The Study area lacked important habitat features including native shrubby understorey, rock outcrops/crevices, soaks. Subsequently, most threatened fauna species known to occur within 10km of the study area could be discounted as the habitat was found to be not suited.

Desktop analysis revealed a suite of threatened fauna species as having the potential to utilise habitat on the study area during part of their lifecycles. Many of these species were discounted as being not likely to occur in the study area. However, the following species do have potential to occur in the study area therefore appropriate impact assessments will be required to assess the impacts of the proposed development on the habitat proposed to be impacted.

Abundant native trees identified in the Study area which may provide potential foraging habitat for locally resident and nomadic fauna, including:

- *Pteropus poliocephalus* (Grey-headed Flying Fox) (BC Act: Vulnerable; EPBC Act: Vulnerable)
- *Glossopsitta pusilla* (Little Lorikeet) – confirmed present
- *Lathamus discolor* (Swift Parrot) (BC Act: Endangered; EPBC Act: Critically Endangered)
- *Ninox connivens* (Barking Owl) (BC Act: Vulnerable)
- *Ninox strenua (*Powerful Owl) (BC Act: Vulnerable)
- *Hieraaetus morphnoides* (Little Eagle) (BC Act: Vulnerable)
- *Haliaeetus leucogaster* (White-bellied Sea-eagle) (BC Act: Vulnerable)
- *Lophoictinia isura* (Square-tailed Kite) (BC Act: Vulnerable)
- *Anthochaera phrygia (*Regent Honeyeater) (BC Act: Critically Endangered; EPBC Act: Critically Endangered)
- *Saccolaimus flaviventris (*Yellow-bellied Sheathtail Bat) (BC Act: Vulnerable)
- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat) (BC Act: Vulnerable)
- *Chalinolobus dwyeri (*Large-eared Pied Bat) (BC Act: Vulnerable; EPBC Act: Vulnerable)
- *Falsistrellus tasmaniensis (*Eastern False Pipistrelle) (BC Act: Vulnerable)
- *Myotis macropus* (Southern Myotis) (BC Act: Vulnerable)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat) (BC Act: Vulnerable)
- *Miniopterus australis* (Little Bent-winged Bat) (BC Act: Vulnerable)
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat) (BC Act: Vulnerable)

The Grey-headed Flying Fox is highly mobile and known to forage over 50km in one foraging bout. It is not likely that any of the trees on the study area provide important foraging or roosting resources for a local viable population of this species. No active roost camps were observed in or near the study area.

The presence of mature nectar-bearing trees was confirmed to support Little Lorikeet and may provide forage for Grey-headed Flying-fox and other threatened nectarivores birds, in particular Swift Parrot. These birds are mobile and not likely to breed or depend on vegetation in the Study area. The Swift Parrot only nests in Tasmania while Little Lorikeet may nest in a wide range of locations where suitable tree hollows are present.

Suitable roost habitat occurs across the Study area for vulnerable microbats, the most notable habitat features are the hollow-bearing trees, bridge, culverts, old buildings including the existing sheds (microbats like to roost in building cavities) and the dense fronds of introduced *Phoenix canariensis* (Canary Island Date Palm). The entire study area is likely to be used as foraging space for vulnerable microbats, such as *Micronomus nofolkensis, Falsistrellus tasmaniensis, Scoteanax rueppellii, Miniopterus orianae oceanensis, Miniopterus australis, Chalinolobus dwyeri* and *Saccolaimus flaviventris.*

The trees in the Study area are likely to attract the prey of vulnerable diurnal and nocturnal birds. Powerful Owl and Barking Owl) may forage in the Study area for prey species including possums, gliders, rats and birds. Dense trees may be used as temporary roosts. It is possible, that breeding may occur among these species in large tree hollows, however, the lack of suitable dense shrubbery reduces the suitability of these tree hollows for nesting.

The presence of ponded waterbodies and ephemeral drainage lines provide potential habitat for *Litoria aurea* (Green and Golden Bell Frog) along with threatened and migratory nomadic waterbirds including:

- *Ixobrychus flavicollis* (Black Bittern) (BC Act: Vulnerable)
- *Botaurus poiciloptilus* (Australasian Bittern) (BC Act: Endangered, EPBC Act: Endangered)
- *Rostratula australis* (Australian painted Snipe) (BC Act: Endangered, EPBC Act: Endangered)
- *Oxyura australis* (Blue-billed Duck) (BC Act: Vulnerable)
- *Stictonetta naevosa* (Freckled Duck) (BC Act: Vulnerable)
- *Actitis hypoleucos* (Common Sandpiper) (EPBC Act: Migratory)
- *Gallinago hardwickii* (Latham's Snipe) (EPBC Act: Migratory)
- *Calidris acuminata* (Sharp-tailed Sandpiper) (EPBC Act: Migratory)

The presence of leaf litter, bark litter and coarse woody debris may provide habitat for the BC Act listed vulnerable *Meridolum corneovirens* (Cumberland Plain Land Snail) however, Land Eco carried-out targeted surveys for this snail during the site visit and only encountered common introduced species (**Appendix 1**).

Table 7. Fauna habitat features in the study area identified by Land Eco Consulting

Habitat component	Site values
Coarse woody debris	Large logs, bark, debris piles and other waste material present. All provide habitat for a wide range of ground-dwelling reptiles, mammals, frogs and invertebrates. Some woodland birds may also shelter and forage among.
Rock outcrops and bush rock	Absent.
Caves, crevices and overhangs	Absent.
Culverts, bridges, mine shafts, or abandoned structures	A large culvert and bridge occur in the far north-west of the study area. These structures may be used for roosting by microbats, in particular, Southern Myotis.
Nectar/lerp-bearing Trees	All of the *Eucalyptus spp.* on the study area may provide foraging habitat for nomadic nectivorous birds and the Grey-headed Flying-fox.
Nectar-bearing shrubs	Nectar-bearing shrubs including Melaleuca spp., Callistemon spp. and Grevillea spp. were abundant and may provide foraging habitat for nomadic nectivorous birds and the Grey-headed Flying-fox.
Koala and Greater Glider browse	While Eucalyptus spp. are present, it is highly unlikely that either Koala or Greater Glider would visit this site is it is located too far from the nearest known populations of this sensitive species.
Large stick nests	No large stick nests suitable for threatened raptorial birds of prey were observed on the Study area during the assessment by Land Eco. This does not rule-out potential for raptors to utilise this habitat for future nest building. Of all of the threatened raptors with potential to nest in the study area, it is considered that the Square-tailed Kite is the most likely to occur.
Sap and gum sources	Many of the trees in the development footprint are sap/gum producing and may provide forage for gliders. Particularly *Eucalyptus tereticornis, Eucalyptus moluccanna* and *Acacia spp.*
She-oak fruit (Glossy Black Cockatoo feed)	While *Casuarina spp.* are present, it is highly unlikely that Glossy Black Cockatoo would visit this site is it is located too far from the nearest known populations of this sensitive species.
Seed-bearing trees and shrubs	Fruit-bearing trees such as *Eucalyptus spp.* and fruit-bearing shrubs such as *Acacia spp.* provide foraging habitat for birds.
Soft-fruit-bearing trees	Abundant *Olea europea subsp. cuspidata* (African Olive) bushes may provide fruit that could be consumed by Grey-headed Flying-fox.
Dense shrubbery and leaf litter	Absent.
Tree hollows	Hollows existed in large trees across the study area and its periphery.
Decorticating bark	Peeling bark was observed on the *Eucalyptus moluccana* and other *Eucalyptus spp.* trees.
Wetlands, soaks and streams	The study area contains no natural wetlands or soaks; however, an engineered drainage channel enters the study areas in the north-west corner. The drainage channels provide habitat for frogs and waterbirds.
Open water bodies	Small and large artificial waterbodies 'dams' and 'water hazards' occur on the southern and northern peripheries of the study area. These waterbodies provide habitat for frogs and waterbirds.
Estuarine, beach, mudflats, and rocky foreshores	Absent.

Figure 5. Threatened species and habitat recorded in the study area by Land Eco Consulting

5. Conclusion

The application for a site compatibility certificate under the Seniors Housing SEPP must consider a number of matters including:

(i) *the natural environment (including known significant environmental values, resources or hazards) and the existing uses and approved uses of land in the vicinity of the proposed development, and*

(vi) *if the development may involve the clearing of native vegetation that is subject to the requirements of section 12 of the Native Vegetation Act 2003 – the impact that the proposed development is likely to have on the conservation and management of native vegetation.*

The study area consists largely of planted exotic and native species, with a small area considered as being comprised of remnant trees. There is potential for remnant native vegetation to provide habitat in the form of small hollows and represent a highly modified remnant Endangered Ecological Community. Steps to avoid or minimise loss will be recorded for the development application.

The vegetation is likely to provide occasional foraging, shelter and potential breeding habitat for a variety of both common and threatened native fauna species. One threatened fauna species, the Little Lorikeet was observed foraging in the study area during the site visit by Land Eco.

The Native Vegetation Act 2003 was repealed and replaced with the Local Land Services Act 2013. However, the LLS Act 2013 does not apply to land zoned RE2 (Private Recreation). Therefore, consent under the LLS Act 2013 would not be required for clearing of native vegetation.

The Biodiversity Conservation Act 2016 does however apply to the site and will need to be considered in future Development Applications lodged on the site. If the development triggers the Biodiversity Offset Scheme, a Biodiversity Development Assessment Report will be required to be submitted with the DA and biodiversity offsets will be required.

Land Eco is of the opinion that the natural environment and biodiversity values of the study area are of low condition and/or overall significance. It is considered that Seniors Housing development would be a suitable and compatible land use for this site.

6. References

Altis Architecture (2021) Fox Hills Golf Club Masterplan 55 Fox Hills Crescent, Prospect.

Atlas of Living Australia (ALA) (2020) Atlas of Living Australia. Spatial Portal http://spatial.ala.org.au/ [accessed 23/11/2020]

Australian Native Plants Society (Australia) (ANSPA) (2010) Threatened Flora Lists: ROTAP Coding System http://anpsa.org.au/coding.html

Bannerman and Hazelton (2011) Soil Landscapes of the Penrith 1:100,000 Sheet report, digital reprint, Office of Environment and Heritage, Sydney.

Briggs, J.D. and Leigh, J.H.C. (1996) Rare or Threatened Australian Plants: 1995 Revised Edition. CSIRO Division of Plant Industry/Australian National Parks and Wildlife Service. CSIRO Publishing, Melb.

Bureau of Meteorology (BOM) (2020) Parramatta, New South Wales October 2020 Daily Weather Observations http://www.bom.gov.au/climate/dwo/202010/html/IDCJDW2107.202010.shtml

Churchill, S. (1998) Australian Bats, Reed New Holland, Sydney.

Commonwealth of Australia (2010a) Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

Commonwealth of Australia (2010b) Survey guidelines for Australia's threatened bats. Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

Commonwealth of Australia (2010c) Survey guidelines for Australia's threatened frogs. Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

Commonwealth of Australia (2011) Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

Commonwealth of Australia (2013) Survey guidelines for Australia's threatened orchids. Guidelines for detecting orchids listed as 'threatened' under the Environment Protection and Biodiversity Conservation Act 1999

Commonwealth of Australia Department of the Environment (DotE) (2020) Protected Matters Search Tool http://www.environment.gov.au/epbc/protect/index.html [accessed 23/11/2020]

Cropper S.C. (1993) Management of Endangered Plants. CSIRO Publishing, Collingwood, Victoria, Australia

Department of Primary Industries (DPI) (2019) Priority Weeds for the Greater Sydney Region NSW Weeds Wise http://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=3

Harden, G.J . (ed) (2002). Flora of New South Wales Volume 2. NSW University Press: Sydney.

Harden, G.J. (ed) (1992). Flora of New South Wales Volume 3. NSW University Press: Sydney.

Harden, G.J. (ed) (1993). Flora of New South Wales Volume 4. NSW University Press: Sydney.

Harden, G.J. (ed) (2000). Flora of New South Wales Volume 1. NSW University Press: Sydney.

Herbert C., (1983) Sydney 1:100 000 Geological Sheet 9130, 1st edition. Geological Survey of New South Wales, Sydney.

Landcom (2004) Managing Urban Stormwater: Soils and Construction 'The Blue Book', Volume 1, Fourth Edition, New South Wales Government, ISBN 0-9752030-3-7

Mitchell, P., (2002) Descriptions for NSW (Mitchell) Landscapes Version 2 (2002)

NSW Department of Environmental Conservation (DEC) (2004) Threatened Species Survey and Assessment: Guidelines for developments and activities (working draft), New South Wales Department of Environment and Conservation, Hurstville, NSW.

NSW Department of Environment and Conservation (DEC) (2009) Threatened species survey and assessment guidelines: field survey methods for fauna: Amphibians

NSW Department of Planning Industry and Environment (DPIE) (2020a) Planning Portal ePlanning Spatial Viewer https://www.planningportal.nsw.gov.au/ [accessed 23/11/2020]

NSW Department of Planning Industry and Environment (DPIE) (2020b) Biodiversity Values Map and Threshold Tool https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap [accessed 23/11/2020]

NSW Department of Planning Industry and Environment (2020c) NSW Bionet. The website of the Atlas of NSW Wildlife http://www.bionet.nsw.gov.au/ [accessed 23/11/2020]

NSW Department of Planning Industry and Environment (2020d) Threatened biodiversity profile search https://www.environment.nsw.gov.au/threatenedspeciesapp/ [accessed 23/11/2020]

NSW Office of Environment and Heritage (OEH) (2016a) The Native Vegetation of the Sydney Metropolitan Area. Volume 1: Technical Report. Version 2.0, Department of Premier and Cabinet, Sydney.

NSW Office of Environment and Heritage (OEH) (2016b) The Native Vegetation of the Sydney Metropolitan Area. Volume 2: Vegetation Community Profiles. Version 3.0, Department of Premier and Cabinet, Sydney.

NSW Office of Environment and Heritage (OEH) (2016c) NSW Guide to Surveying Threatened Plants

NSW Office of Environment and Heritage (OEH) (2017) Biodiversity Assessment Method

NSW Scientific Committee (2009) Cumberland Plain Woodland in the Sydney Basin Bioregion - critically endangered ecological community listing. NSW Scientific Committee - final determination

NSW Scientific Committee (2011) River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions - Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act. NSW Scientific Committee - final determination

PlantNET (2020) The NSW Plant Information Network System, Royal Botanic Gardens and Domain Trust, Sydney. http://plantnet.rbgsyd.nsw.gov.au [accessed 23/11/2020]

Appendices

Appendix 1. Fauna species identified during survey of Study area

Class	Scientific Name	Species	Status
Amphibia	*Limnodynastes peronii*	Striped Marsh Frog	Protected
Aves	*Anas superciliosa*	Pacific Black Duck	Protected
Aves	*Cactua galerita*	Sulphur-crested Cockatoo	Protected
Aves	*Calyptorhynchus funereus*	Yellow-tailed Black Cockatoo	Protected
Aves	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	Protected
Aves	*Covus cornoides*	Australian Raven	Protected
Aves	*Cracticus tibicen*	Australian Magpie	Protected
Aves	*Dacelo novaehollandiae*	Laughing Kookaburra	Protected
Aves	*Eolophus roseicapilla*	Galah	Protected
Aves	*Eudynamys orientalis*	Common Koel	Protected
Aves	*Fulica atra*	Eurasian Coot	Protected
Aves	*Gallinula tenebrosa*	Dusky Moorhen	Protected
Aves	*Glossopsitta pusilla*	Little Lorikeet	Protected
Aves	*Grallina cyanoleuca*	Magpie-lark	Protected
Aves	*Hirundo neoxena*	Welcome Swallow	Protected
Aves	*Manorina melanocepala*	Noisy Miner	Key Threatening Process
Aves	*Microcarbo melanoleucos*	Little Pied Cormorant	Protected
Aves	*Ocyphaps lophotes*	Crested Pigeon	Protected
Aves	*Petrochelidon ariel*	Fairy Martin	Protected
Aves	*Porphyrio melanotus*	Australasian Swamphen	Protected
Aves	*Psephotus haematonotus*	Red-rumped Parrot	Protected
Aves	*Rhipidura leucophrys*	Willie Wagtail	Protected
Aves	*Strepera graculina*	Pied Currawong	Protected
Aves	*Streptopelia chinensis*	Spotted Dove	Feral Pest
Aves	*Sturnus tristis*	Common Myna	Feral Pest
Aves	*Trichoglossus haematodus*	Rainbow Lorikeet	Protected
Aves	*Vanellus miles novaehllandiae*	Masked Lapwing	Protected
Mammallia	*Trichosurus vulpecula*	Common Brush-tailed Possum	Protected
Mammallia	*Vulpes vulpes*	Fox (scat)	Feral Pest
Mollusca	*Cornu asperum*	Garden Snail	Feral Pest
Mollusca	*Limax maxima*	Leopard Slug	Feral Pest
Reptilia	*Eulamprus quoyii*	Eastern Water Skink	Protected
Reptilia	*Lampropholis delicata*	Common Garden Skink	Protected

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