5 March 2021

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Australian War Memorial redevelopment project – Ecological Impact Assessment

Capital Ecology project no. 2956

Dear Mr Burnside,

This letter provides an Ecological Impact Assessment (EIA) for the Australian War Memorial redevelopment project (the 'proposed development'). As detailed in the Statement of Requirements[1], the proposed development requires the following three Works Approval applications to be prepared and lodged with the National Capital Authority.

- Works Approval 1 includes the demolition of Anzac Hall and early works excavation for the Bean Building, Anzac Hall, and Glazed Link.
- Works Approval 2 includes the construction of Anzac Hall, Glazed Link, Bean Building, Research Centre, Central Energy Plant, Southern Entrance, Parade Ground, and select surrounds.
- Works Approval 3 includes the Public Realm (e.g. wayfinding, new accessible paths, and landscaping).

This EIA considers the combined impact of all three Works Approvals in order to ensure that the total impact of the proposed development on ecological values is appropriately assessed.

The 'study area' for this EIA encompasses Block 3, Section 39, Campbell, ACT and the immediately adjoining road verges (total area = 14.49 ha). The study area contains the Australian War Memorial, associated development (e.g. Poppy's Café, car parks, etc.), and landscaped areas.

[1] Australian War Memorial Development Project. *Approach to Market – AWM000355. Provision of Town Planning Consultancy Services. Attachment A – Statement of Requirements*.

The Territory Plan Land Use Zone of the entire study area is 'DES: DESIGNATED' and there is no Territory Plan Overlay Zone. As shown in Figure 1 and Figure 2, the study area is boarded by:

- Fairbairn Avenue to the south-east, beyond which is residential development;
- Limestone Avenue to the south-west, beyond which is residential development; and
- Treloar Crescent to the north and north-east, beyond which is Campbell High School, Mount Ainslie Nature Reserve, and residential development.

As the study area is a 'Designated Area' under the National Capital Plan, a Works Approval must be granted under the *Australian Capital Territory (Planning and Land Management) Act 1988*. The ACT *Planning and Development Act 2007* (P&D Act), ACT *Nature Conservation Act 2014* (NC Act), and ACT *Tree Protection Act 2005* (TP Act) do not apply to development in Designated Areas.

The primary aim of this EIA is therefore to identify and assess the values of the study area of formally recognised biodiversity conservation significance, specifically those currently listed pursuant to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Whilst the NC Act does not apply to development in Designated Areas, pursuant to the EPBC Act a proposed action undertaken by a Commonwealth Government entity and/or occurring on Commonwealth land must consider the significance of impacts on the 'whole of environment' in addition to EPBC Act listed Matters of National Environmental Significance. Accordingly, matters listed pursuant to the NC Act or otherwise of currently recognised specific conservation significance in the ACT are also addressed.

This EIA has been prepared based on:

- information provided by Knight Frank Town Planning, notably the location and design of the proposed development;
- a review of relevant studies and other background information, including the surveys and sources referenced herein;
- the results of database searches for the study area, including the EPBC Act Protected Matters Search Tool (PMST), ACTmapi[2], and Canberra Nature Map[3];
- approximately eight hours of field survey carried out between 19 October 2020 and 1 November 2020, completed to record and assess the ecological values of the study area; and
- the knowledge of the authors regarding the biota of the locality, specifically the threatened ecological communities, flora, and fauna (and associated habitat) with the potential to occur in the lowland ecosystems of the region.

1. Methods

1.1 Database Searches

This EIA was informed by a desktop review that included the following.

- A list of threatened species (flora and fauna), threatened populations, and threatened ecological communities (TECs) listed pursuant to the EPBC Act with the potential to occur in the

[2] http://www.actmapi.act.gov.au/
[3] https://canberra.naturemapr.org/

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study area was generated using the Department of Agriculture, Water and the Environment's online EPBC Act PMST on 6 November 2020.

- A review of the ACT Government ACTmapi mapping tool and Canberra Nature Map to obtain the most current layers and point data for the significant ecological values of the locality. These values include species listed as threatened pursuant to the EPBC Act and/or the NC Act, together with flora species considered 'rare or uncommon in the ACT' and fauna which are otherwise of a conservation focus.
- Previous and current studies undertaken by Capital Ecology and others in the locality.

1.2 Vegetation Survey and Mapping

The vegetation survey and mapping involved the following.

- Mapping of the on-ground boundaries of the Plant Community Types (PCTs).
- Division and delineation of PCTs into Vegetation Zones based on condition.
- The collection of floristic site value data as required.

The results of the vegetation survey have been accurately mapped using GIS allowing the total area of each vegetation zone to be calculated.

Plant Community Type (PCT) mapping

The on-ground boundaries of each of the Plant Community Types (PCTs) (as provided in the ACT Vegetation Types Database[4]) present in the study area were accurately mapped. Mapping of the PCTs (i.e. the climax communities) was undertaken by walking the boundaries and recording them using a combination of hand-held GPS and marking directly on to high resolution orthorectified aerial photograph field maps.

The PCT boundaries were defined based on the:

- presence, species, growth form and density of remnant canopy trees and/or stags or stumps of these;
- presence and species of midstorey shrubs and trees;
- floristic composition of the groundstorey; and
- the landscape position and other geographical features (elevation, aspect, soils, apparent hydrology).

The above was informed by both the current vegetation (2020 aerial image and site surveys) and that shown in historic (1955) aerial images provided on ACTmapi.

Vegetation Zone delineation and mapping

The mapped PCTs were further divided into Vegetation Zones based on the structure, floristic composition, and overall condition ('intactness') of the vegetation. The Vegetation Zones were mapped using GIS which allows for accurate calculations of the total area of each Vegetation Zone in the study area. A species list for the study area is presented in Appendix A.

[4] ACT Government (2015). *ACT Vegetation Types Database – Attachment to the ACT Environmental Offsets Calculator Assessment Methodology*. 18 May 2015.

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Tree Survey

Each of the mature (i.e. greater than 20 cm Diameter at Breast Height [DBH]) native trees (i.e. including both naturally occurring and planted trees) in the study area were assessed during field surveys. Each tree was identified to species and its location marked via hand-held GPS. Data collected for each tree included:

- tree number;
- species;
- remnant/planted;
- an estimate of DBH (cm);
- an estimate of height (m);
- presence of any hollows and the size of hollows; and
- presence of any other habitat values such as nests, mistletoe etc.

The results of Capital Ecology's tree habitat assessment are provided in Appendix B and Appendix C.

1.3 Likelihood of Occurrence Assessment

The Likelihood of Occurrence Assessment for threatened flora and fauna species is a categorisation used to determine the likelihood that the subject species occurs within a site. The results are based on the findings of completed desktop studies and field surveys, expert opinion, and consideration of the species' currently recognised distribution and preferred habitat.

Threatened species and populations identified in the Likelihood of Occurrence Assessment include all of those identified during the database and literature review as potentially occurring within five kilometres of the study area. Included are threatened species listed pursuant to the EPBC Act and/or the NC Act and considered by Capital Ecology to have some potential to occur in the study area.

The likelihood of a species occurring in the study area is categorised as either negligible, low, moderate, or high. A species that has been identified in the study area during the surveys for this EIA or by other confirmed records is expressed as confirmed.

The completed Likelihood of Occurrence Assessment is provided as Appendix D. Species assigned a moderate or higher likelihood of occurrence in the study area, other than if this is limited to transient visitation, are considered in more detail in Section 2.4 (threatened flora) and Section 2.5 (threatened fauna) of this EIA.

2. Results

2.1 Database Searches

No 'Significant Plants and Animals' are mapped within the study area on the ACT Government's ACTmapi online mapping tool. However, Rosenberg's Monitor *Varanus rosenbergi* and ACT Listed Orchid habitat are mapped immediately to the north-east in Mount Ainslie Nature Reserve, and Golden Sun Moth *Synemon plana* habitat is mapped to the north on the far side of Campbell High School.

ACTmapi identifies small areas in the east of the study area as 'Potential Threatened Woodland' (i.e. potential EPBC Act *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland* and/or NC Act listed

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Yellow Box – Red Gum Grassy Woodland, commonly known as Box-Gum Woodland). These areas of 'Potential Threatened Woodland' are connected to similarly mapped vegetation across the lower footslopes of Mount Ainslie.

A radar search on Canberra Nature Map did not identify any rare or threatened species as occurring in the study area. However, the following 10 rare or threatened species were identified as occurring within 1 km of the study area.

- Fauna: Gang-Gang Cockatoo *Callocephalon fimbriatum*; Varied Sitella *Daphoenositta chrysoptera* (NC Act vulnerable); White-bellied Sea-eagle *Haliaeetus leucogaster*; White-winged Triller *Lalage tricolor* (NC Act vulnerable); Scarlet Robin *Petroica boodang* (NC Act vulnerable); Rose Robin *Petroica rosea*; Speckled Warbler *Pyrrholaemus sagittatus*; and Golden Sun Moth *Synemon plana* (EPBC Act critically endangered, NC Act endangered).

- Flora: Blue Flax Lily *Dianella longifolia* and Hoary Sunray *Leucochrysum albicans* subsp. *tricolor* (EPBC Act endangered).

As detailed in Appendix D (Likelihood of Occurrence Assessment), database searches returned 43 EPBC Act and/or NC Act listed threatened species and two EPBC Act and/or NC Act listed threatened ecological communities as having the potential to occur in the locality.

2.2 Vegetation Survey and Mapping

The study area contains one PCT, namely 'ACT16 – *Eucalyptus melliodora – E. blakelyi* Tableland Grassy Woodland' (Table 1). ACT16 and its constituent vegetation zones occurring in the study area are described below, in Tables 2a-c, and illustrated in Figure 2. A list of the flora species recorded in the study area is provided in Appendix A.

Table 1. PCTs recorded in the study area.

PCT	PCT name	PCT description	Occurrence in the study area
ACT16	*Eucalyptus melliodora - E. blakelyi* Tableland Grassy Woodland	ACT16 occurs on toe-slopes and other areas of similar elevation on soils of moderate to high fertility and generally moderate depth. In its climax form this community would have been characterised by an open canopy, sparse or absent mid- and shrubstorey, together with a defined grassy groundstorey supporting a high diversity of native forbs.	This PCT was mapped across the whole of the study area.

The study area has been used as the site for the Australian War Memorial since the early 1940's. As a result, the vegetation which occurs today is highly modified. The majority of the study area has been cleared, intensively landscaped, and regularly mown over a long period of time. The remnant overstorey is largely absent and the native midstorey and shrubstorey have been entirely removed. The groundstorey is heavily modified and dominated by a variety of exotic lawn grasses and common weeds. The few native non-grass species present in the study area are primarily non-local native species of various provenance, all of which have been planted for landscaping purposes.

As shown in Figure 2 and Appendix B, a total of 14 mature remnant trees occur in the study area. These comprise nine Yellow Box *Eucalyptus melliodora* and five Apple Box *E. bridgesiana*. As shown in Figure 3, the sections of the study area that currently support remnant trees correspond to those parts of the study area that supported naturally occurring trees in 1955.

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The remainder of the native vegetation occurring in the study area comprises local and non-local planted trees, shrubs, forbs, and grasses. While some of these mature native trees are PCT appropriate species (i.e. Yellow Box, refer to Figure 2 and Appendix B), their age, size, and/or location indicate that they have be planted. The other non-remnant mature native trees were planted approximately 20 - 70 years ago and are predominately non-local species such as Blue Gum *E. bicostata* and Maiden's Gum *E. maidenii*.

The study area contains a groundlayer clearly dominated by exotic grasses and herbaceous weeds, notably Kikuyu Grass *Cenchrus clandestinus,* Chilean Needle Grass *Nassella neesiana*, Capeweed *Arctotheca calendula*, Clovers *Trifolium* spp.*,* Ribwort Plantain *Plantago lanceolata,* Flatweed *Hypochaeris radicata*, and Red-flowered Mallow *Modiola caroliniana*.

The following three vegetation zones were identified, assessed, and mapped during field surveys.

- **ACT16 Zone 1 – Remnant Trees – Exotic Groundstorey – Low Diversity**. This zone supports 14 mature remnant trees. There is no regeneration of the overstorey and the native midstorey and shrubstorey are entirely absent. The groundstorey has been historically disturbed and is dominated by a variety of exotic grasses and broadleaf weeds.

- **ACT16 Zone 2 – Planted Native Vegetation – Exotic Groundstorey – Low Diversity**. This zone supports planted local and non-local trees, shrubs, forbs, and grasses. No naturally occurring remnant overstorey, midstorey, or shrubstorey is present. The groundstorey has been historically disturbed and is dominated by a variety of exotic grasses and broadleaf weeds

- **ACT16 Zone 3 – Exotic Trees/Groundstorey – Low Diversity**. This zone does not support any naturally occurring or planted native overstorey but does support planted exotic trees. The groundstorey has been historically disturbed and is dominated by a variety of exotic grasses and broadleaf weeds.

Tree Survey

The results of the tree assessment are provided in Appendix B and Appendix C and are shown in Figure 2 and Figure 3.

In total, 154 mature (i.e. > 20 cm DBH) trees were assessed within the study area. Of those, 14 were determined to be naturally occurring remnant trees. These comprise nine Yellow Box and five Apple Box. All of the remaining mature trees in the study area are either planted locally occurring species or planted non-locally occurring species. Of the 154 trees, only five contain a functional hollow and therefore support a potential nesting/roosting habitat resource to hollow-dependant fauna. As detailed in Appendix B, Sulphur-crested Cockatoos *Cacatua galerita* were observed nesting in two of the hollows.

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Table 2a. ACT16 Zone 1 results summary

ACT16 Zone 1	
Description	Highly modified open woodland This zone supports 14 mature remnant trees. There is no regeneration of the overstorey and the native midstorey and shrubstorey are entirely absent. The groundstorey has been historically disturbed and is dominated by a variety of exotic grasses and broadleaf weeds.
Study Area	0.27 ha.
Impact Area	0.12 ha
Overstorey Species	Yellow Box *E. melliodora* and Apple Box *E. bridgesiana*
Overstorey Cover	Low to Moderate.
Overstorey Regeneration	No.
Perennial Groundlayer	Exotic dominant.
Significant Weeds	Chilean Needle Grass *Nassella neesiana.*
EPBC Act and/or NC Act listed TEC	Yes (NC Act).

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Table 2b. ACT16 Zone 2 results summary

ACT16 Zone 2	
Description	Planted native vegetation This zone supports planted local and non-local trees, shrubs, forbs, and grasses. No naturally occurring remnant overstorey, midstorey, or shrubstorey is present. The groundstorey has been historically disturbed and is dominated by a variety of exotic grasses and broadleaf weeds.
Study Area	2.03 ha.
Impact Area	1.24 ha
Overstorey Species	A variety of planted local and non-local trees (refer to Appendix B).
Overstorey Cover	Low to High.
Overstorey Regeneration	No.
Perennial Groundlayer	Exotic dominant.
Significant Weeds	Chilean Needle Grass
EPBC Act and/or NC Act listed TEC	No.

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Table 2a. ACT16 Zone 3 results summary

ACT16 Zone 3	
Description	Exotic vegetation This zone does not support any naturally occurring or planted native overstorey but does support planted exotic trees. The groundstorey that has been historically disturbed and is dominated by a variety of exotic grasses and broadleaf weeds
Study Area	3.90 ha.
Impact Area	2.37 ha
Overstorey Species	No native overstorey.
Overstorey Cover	None.
Overstorey Regeneration	No.
Perennial Groundlayer	Exotic dominant.
Significant Weeds	Chilean Needle Grass
EPBC Act and/or NC Act listed TEC	No.

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2.3 Threatened Ecological Communities

Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

Two EPBC Act listed threatened ecological communities (TEC's) have the potential to occur in the study area, both listed as critically endangered under the EPBC Act: 'Natural Temperate Grassland of the South Eastern Highlands' (NTG-SEH), and 'White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland' (Box-Gum Woodland).

Natural Temperate Grassland of the South Eastern Highlands

Description – The NTG-SEH TEC is characterised by grassy vegetation dominated by moderately tall (25–50cm) to tall (50–100cm), dense to open tussock grasses in the genera *Austrodanthonia* (note: now *Rytidosperma*), *Austrostipa*, *Bothriochloa*, *Poa* and *Themeda*. Up to 70% of all plant species may be forbs. The community may be treeless or contain up to 10% cover of trees, shrubs or sedges.

Presence in the study area – Absent – As detailed above, the climax (i.e. pre-European) ecological community for the entire study area is 'PCT-ACT16 – *Eucalyptus melliodora – E. blakelyi* Tableland Grassy Woodland'. No part of the study area would have once supported a grassland PCT. Accordingly, the study area does not support EPBC Act NTG-SEH.

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland

To determine whether a patch meets the criteria for the community, the vegetation must be assessed against the flowchart provided in *Policy Statement 3.5: White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands* (Commonwealth of Australia 2006[5]). An assessment of the vegetation in the subject land against this flowchart is provided below.

1. *Criterion 1. Is, or was previously, at least one of the most common overstorey species White Box, Yellow Box or Blakely's Red Gum?*

   Yes – ACT16 Zone 1 supports remnant Yellow Box and ACT16 Zones 2 and Zone 3 are estimated to have historically supported Yellow Box and/or Blakely's Red Gum.

2. *Does the patch have a predominantly native understorey?*

   No – the understorey of ACT16 Zone 1, Zone 2, and Zone 3 is clearly dominated by exotic species (i.e. > 90% perennial exotic).

3. *Is the patch 0.1 ha (1000 m^2) or greater is size with 12 or more native understorey species present (excluding grasses)? There must be at least one important species.*

   Or

   Is the patch 2 ha or greater in size with an average of 20 or more mature trees per hectare, or is there natural regeneration of the dominant overstorey eucalypts?

   N/A – refer to 2.

Presence in the study area – Absent – as demonstrated by the above assessment, the study area does not support EPBC Act listed Box-Gum Woodland.

[5] Commonwealth of Australia (2006). *Policy Statement 3.5: White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands. Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Department of Environment and Heritage.

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Nature Conservation Act 2014 (ACT)

The following two ecological communities are listed as endangered pursuant to the NC Act.

Natural Temperate Grassland

The definition of the NC Act listed TEC is generally consistent with the EPBC Act definition. As detailed in the ACT Native Grassland Conservation Strategy and Action Plans (ACT Government 2017[6]), the key defining characteristics of Natural Temperate Grassland are:

- occurrence within the ACT's temperate zone where tree growth is climatically limited (elevation up to approximately 1200 m);
- treeless or contains up to 10% projective cover of trees, shrubs or sedges;
- dominated by native grasses and/or native forbs (more than 50% total vegetative cover, excluding introduced annuals); and
- a diversity of native forbs present, or if disturbed, having components of the indigenous native species (including both existing plants and reproductive propagules in the soil e.g. soil seed banks) sufficient to re-establish the characteristic native groundcover.

Presence in the study area – Absent – As discussed above, the climax (i.e. pre-European) ecological community for the entire study area is 'PCT-ACT16 – *Eucalyptus melliodora – E. blakelyi* Tableland Grassy Woodland'. No part of the study area would have once supported a grassland PCT. As such, no vegetation in the study area meets the definition of Natural Temperate Grassland under the NC Act.

Yellow Box – Blakely's Red Gum Grassy Woodland

Woodland meeting the NC Act listed community was defined in the ACT Native Woodland Conservation Strategy and Action Plans (ACT Government 2019[7]). The key defining characteristics of Yellow Box – Blakely's Red Gum Grassy Woodland are:

- a discontinuous stratum of trees of medium height (10-35 m) with canopies that are separated and with 4-30% foliage cover;
- dominated by Yellow Box (*Eucalyptus melliodora*) and/or Blakely's Red Gum (*Eucalyptus blakelyi*). Apple Box (*Eucalyptus bridgesiana*) and Candlebark (*Eucalyptus rubida*) are the most common co-dominant trees;
- remnants of the community in good condition have a ground cover dominated (50% or more of the perennial species) by native grasses and forbs;
- the ground cover of remnants in lower condition may not be dominated by native species, yet retain a canopy of mature trees (20 or more per hectare on average) and/or support natural regeneration;
- a patch size of at least 0.1 ha.

[6] ACT Government (2017*). ACT native grassland conservation strategy and action plans* (Environment, Planning and Sustainable Development, Canberra).
[7] ACT Government (2019). *ACT Native Woodland Conservation Strategy and Action Plans*. Environment, Planning and Sustainable Development, Canberra.

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Polygons within which most or all of the trees have been cleared (described as secondary grassland) also constitute the NC Act listed community, provided:

- Yellow Box and/or Blakely's Red Gum are estimated to have previously been the dominant or co-dominant species;
- a relatively diverse native understorey is present; and
- the patch size is at least 0.1 ha.

Presence in the study area – Confirmed – ACT16 Zone 1 supports a remnant canopy with greater than 20 mature trees per hectare (i.e. 14 mature trees in 0.27 ha), no regeneration of the overstorey, and a low diversity exotic dominant groundstorey. ACT16 Zone 1 therefore meets the definition of NC Act Box-Gum Woodland in low condition.

ACT16 Zone 2 and Zone 3 have been modified to the extent that they now lack the required canopy cover, natural regeneration, native groundstorey, and native understorey diversity to meet the definition of NC Act Box-Gum Woodland.

As such, the portions of the study area defined by ACT16 Zone 1 meet the definition of Yellow Box – Blakely's Red Gum Woodland under the NC Act.

2.4 Threatened Flora Occurrence

No threatened flora species were recorded within the study area during the survey, and as detailed in the Likelihood of Occurrence Assessment (Appendix D), no threatened flora species with the potential to occur in the locality are considered to have a moderate or higher likelihood of occurrence within the study area.

2.5 Fauna Habitat and Threatened Fauna Occurrence

A total of 15 native birds were recorded in the study area during field surveys (Appendix A). This included an observation of two rare/threatened species flying over the study area, being the Superb Parrot *Polytelis swainsonii* (EPBC Act and NC Act vulnerable) and Gang-Gang Cockatoo *Callocephalon fimbriatum.*

As recorded during the field survey, the study area supports the following fauna habitat features.

- Fourteen mature remnant trees (Appendix B and Appendix C), one of which (Tree No. 112) contains a functional hollow currently occupied by nesting Sulphur-crested Cockatoos. All of the mature remnant trees would provide foraging resources for a variety of birds and marsupials, and the hollow bearing tree may provide a nesting resource for a variety of birds, bats, and marsupials.
- A variety of planted non-local mature eucalypt trees, consisting primarily of Blue Gum and Maiden's Gum (Appendix B). These species are commonly planted for native landscaping as they grow quickly and have high aesthetic value. Blue Gum and Maiden's Gum do not occur naturally in the ACT region. Four of the planted trees contain a functional hollow (Tree No. 13, 23, 51, and 93). All of the mature planted trees would provide foraging resources for a variety of birds and marsupials, and the hollow bearing trees may provide a nesting resource for a variety of birds, bats, and marsupials.

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- The largely absent midstorey and shrubstorey is likely to limit the habitat value of the study area for many of the region's threatened and rare woodland birds, which generally prefer to inhabit woodland where such features are more intact.
- The study area supports a sparse understorey dominated by exotic species. Such areas are unlikely to be of value to threatened fauna species but may be used by common native fauna (e.g. birds, kangaroos, reptiles, arthropods).
- As detailed in the Likelihood of Occurrence Assessment (Appendix D), several threatened woodland birds may visit the study area to forage. However, it is unlikely that the foraging resources present within the study area constitute an important proportion of those present within the locality for any threatened fauna species.
- The study area is unlikely to constitute important habitat for any EPBC Act listed migratory birds, although some migratory species may periodically forage within the study area.

The fauna habitat within study area is adjacent to high quality habitat to the north-east (Mt Ainslie Nature Reserve). Given that the study area is currently a manicured landscape and is heavily frequented by the public, it is unlikely that it constitutes a significant component of a wildlife movement corridor or is otherwise of high importance for fauna habitat connectivity. This is evident as the majority of the study area is not identified as a 'Local Link' or as possessing 'Regional Linkage Value' on ACTmapi.

In summary, the fauna habitat within the study area has been substantially modified by the use of the land for recreational purposes, notably the associated intensive landscaping primarily with native planted eucalypts, mowing of open areas, and other ongoing management. As a result, the only remaining features of fauna habitat of value in the study area are the planted eucalypt trees (primarily comprising species not native to the area) and the 14 remnant trees. While these habitat features would provide a foraging resource and potential nesting resource for a variety of birds, bats, and marsupials, the highly modified nature of the vegetation in the study area and ongoing disturbance associated with the Australian War Memorial indicate that these features are unlikely to support habitat of significance to any threatened fauna species.

2.6 Pest Plants

Thirty-three exotic plant species were recorded in the study area during the field survey for this EIA. While the majority of these species are common weeds throughout the region, the species in Table 3 are listed as Weeds of National Significance (Commonwealth) and/or are listed as declared pest plant species in the ACT.

Table 3. Noxious weed occurrence.

Name	Growth Form	Status	Occurrence	Threat Level
Echium plantagineum Paterson's Curse	Forb <1.2 m	Must be contained	Scattered plants across all vegetation zones.	Low
Eragrostis curvula African Love Grass	Tussock <1.2 m	Must be contained	Scattered plants and small patches across all vegetation zones	High – in the absence of concerted control the infestation will continue to spread throughout the study area and adjoining land.

Key for table. WoNS - (Commonwealth) Weed of National Significance. Declared pest plant species in the ACT listed under the *Pest Plants and Animals (Pest Plants) Declaration 2005*: Notifiable; Must be suppressed; Must be contained; Prohibited.

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2.7 Pest Animals

The Indian Myna *Sturnus vulgaris* and European Rabbit *Oryctolagus cuniculus* were the only exotic fauna species observed during the field survey for this EIA. However, the exotic pest species Red Fox *Vulpes vulpes*, European Brown Hare *Lepus europaeus*, and Feral Cat *Felis catus* are known or considered likely to occur in the study area and surrounds. The Red Fox and European Rabbit are species which are the cause of or key contributor toward a Key Threatening Process declared under the EPBC Act.

3. Avoidance, Minimisation and Mitigation Measures

In order to reduce potential impacts on the ecological values within the study area and adjoining land, a number of measures will be implemented during and following the proposed development. These are described below.

Weed Management

The weed management measures that will be implemented to prevent the introduction and/or spread of weeds include the following.

- Appropriate vehicle hygiene will be maintained. Vehicles and machinery entering the study area will be clean of weed seed or propagules.
- Only sterile materials such as hessian/jute or rice straw will be used for soil stabilisation or similar purposes.
- For 12 months following conclusion of the works, significant weeds will be controlled throughout the study area by a qualified and experienced weed control contractor.

A weed control program will be developed to prevent the establishment and spread of significant weeds and control other less significant exotic species (lawn/pasture grasses etc.) within road verges, landscaped areas, and other open space.

Landscaping

Local and non-local native species will be used for landscaping to the fullest extent practicable. Where practicable within open space areas, all strata will be re-established (i.e. groundcover, midstorey shrubs, and canopy trees) to create habitat complexity. This will discourage urban adapted species and encourage small woodland birds to visit the land. Open space plantings will include species appropriate for the applicable historical PCT (i.e. 'ACT16 – *Eucalyptus melliodora – E. blakelyi* Tableland Grassy Woodland').

Retention of Mature Remnant Trees

The study area contains 14 remnant trees, many of which occur to the east of the border of the proposed development footprint. While the proposed development will impact six remnant trees, the remaining eight remnant trees will be retained and protected unless a qualified arborist determines they are unsafe for public areas.

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4. Summary of Proposed Direct Impacts

As illustrated in Figure 4, the proposed development will result in the maximum clearance of a total area 3.73 ha of vegetation[8], consisting of the following.

- 0.12 ha of remnant vegetation over a low diversity, exotic dominant groundstorey (i.e. PCT16 Zone 1), including the removal of six mature remnant trees (i.e. > 20 cm DBH). This vegetation meets the definition of NC Act Box-Gum Woodland in low condition.
- 1.24 ha of planted vegetation over a low diversity, exotic dominant groundstorey (i.e. PCT16 Zone 2), including the removal of 63 mature planted native trees (i.e. > 20 cm DBH). The proposed development will also remove a number of immature planted native trees (i.e. < 20 cm DBH) that occur in the 1.24 ha of PCT16 Zone 2.
- 2.37 ha of low diversity exotic vegetation (i.e. PCT16 Zone 3).

The proposed development will not impact an EPBC Act threatened ecological community or potentially important habitat for any EPBC Act or NC Act listed threatened flora or fauna species.

5. Legislative Requirements

5.1 EPBC Act Referral

Matters of National Environmental Significance

The EPBC Act is the key Commonwealth Government legislation for the protection and conservation of Australia's environment and biodiversity. The EPBC Act provides the legislative framework for the assessment and approval mechanism requiring that proposed 'actions' to be assessed in terms of their potential to impact upon 'Matters of National Environmental Significance' (MNES). MNES currently listed under the EPBC Act are:

- listed threatened species and communities;
- listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- world heritage properties;
- national heritage places;
- the Great Barrier Reef Marine Park;
- nuclear actions; and
- a water resource, in relation to coal seam gas development and large coal mining development.

Where a potential impact on a MNES may occur as a result of a proposed action, the significance of that impact must be assessed. Guideline criteria for determining whether an impact is significant are

[8] Note: the proposed development will not remove all of trees that occur within the 'Proposed Development – maximum extent of disturbance' (refer to Figure 4). With respect to trees with a DBH > 20 cm, only those shown in Figure 4 will be impacted.

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provided under the Act[9]. Where a proposed action will, or is likely to, have a significant impact on a MNES, the proposed action must be referred to the Commonwealth Minister for Agriculture, Water and the Environment. The purpose of the referral is to determine whether a proposed action requires approval and/or controls under the EPBC Act.

With regard to the above, it is unlikely that the proposed development will have a significant impact on a MNES given the study area does not:

- support any EPBC Act listed ecological communities;
- support any EPBC Act listed flora species; or
- contain habitat of potential importance to any EPBC Act listed threatened or migratory fauna species.

In light the above, EPBC Act referral is unwarranted and is not recommended

Whole of Environment

As the proposed action will be carried out by the Commonwealth Government (i.e. the Australian War Memorial) and will occur on Commonwealth/National land, the significance of the proposed action on the 'whole of environment' must also be assessed. Guidelines for determining whether an impact is significant are provided by the Department of the Environment (Commonwealth of Australia 2013b[10]) and are addressed below. If the proposed action will, or is likely to, have a significant impact on the 'whole of environment', it must be referred to the Commonwealth Minister for Agriculture, Water and the Environment. The purpose of the referral is to determine whether a proposed action requires approval and/or controls under the EPBC Act.

In deciding whether or not the proposed action is likely to have a significant impact on the 'whole of environment', the following must be considered.

- The environmental context

  The study area has been used as the site for the Australian War Memorial since the early 1940's. As a result, the vegetation which occurs today is highly modified and manicured. The majority of the study area has been cleared, intensively landscaped, and regularly mown over a long period of time. The remnant overstorey is largely absent and the native midstorey and shrubstorey have been entirely removed. The groundstorey is heavily modified and dominated by a variety of exotic lawn grasses and common weeds. The few native non-grass species present in the study area are primarily non-local native species of various provenance, all of which have been planted for landscaping purposes

  As a result, the only notable ecological value are the 14 mature remnant trees that occur in the eastern corner of the study area (refer to Figure 2).

  The study area is adjacent to high quality habitat to the north (i.e. Mt Ainslie Nature Reserve) and is bordered to the east by a small patch of EPBC Act and NC Act listed Box-Gum Woodland.

[9] Commonwealth of Australia (2013a). *Matters of National Environmental Significance - Significant Impact Guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Department of the Environment

[10] Commonwealth of Australia (2013b). *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies - Significant Impact Guidelines 1.2. Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Department of the Environment

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Given the historic modification of the study area and the on-going disturbance caused by visitors to the Australian War Memorial, it is unlikely that the study area constitutes a significant component of a wildlife movement corridor or is otherwise important for fauna habitat connectivity. This is evident as the majority of the study area is not identified as a 'Local Link' or as possessing 'Regional Linkage Value' on ACTmapi.

- The potential impacts likely to be generated by the action, including indirect consequences of the action

  As discussed above, the only notable ecological value within the study area are the 14 remaining remnant trees. Given the historic modification of the study area and its long-term and on-going use as the Australian War Memorial, it is unlikely that these trees (or any of the planted trees) constitute a significant resource for fauna in the locality. Furthermore, the study area is adjacent to high quality habitat to the north (i.e. Mt Ainslie Nature Reserve) and is bordered to the east by a small patch of EPBC Act and NC Act listed Box-Gum Woodland; these areas contain many mature eucalypt trees and expanses of important habitat for native fauna. The trees in the study area comprise only a very small proportion of the trees present within a one-kilometre radius of the study area. The loss of such a small proportion of the local vegetation is unlikely to significantly impact the environment. In addition, the proposed development includes substantial plantings of local and non-local trees, shrubs, and groundcover. Once mature, these plantings will help to offset the impact of the proposed development.

  With respect to the above, it is highly unlikely that the removal of the remnant or planted mature eucalypt trees in the study area will significantly impact the environment, either directly or indirectly.

- Whether mitigation measures will avoid or reduce these impacts

  The study area supports substantially modified vegetation that is associated with the Australian Warm Memorial and which is primarily used for recreational purposes. As a result, the majority of the study area has been intensively landscaped and regularly mown over a long period of time. This has modified the groundlayer and midstorey and encouraged the proliferation of exotic species. The selection of this site for the proposed development therefore largely avoids impacts on the environmental values of the locality.

  As discussed previously, the only notable ecological value within the study area are the 14 remaining remnant trees. The proposed development will impact six of these remnant trees; given the small size of the Australian War Memorial grounds and the nature of the proposed development, design constrains mean that these impacts cannot be avoided. The remaining eight remnant trees will be retained unless a qualified arborist determines they are unsafe for public areas. In addition, the proposed development includes substantial plantings of local and non-local trees, shrubs, and groundcover. Once mature, these plantings will help to offset the impact of the proposed development.

  Combined with the weed control strategies outlines in Section 3, the mitigation measures outlined in this EIA substantially reduce the potential impacts on the environment.

With respect to the above, and from an ecological values perspective, the proposed development is unlikely to significantly impact upon the 'whole of environment'. As such, EPBC Act referral is unwarranted and is not recommended.

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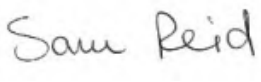
We trust that this EIA provides the assessment and advice required. If, however, you should have any questions relating to any of the matters discussed herein, please do not hesitate to contact us.

Yours sincerely,



Robert Speirs

Director / Principal Ecologist

Dr Sam Reid

Senior Ecologist

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Attachments:

Figure 1. Locality Plan

Figure 2. Study Area and Ecological Values

Figure 3. Tree Survey Results on 1955 Aerial Image

Figure 4. The Impact of the Proposed Development

Appendix A. Flora and Fauna Species Inventories

Appendix B. Tree Habitat Assessment

Appendix C. Mature Remnant Tree Photo Plates

Appendix D. Threatened Species Likelihood of Occurrence Assessment

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Commonwealth of Australia (2013b). *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies - Significant Impact Guidelines 1.2. Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Department of the Environment.

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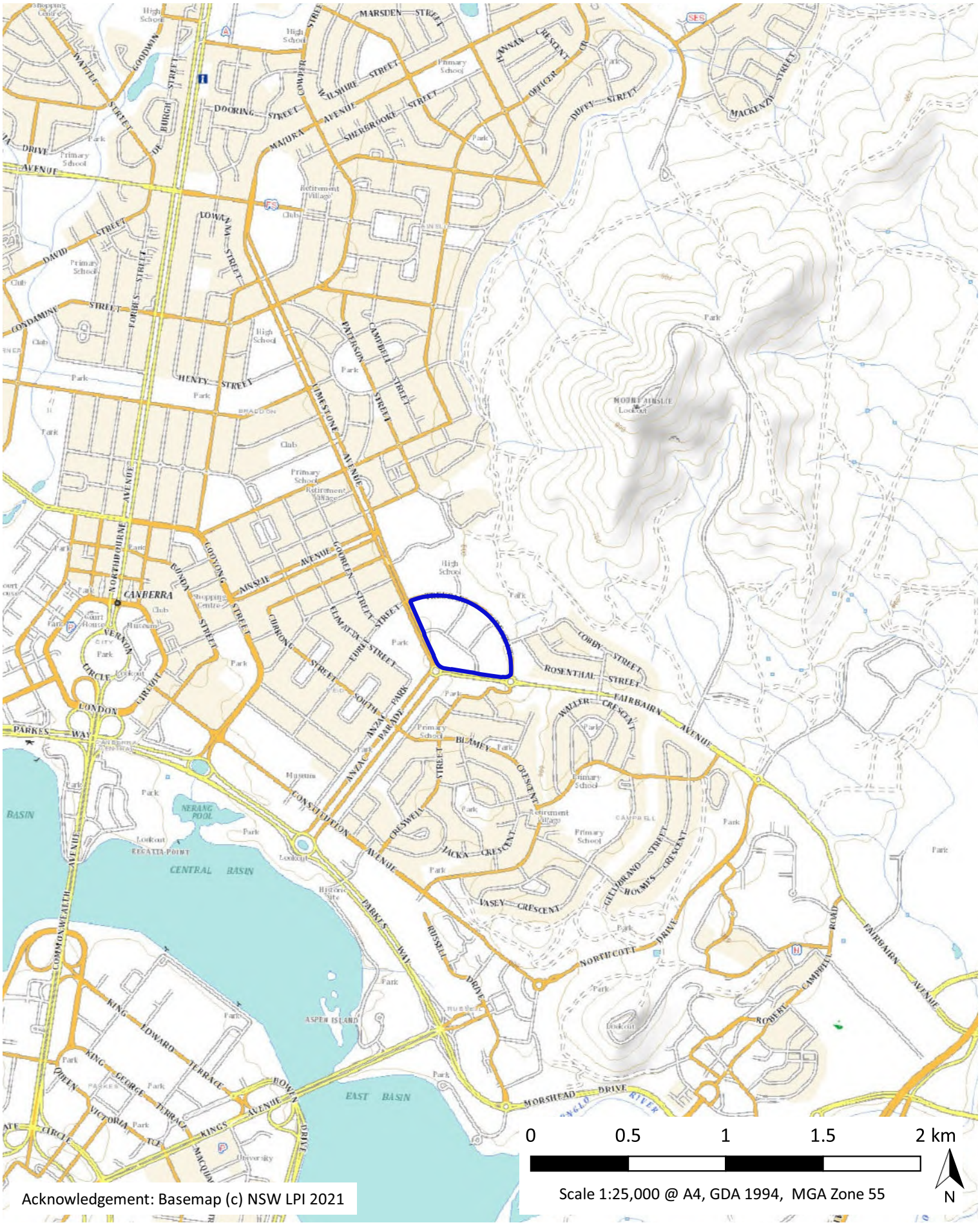

Figure 1. Locality Plan

Legend

Study Area

Capital Ecology Project No: 2956
Drawn by: S. Reid
Date: 22 January 2021

Figure 2. Study Area and Ecological Values

Capital Ecology Project No: 2956
Drawn by: S. Reid
Date: 22 January 2021

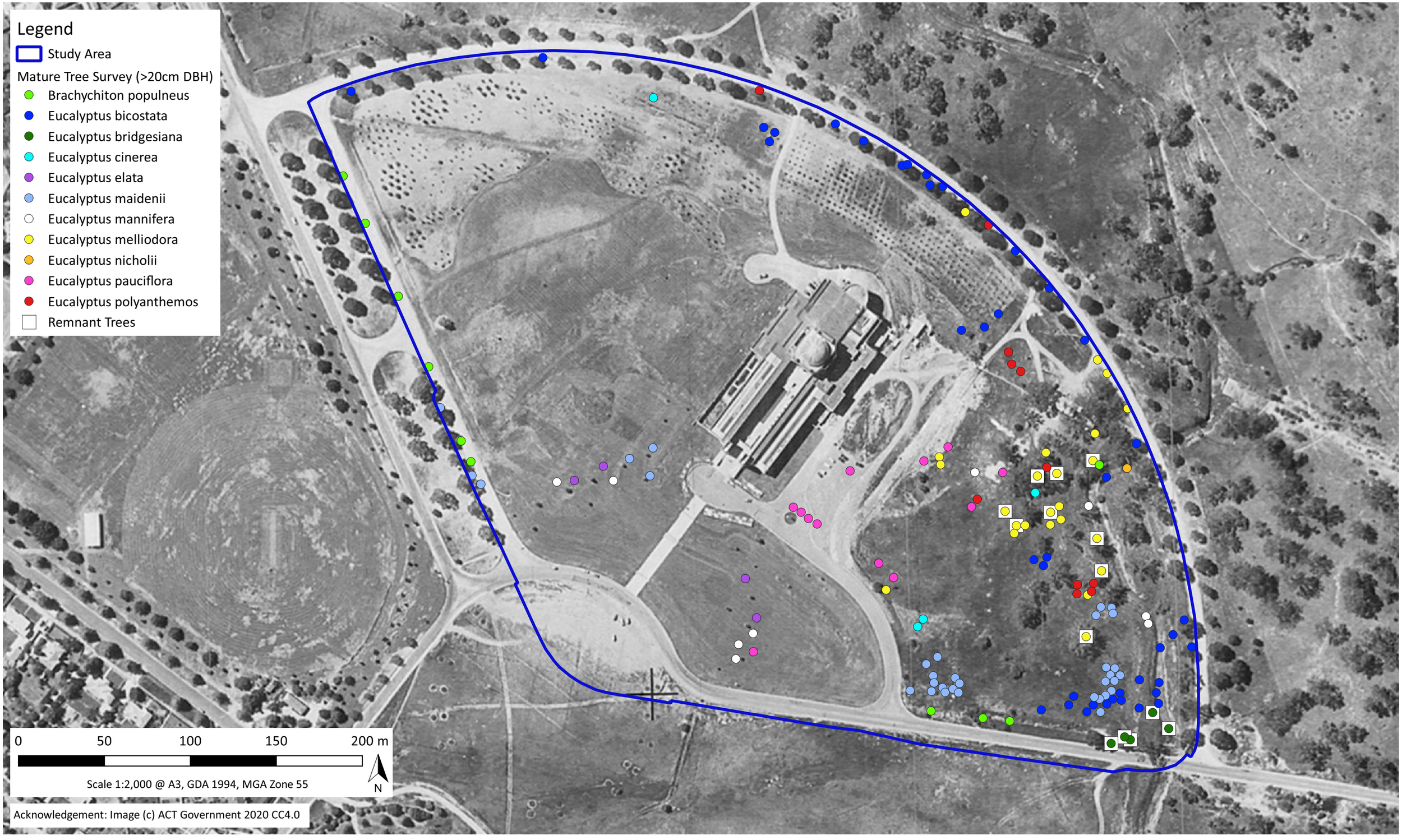

Figure 3. Tree Survey Results on 1955 Aerial Image

Capital Ecology Project No: 2956
Drawn by: S. Reid
Date: 22 January 2021

Figure 4. The Impact of the Proposed Development

Capital Ecology Project No: 2956
Drawn by: S. Reid
Date: 22 January 2021

Appendix A. Flora and Fauna Species Inventories

Table A1. Flora Species Recorded

Scientific name	Common name
Exotic	
Arctotheca calendula	Cape Weed
Betula sp.	Birch
Bromus sp.	Brome Grass
Capsella bursa-pastoris	Shepherd's Purse
Cenchrus clandestinus	Kikuyu Grass
Cerastium sp.	Mouse-ears
Cirsium vulgare	Spear Thistle
Cynodon dactylon	Couch Grass
Echium plantagineum	Paterson's Curse
Eragrostis curvula	African Lovegrass
Festuca arundinacea	Tall Fescue
Fraxinus sp.	Ash
Galium aparine	Goosegrass
Hedera sp.	Ivy
Hirschfeldia incana	Buchan Weed
Hordeum sp.	Barley Grass
Hypochaeris radicata	Flatweed
Lepidium africanum	African Pepercress
Lolium perenne	Perennial Ryegrass
Malva sp.	Mallow / Marshmallow Weed
Modiola caroliniana	Red-flowered Mallow
Nassella neesiana	Chilean Needle Grass
Paronychia brasiliana	Brazilian Whitlow
Pinus sp.	Pine
Plantago lanceolata	Plantain / Lamb's Tongue
Poa annua	Winter Grass
Populus sp.	Poplar
Quercus sp.	Oak
Sonchus sp.	Milk/Sow Thistle
Taraxacum officinale	Common Dandelion
Trifolium sp.	Clover
Ulmus sp.	Elm
Vulpia sp.	Rat's Tail Fescue
Native	
Acacia baileyana	Cootamundra Wattle
Acacia fimbriata	Fringed Wattle
Acacia implexa	Hickory Wattle
Acacia pravissima	Oven's Wattle
Acacia sp.	Wattle
Austrostipa bigeniculata	Tall Speargrass

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Scientific name	Common name
Austrostipa scabra	Rough Spear-grass
Banksia sp.	Banskia
Brachychiton populneus	Kurrajong
Callistemon sp.	Bottlebrush
Chrysocephalum apiculatum	Common Everlasting
Crassula sieberiana	Austral Stonecrop
Dianella revoluta	Blue Flax-Lily
Dysphania pumilio	Small Crumbweed
Einadia nutans	Climbing Saltbush
Eucalyptus bicostata	Blue Gum
Eucalyptus bridgesiana	Apple Box
Eucalyptus cinerea	Argyle Apple
Eucalyptus elata	River Peppermine Gum
Eucalyptus mannifera	Brittle Gum
Eucalyptus maidenii	Maiden's Blue Gum
Eucalyptus melliodora	Yellow Box
Eucalyptus nicholii	Narrow Leaf Peppermine
Eucalyptus pauciflora	Snow Gum
Eucalyptus polyanthemos	Red Box
Hardenbergia violacea	Native Sarsaparilla
Oxalis perennans	Woody-Root Oxalis
Poa labillardieri	River Tussock-grass
Rytidosperma sp.	Wallaby Grass
Westringia fruticosa	Coastal Rosemary

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Table A2. Fauna Species Recorded

Classification	Scientific Name	Common Name	EPBC Status	NC Status
Amphibia	*Crinia signifera*	Common Eastern Froglet	-	Protected
Aves	*Acridotheres tristis**	Indian Myna*	-	-
Aves	*Cacatua galerita*	Sulphur-crested Cockatoo	-	Protected
Aves	*Callocephalon fimbriatum*	Gang-gang Cockatoo	-	Protected
Aves	*Chenonetta jubata*	Australian Wood Duck	-	Protected
Aves	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	-	Protected
Aves	*Corvus coronoides*	Australian Raven	-	Protected
Aves	*Dacelo novaeguineae*	Laughing Kookaburra	-	Protected
Aves	*Eolophus roseicapilla*	Galah	-	Protected
Aves	*Grallina cyanoleuca*	Magpie-lark	-	Protected
Aves	*Gymnorhina tibicen*	Australian Magpie	-	Protected
Aves	*Hirundo neoxena*	Welcome Swallow	-	Protected
Aves	*Manorina melanocephala*	Noisy Miner	-	Protected
Aves	*Platycercus elegans*	Crimson Rosella	-	Protected
Aves	*Platycercus eximius*	Eastern Rosella	-	Protected
Aves	***Polytelis swainsonii***	**Superb Parrot**	**Vulnerable**	**Vulnerable**
Aves	*Strepera graculina*	Pied Currawong	-	Protected
Mammalia	*Oryctolagus cuniculus**	European Rabbit*	-	-

* denotes exotic species

Appendix B. Tree Habitat Assessment

*Estimated size class of each hollow based upon entrance diameter (i.e. Small <5 cm, Medium 5-20 cm, Large >20 cm).

Tree number	Species Name	Common Name	Remnant/ Planted	DBH (cm)	Height (m)	Hollows*			Alive/ Dead	Notes
						S	M	L		
1	*Eucalyptus elata*	River Peppermint Gum	Planted	80	19				A	
2	*Eucalyptus mannifera*	Brittle Gum	Planted	30	13				A	
3	*Eucalyptus pauciflora*	Snow Gum	Planted	90	10				A	
4	*Eucalyptus mannifera*	Brittle Gum	Planted	50	12				A	
5	*Eucalyptus mannifera*	Brittle Gum	Planted	45	13				A	
6	*Eucalyptus elata*	River Peppermint Gum	Planted	50	13				A	
7	*Eucalyptus pauciflora*	Snow Gum	Planted	30	9				A	
8	*Eucalyptus pauciflora*	Snow Gum	Planted	30	10				A	
9	*Eucalyptus pauciflora*	Snow Gum	Planted	30	10				A	
10	*Eucalyptus pauciflora*	Snow Gum	Planted	30	7				A	
11	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	100	18				A	
12	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	140	22		1		A	Sulphur-crested Cockatoo nesting in hollow
13	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	150	20				A	
14	*Eucalyptus elata*	River Peppermint Gum	Planted	40	16				A	
15	*Eucalyptus mannifera*	Brittle Gum	Planted	40	8				A	
16	*Eucalyptus elata*	River Peppermint Gum	Planted	45	11				A	
17	*Eucalyptus mannifera*	Brittle Gum	Planted	45	9				A	
18	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	30	8				A	
19	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	25	8				A	
20	*Brachychiton populneus*	Kurrajong	Planted	35	4				A	
21	*Brachychiton populneus*	Kurrajong	Planted	50	8				A	

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Tree number	Species Name	Common Name	Remnant/ Planted	DBH (cm)	Height (m)	Hollows*			Alive/ Dead	Notes
						S	M	L		
22	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	60	17				A	
23	*Brachychiton populneus*	Kurrajong	Planted	35/30	6				A	
24	*Brachychiton populneus*	Kurrajong	Planted	25	5				A	
25	*Brachychiton populneus*	Kurrajong	Planted	25	5				A	
26	*Brachychiton populneus*	Kurrajong	Planted	20	4				A	
27	*Eucalyptus bicostata*	Blue Gum	Planted	120	19		1		A	
28	*Eucalyptus bicostata*	Blue Gum	Planted	35	6				A	
29	*Eucalyptus cinerea*	Argyle Apple	Planted	60	9				A	
30	*Eucalyptus polyanthemos*	Red Box	Planted	20	6				A	
31	*Eucalyptus bicostata*	Blue Gum	Planted	90	16				A	1 x small stick nest
32	*Eucalyptus bicostata*	Blue Gum	Planted	50	10				A	
33	*Eucalyptus bicostata*	Blue Gum	Planted	50	9				A	
34	*Eucalyptus bicostata*	Blue Gum	Planted	85	11				A	
35	*Eucalyptus bicostata*	Blue Gum	Planted	75	12				A	
36	*Eucalyptus bicostata*	Blue Gum	Planted	30	8				A	
37	*Eucalyptus bicostata*	Blue Gum	Planted	95	16		1		A	Sulphur-crested Cockatoo nesting in hollow
38	*Eucalyptus bicostata*	Blue Gum	Planted	50	15				A	
39	*Eucalyptus bicostata*	Blue Gum	Planted	35	14				A	
40	*Eucalyptus bicostata*	Blue Gum	Planted	30	13				A	
41	*Eucalyptus melliodora*	Yellow Box	Planted	35	13				A	
42	*Eucalyptus polyanthemos*	Red Box	Planted	20/20/20	8				A	
43	*Eucalyptus bicostata*	Blue Gum	Planted	65	11				A	
44	*Eucalyptus bicostata*	Blue Gum	Planted	70	15				A	
45	*Eucalyptus bicostata*	Blue Gum	Planted	46	8				A	

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Tree number	Species Name	Common Name	Remnant/ Planted	DBH (cm)	Height (m)	Hollows*			Alive/ Dead	Notes
						S	M	L		
46	*Eucalyptus bicostata*	Blue Gum	Planted	35	7				A	
47	*Eucalyptus bicostata*	Blue Gum	Planted	95	18				A	
48	*Eucalyptus pauciflora*	Snow Gum	Planted	25	6				A	
49	*Eucalyptus polyanthemos*	Red Box	Planted	30/25/20	7				A	
50	*Eucalyptus polyanthemos*	Red Box	Planted	30	7				A	
51	*Eucalyptus polyanthemos*	Red Box	Planted	35/20	7				A	
52	*Eucalyptus bicostata*	Blue Gum	Planted	40	7				A	
53	*Eucalyptus melliodora*	Yellow Box	Planted	20	6				A	
54	*Eucalyptus melliodora*	Yellow Box	Planted	20	7				A	
55	*Eucalyptus melliodora*	Yellow Box	Planted	40	8				A	
56	*Eucalyptus bicostata*	Blue Gum	Planted	30	12				A	
57	*Eucalyptus nicholii*	Narrow Leaf Peppermint	Planted	35	10				A	
58	*Eucalyptus bicostata*	Blue Gum	Planted	35	11				A	
59	*Eucalyptus bicostata*	Blue Gum	Planted	20	9				A	
60	*Eucalyptus bicostata*	Blue Gum	Planted	35	13				A	
61	*Eucalyptus bicostata*	Blue Gum	Planted	100	18				A	
62	*Eucalyptus bicostata*	Blue Gum	Planted	60	16				A	1 x small stick nest
63	*Eucalyptus bicostata*	Blue Gum	Planted	40	15				A	
64	*Eucalyptus bridgesiana*	Apple Box	Remnant	105	14				A	
65	*Eucalyptus bridgesiana*	Apple Box	Remnant	50	17			1	A	
66	*Eucalyptus bridgesiana*	Apple Box	Remnant	50	14				A	
67	*Eucalyptus bridgesiana*	Apple Box	Remnant	50	14				A	
68	*Brachychiton populneus*	Kurrajong	Planted	40	5				A	
69	*Brachychiton populneus*	Kurrajong	Planted	30	4				A	

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Tree number	Species Name	Common Name	Remnant/ Planted	DBH (cm)	Height (m)	Hollows*			Alive/ Dead	Notes
						S	M	L		
70	*Brachychiton populneus*	Kurrajong	Planted	45	4				A	
71	*Eucalyptus pauciflora*	Snow Gum	Planted	30	6				A	
72	*Eucalyptus pauciflora*	Snow Gum	Planted	20	4				A	
73	*Eucalyptus melliodora*	Yellow Box	Planted	20	10				A	
74	*Eucalyptus cinerea*	Argyle Apple	Planted	45	12				A	
75	*Eucalyptus cinerea*	Argyle Apple	Planted	45	12				A	
76	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	60	18				A	
77	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	50	17				A	
78	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	50	17				A	
79	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	65	18				A	
80	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	125	20				A	1 x small stick nest
81	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	40	20				A	
82	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	40	18				A	
83	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	30	10				A	
84	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	50	20				A	
85	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	50	20				A	
86	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	40	14				A	
87	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	50	14				A	
88	*Eucalyptus pauciflora*	Snow Gum	Planted	30	5				A	
89	*Eucalyptus melliodora*	Yellow Box	Planted	20	4				A	
90	*Eucalyptus melliodora*	Yellow Box	Planted	20	5				A	
91	*Eucalyptus pauciflora*	Snow Gum	Planted	30	7				A	
92	*Eucalyptus mannifera*	Brittle Gum	Planted	20	8				A	
93	*Eucalyptus polyanthemos*	Red Box	Planted	40	14				A	

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Tree number	Species Name	Common Name	Remnant/ Planted	DBH (cm)	Height (m)	Hollows*			Alive/ Dead	Notes
						S	M	L		
94	*Eucalyptus pauciflora*	Snow Gum	Planted	20	6				A	
95	*Eucalyptus pauciflora*	Snow Gum	Planted	25	5				A	
96	*Eucalyptus polyanthemos*	Red Box	Planted	20	7				A	
97	*Eucalyptus melliodora*	Yellow Box	Planted	20/20/20	7				A	
98	*Eucalyptus melliodora*	Yellow Box	Planted	25	7				A	
99	*Eucalyptus melliodora*	Yellow Box	Remnant	65	12				A	Muliple Mistletoe
100	*Brachychiton populneus*	Kurrajong	Planted	20	8				A	
101	*Eucalyptus mannifera*	Brittle Gum	Planted	35	14				A	
102	*Eucalyptus melliodora*	Yellow Box	Remnant	65	16				A	
103	*Eucalyptus melliodora*	Yellow Box	Remnant	70	17			1	A	
104	*Eucalyptus melliodora*	Yellow Box	Remnant	40	12				A	
105	*Eucalyptus melliodora*	Yellow Box	Remnant	45	14				A	
106	*Eucalyptus melliodora*	Yellow Box	Planted	35	13				A	Tree is unhealthy
107	*Eucalyptus melliodora*	Yellow Box	Planted	20	11				A	
108	*Eucalyptus melliodora*	Yellow Box	Remnant	50	17				A	
109	*Eucalyptus melliodora*	Yellow Box	Planted	25	8				A	
110	*Eucalyptus melliodora*	Yellow Box	Planted	30	10				A	
111	*Eucalyptus melliodora*	Yellow Box	Planted	30	8				A	
112	*Eucalyptus melliodora*	Yellow Box	Remnant	60	12				A	
113	*Eucalyptus bicostata*	Blue Gum	Planted	35	19				A	1 x small stick nest
114	*Eucalyptus bicostata*	Blue Gum	Planted	50	18				A	
115	*Eucalyptus bicostata*	Blue Gum	Planted	30	18				A	
116	*Eucalyptus melliodora*	Yellow Box	Remnant	35	7				A	Tree is unhealthy
117	*Eucalyptus polyanthemos*	Red Box	Planted	20	6				A	

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Tree number	Species Name	Common Name	Remnant/ Planted	DBH (cm)	Height (m)	Hollows*			Alive/ Dead	Notes
						S	M	L		
118	*Eucalyptus polyanthemos*	Red Box	Planted	25	7				A	
119	*Eucalyptus melliodora*	Yellow Box	Planted	25	8				A	
120	*Eucalyptus polyanthemos*	Red Box	Planted	35	8				A	
121	*Eucalyptus polyanthemos*	Red Box	Planted	20	7				A	
122	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	45	15				A	
123	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	40	14				A	
124	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	60	16				A	
125	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	40	12				A	
126	*Eucalyptus melliodora*	Yellow Box	Remnant	70	13				A	
127	*Eucalyptus mannifera*	Brittle Gum	Planted	35	9				A	
128	*Eucalyptus mannifera*	Brittle Gum	Planted	30	7				A	
129	*Eucalyptus bicostata*	Blue Gum	Planted	55	13				A	
130	*Eucalyptus bicostata*	Blue Gum	Planted	20	8				A	
131	*Eucalyptus bridgesiana*	Apple Box	Remnant	30/20	8				A	
132	*Eucalyptus bicostata*	Blue Gum	Planted	25	8				A	
133	*Eucalyptus bicostata*	Blue Gum	Planted	25	10				A	
134	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	35	9				A	
135	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	45	12				A	
136	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	40	11				A	
137	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	40	12				A	
138	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	35	11				A	
139	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	35	10				A	
140	*Eucalyptus cinerea*	Argyle Apple	Planted	25	8				A	
141	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	40	14				A	

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Tree number	Species Name	Common Name	Remnant/ Planted	DBH (cm)	Height (m)	Hollows*			Alive/ Dead	Notes
						S	M	L		
142	*Eucalyptus bicostata*	Blue Gum	Planted	50	15				A	
143	*Eucalyptus bicostata*	Blue Gum	Planted	50	14				A	
144	*Eucalyptus bicostata*	Blue Gum	Planted	35	13				A	1 x small stick nest
145	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	35	11				A	
146	*Eucalyptus bicostata*	Blue Gum	Planted	40	13				A	
147	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	40	12				A	
148	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	45	11				A	
149	*Eucalyptus bicostata*	Blue Gum	Planted	30	10				A	
150	*Eucalyptus bicostata*	Blue Gum	Planted	40	10				A	
151	*Eucalyptus maidenii*	Maiden's Blue Gum	Planted	30	8				A	
152	*Eucalyptus bicostata*	Blue Gum	Planted	40	10				A	
153	*Eucalyptus bicostata*	Blue Gum	Planted	55	12				A	
154	*Eucalyptus bicostata*	Blue Gum	Planted	105	12				A	

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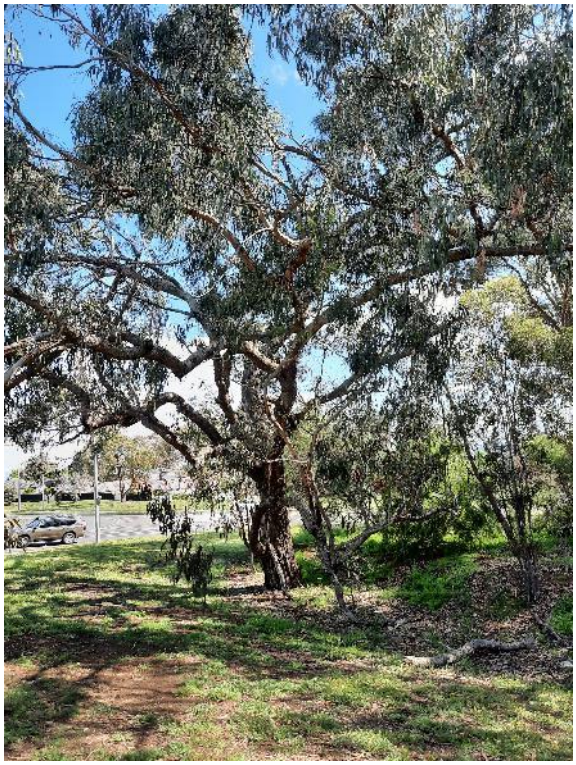
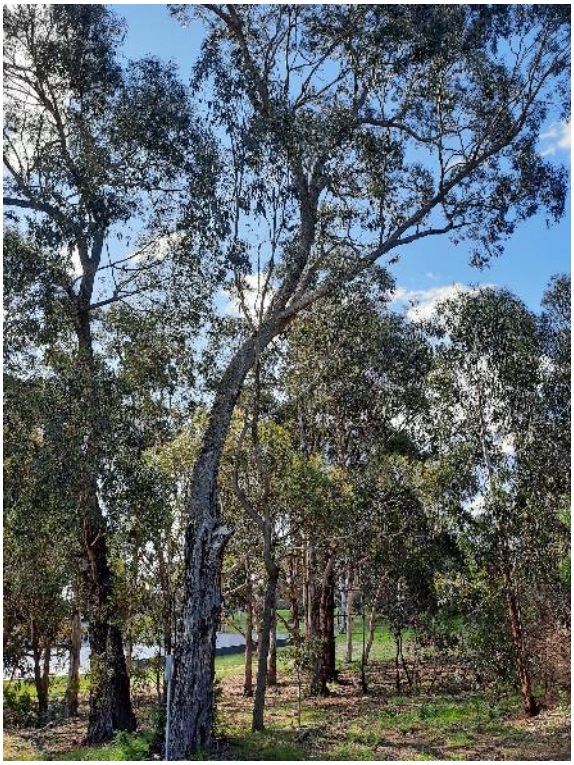
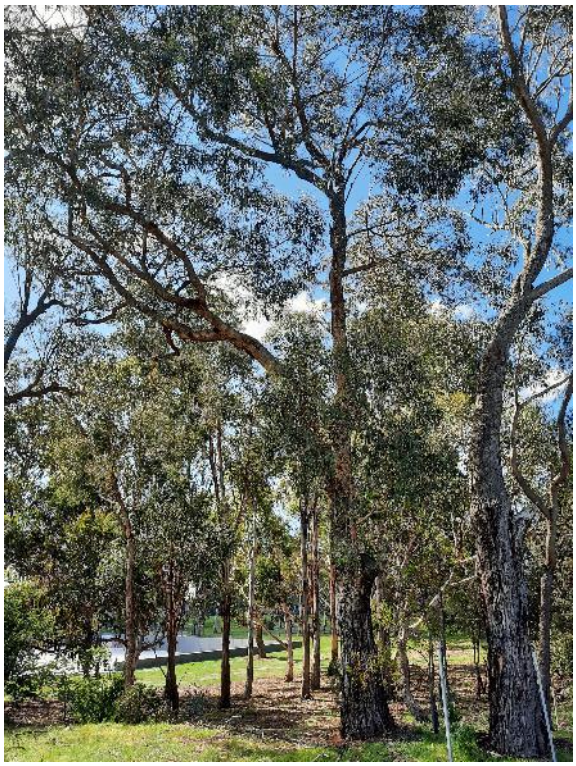
Appendix C. Mature Remnant Tree Photo Plates



Tree 64.



Tree 65.



Tree 66.

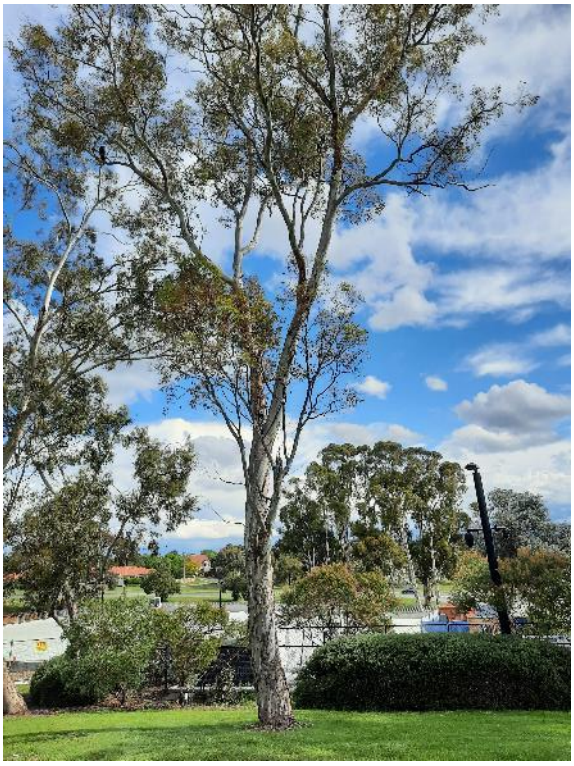
Tree 67.

© Capital Ecology Pty Ltd 2021

Tree 99.

Tree 102.

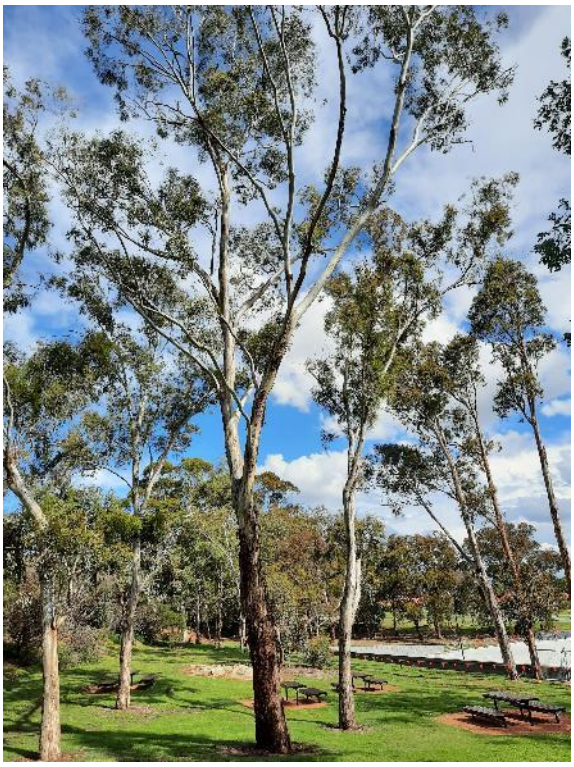
Tree 103.



Tree 104.

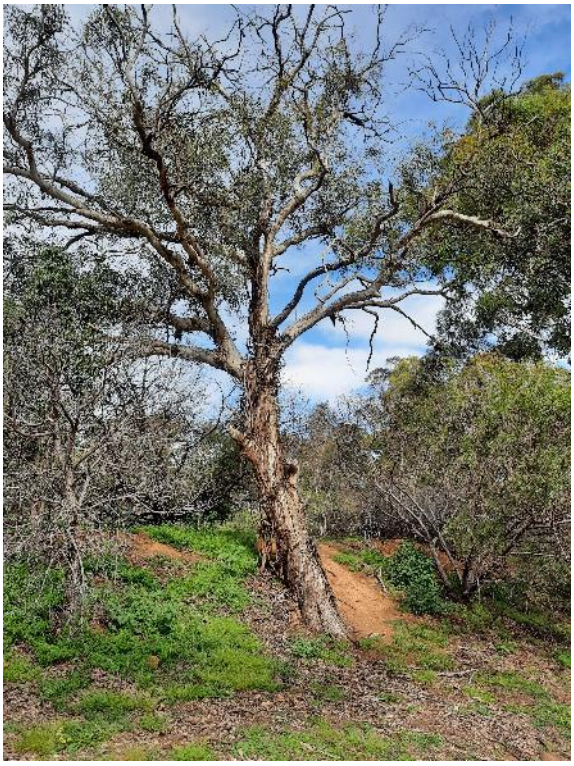
© Capital Ecology Pty Ltd 2021

Tree 105.



Tree 108.

Tree 112.



Tree 116.

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Tree 126.

Tree 131.

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Appendix D. Threatened Species Likelihood of Occurrence Assessment

Key for the below table:

1) Listed pursuant to the EPBC Act as Critically Endangered (CE), Endangered (E), or Vulnerable (V)

2) Listed pursuant to the NC Act as Endangered (E) or Vulnerable (V)

Note: The brief descriptions of species distribution and habitat are paraphrased from or based on information sourced from the threatened species profiles, recovery plans and listing determinations prepared for each species by the Commonwealth and ACT governments. These resources and their references can be found on the relevant government websites.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Plants				
Amphibromus fluitans River Swam Wallaby-grass	V	-	River Swamp Wallaby-grass has been recorded along the Lachlan River at sites at Laggan near Crookwell and the headwaters of the Wollondilly River. The species grows mostly in permanent swamps, as well as lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground, such conditions being caused by seasonally fluctuating water levels.	Negligible There is no potential habitat in the study area for the species.
Caladenia actensis Canberra Spider Orchid	CE	E	This orchid is endemic to the ACT and is only known from two populations on the western lower slopes of Mount Ainslie and Mount Majura. It was previously recorded at Aranda and Campbell, but no longer exists at those locations. The Canberra Spider Orchid grows on shallow, gravelly, brown clay loam soils. The species occurs amongst a groundcover of grasses, forbs and low shrubs, often among rocks. It grows on the transition zone (ecotone) between grassy woodland and dry sclerophyll forest.	Negligible The study area is highly modified by landscaping and mowing. There is no potential habitat in the study area for the species.
Eucalyptus aggregata Black Gum	V	-	Black Gum occurs on the central and southern tablelands of NSW, and in a small disjunct population in Victoria. In NSW, it occurs predominantly in the South Eastern Highlands Bioregion. The species is a small to medium-sized woodland tree which grows in grassy woodlands on alluvial soils in moist sites along creeks on broad, cold and poorly-drained flats and hollows. It commonly occurs with Candlebark *Eucalyptus rubida*, Ribbon Gum *E. viminalis*, and Snow Gum *E. pauciflora*, with a grassy understorey of River Tussock *Poa labillardieri*. Most populations are located on private land or road verges and travelling stock routes.	Negligible The species is not present in the study area.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Lepidium ginninderrense Ginninderra Peppercress	V	E	The species is known from two natural sites in northern ACT, both within Natural Temperate Grassland.	Negligible There is no potential habitat in the study area for the species.
Lepidium hyssopifolium Basalt Peppercress	E	-	This species is known from a few populations in NSW, Victoria and Tasmania. The Basalt Pepper-cress is known to establish on open, bare ground with limited competition from other plants. It was previously recorded from Eucalypt woodland with a grassy ground cover, low open Casuarina woodland with a grassy ground cover and tussock grassland. Recently recorded localities have predominantly been in weed-infested areas of heavy modification, high degradation and high soil disturbance such as road and rail verges, on the fringes of developed agricultural land or within small reserves in agricultural land. Many populations are now generally found amongst exotic pasture grasses and beneath exotic trees.	Negligible There is no potential habitat in the study area for the species.
Leucochrysum albicans var. *tricolor* Hoary Sunray	E	-	The Hoary Sunray occurs from Queensland to Victoria and in Tasmania. In the ACT the species can be seen in spring in abundance on the roadside along Fairbairn Avenue and into Mt Ainslie Nature Reserve, on the western slopes of Mt Majura and adjacent to the Federal Highway road easement. The species is usually found in ungrazed and lightly grazed areas, along roadsides in particular. It appears to be very sensitive to grazing but responds to disturbance as a coloniser and appears to tolerate mowing. Flowers spring to summer.	Low The study area is highly disturbed and has been substantially modified by landscaping and mowing. Despite being conspicuous throughout the year, the species was not recorded during field surveys and has not previously been recorded in the study area. It is therefore considered unlikely to occur.
Pomaderris pallida Pale Pomaderris	V	-	A compact perennial shrub, growing to 1.5 m high. It is found in the ACT, southern NSW and eastern Victoria. In the ACT it is scattered along the Cotter, Paddy's and Murrumbidgee Rivers and through the Molonglo Gorge. It is found along the plateau edge and very steep upper slopes and cliffs of river valleys, in shallow, pale brown sandy loam soil over granite rock. It grows in shrubland, surrounded by *Eucalyptus* or *Callitris* woodland. In the ACT, it is only found on the eastern banks of the rivers.	Negligible The species is not present in the study area.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Prasophyllum petilum Tarengo Leek Orchid	E CE (listed as *Prasophyllum* sp. Wybong)	E	When first described in 1991, the Tarengo Leek Orchid was known only from the Hall Cemetery in the ACT. It has since been found at four sites in New South Wales: Captains Flat Cemetery, Ilford Cemetery, Steves Travelling Stock Route (TSR) at Delegate and the Tarengo TSR near Boorowa. The Tarengo Leek Orchid occurs on relatively fertile soils in grassy woodland or natural grassland. The three cemetery sites originally contained grassy woodland, dominated by Snow Gum *Eucalyptus pauciflora* and Black Gum *E. aggregata* at Captains Flat, and Blakely's Red Gum *E. blakelyi* and Yellow Box *E. melliodora* at Hall and Ilford. Both Tarengo TSR and Steves TSR are natural grasslands. The species is intolerant of grazing and this is considered to be the key reason it has been found only within cemeteries and TSRs, land from which grazing has been restricted.	Negligible The study area is highly disturbed and has been substantially modified by landscaping and mowing. There is no potential habitat in the study area for the species.
Rutidosis leptorrhynchoides Button Wrinklewort	E	E	In the ACT and NSW, Button Wrinklewort occurs in box-gum woodland, secondary grassland derived from box-gum woodland or in natural temperate grassland. It prefers open spaces where it does not have to compete for light. It is known from several sites in the ACT, NSW and Victoria, where it is threatened by habitat loss, grazing and weed encroachment.	Negligible The species is not present in the study area.
Swainsona recta Small Purple-pea	E	E	The Small Purple-pea occurs in the grassy understorey of woodlands and open forests dominated by Blakely's Red Gum, Yellow Box, Candlebark and Bundy. The species grows in association with understorey dominants that include Kangaroo Grass, Poa tussocks and Spear-grasses. Plants die back in summer, surviving as rootstocks until they shoot again in autumn. The species is intolerant of grazing but generally tolerant of fire, which also enhances germination by breaking the seed coat and reducing competition from other species.	Negligible The study area is highly disturbed and has been substantially modified by landscaping and mowing. There is no potential habitat in the study area for the species.
Thesium australe Austral Toadflax	V	-	Found in very small to large populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Austral Toadflax is a root parasite that takes water and some nutrients from other plants, especially Kangaroo Grass. It is often found in damp sites in association with Kangaroo Grass, but it is also found on other grass species at inland sites. Occurs on clay soils in grassy woodlands or coastal headlands.	Negligible The study area is highly disturbed and has been substantially modified by landscaping and mowing. There is no potential habitat in the study area for the species.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Mammals				
Chalinolobus dwyeri Large-eared Pied Bat	V	-	The Large-eared Pied Bat is found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. The species roosts in caves, crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin *Petrochelidon ariel*. The species frequents low to mid-elevation dry open forest and woodland close to roosts and is often found in well-timbered areas containing gullies.	Low No potential roosting habitat is present in the study area or nearby. As the species is known to forage close to roost sites, it is unlikely to forage in the study area.
Dasyurus maculatus maculatus Spot-tailed Quoll (SE mainland population)	E	V	The Spot-tailed Quoll occurs along the east coast of Australia and the Great Dividing Range. The species uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands and rainforests. Occasional sightings have been made in open country, grazing lands, rocky outcrops and other treeless areas. Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage. Seventy per cent of the diet is medium-sized mammals, and also feeds on invertebrates, reptiles and birds. Individuals require large areas of relatively intact vegetation through which to forage. The home range of a female is between 180 and 1000ha, while males have larger home ranges of between 2000 and 5000ha. Breeding occurs from May to August.	Negligible The species is unlikely to occur within the study area.
Petrogale penicillate Brush-tailed Rock-wallaby	V	E	The Brush-tailed Rock-wallaby was once widespread in south-eastern Australia, but its range and numbers have contracted, particularly in Victoria and southern NSW. The last sighting of this species in the ACT was in Tidbinbilla Nature Reserve in 1959. Populations are comprised of small, isolated groups or 'colonies'. Each colony may occupy a territory of up to 35 ha. The species prefers rocky habitats/outcrops and steep slopes/cliffs, combined with dense arboreal cover. They are associated with rainforest, wet and dry sclerophyll forest, vine thicket, and open forest.	Negligible The species is not known to occur in the lowland/urban areas of the ACT.
Phascolarctos cinereus Koala (combined populations of Qld, NSW and the ACT)	V	-	In NSW, the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. They are solitary with varying home ranges. In high quality habitat home ranges may be 1 -2 ha and overlap, while in semi-arid country they are usually discrete and around 100 ha.	Negligible The species is not known to occur in the lowland/urban areas of the ACT.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Pteropus poliocephalus Grey-headed Flying Fox	V	-	The Grey-headed Flying Fox occurs in the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria. Whilst Brisbane, Newcastle, Sydney and Melbourne are occupied continuously, the species is widespread throughout their range during summer. In autumn the species occupies coastal lowlands and is uncommon inland. In winter the species congregates in coastal lowlands north of the Hunter Valley and is occasionally found on the south coast of NSW and on the northwest slopes (associated with flowering eucalypts of these areas). The Grey-headed Flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. The Grey-headed Flying-fox roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. The roost at Commonwealth Park in Canberra is the only known roost in the ACT region.	Low The species may periodically forage within the study area on flowering eucalypts, however the study area is unlikely to contain habitat of significance to the species.
Birds				
Anthochaera phrygia Regent Honeyeater	CE	E	A semi-nomadic species occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forest associations and wet lowland coastal forests. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. It also utilises a number of other eucalypt species. Nectar and fruit from the mistletoes *Amyema miquelii*, *A. pendula*, and *A. cambagei* are also eaten during the breeding season. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and sheoaks as well as within mistletoe haustoria (section of the root which connects with the host tree). An open cup-shaped nest is constructed by the female of bark, grass, twigs and wool.	Low The species may periodically visit the study area to forage, however it is unlikely to nest in the study area.
Botaurus poiciloptilus Australasian Bittern	E	-	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes *Typha* spp. and spikerushes *Eleocharis* spp.. Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails.	Negligible There is no potential habitat in the study area for the species.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Calidris ferruginea Curlew Sandpiper	CE	-	The Curlew Sandpiper occurs around the coast of Australia, and are also widespread inland, albeit in smaller numbers. In the south-east they are occasionally recorded in the Tablelands and often in the Riverina. When inland, they are found around ephemeral and permanent lakes, dams, waterholes and bore drains. Curlew Sandpipers prey mainly on invertebrates, foraging on mudflats and at the edge of shallow pools, wading up to depths of 60 mm deep. They generally roost on dry shingle or sandy beaches, sandspits, and islets. Curlew Sandpipers are migratory and adults are found in Australia from August to April, juveniles are found year-round. This species does not breed in Australia.	Negligible There is no potential habitat in the study area for the species.
Daphoenositta chrysoptera Varied Sittella	-	V	In the ACT region, the Varied Sittella occurs in a wide variety of woodland and forest habitats, particularly in lowland areas. The species prefers areas with a dominance of rough barked trees, notably Red Stringybark at relatively high density. The species is rarely recorded in sparsely treed areas.	Low The species may periodically visit the study area to forage, however it is unlikely to nest in the study area.
Falco hypoleucos Grey Falcon	V	-	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. The species is usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid.	Low It is possible that the species may pass through the study area during movements through the broader locality, however the study area does not contain habitat of potential significance to the species.
Grantiella picta Painted Honeyeater	V	V	The Painted Honeyeater is found in Queensland and New South Wales west of the Great Dividing Range, through to northern Victoria. The species displays some migratory movement and is occasionally found in the Northern Territory and is a vagrant to South Australia and the ACT. The species frequents eucalypt forests and woodlands, particularly those that are infested heavily with mistletoes. In the ACT, the species' primary habitat is River Oak (*Casuarina cunninghamiana*) along river systems, especially the Murrumbidgee River.	Low The species may periodically visit the study area to forage, however it is unlikely to nest in the study area.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Hirundapus caudacutus White-throated Needletail	V	-	The White-throated Needletail is a trans-equatorial migratory bird species which has been recorded in all coastal regions of Queensland and New South Wales and is widespread throughout Victoria. Breeding sites have been primarily located in Asia. In Australia, this species is often recorded above open forest and rainforest, and coastal areas. Feeds on a wide variety of insects during non-breeding season then returns north. Roosts amongst dense tree foliage and in tree hollows.	Low The species may periodically visit the study area to forage, however it is unlikely to nest in the study area.
Hieraaetus morphnoides Little Eagle	-	V	The Little Eagle is distributed throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment and occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. The species is sensitive to human disturbance.	Low The study area may be part of the large home range of an individual or pair of Little Eagles, but the species is unlikely to forage or nest in the study area.
Lalage tricolor White-winged Triller	-	V	The White-winged Triller is most common in the south-east of Australia, the far north of Northern Territory and in the Kimberleys and the west of Western Australia. The White-winged Triller is generally found in lightly timbered country with an open shrub layer and grassy groundcover, usually open woodlands and forest, tree-lined waterways in semi-arid regions and the nearby scrub. The White-winged Triller is a breeding migrant to southern Australia in summer (August to March). It overwinters in the inland and northern Australia.	Low The species may periodically visit the study area to forage, however it is unlikely to nest in the study area.
Lathamus discolor Swift Parrot	CE	V	The Swift Parrot occurs in woodlands and forests of NSW (and occasionally the ACT) from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.	Low The species may move through the study area during winter, however this is unlikely given the habitat present and the paucity of records of the species in the locality.
Limosa lapponica baueri Bar-tailed Godwit	V	-	The Bar-tailed Godwit is a large migratory shorebird. In Australia, the species has been recorded in the coastal areas of all Australian states. It usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. The Bar-tailed Godwit breeds in north-east Siberia and west Alaska. Potential habitat for the species in or nearby the ACT is limited to Jerrabomberra Wetlands and Lake George.	Negligible There is no potential habitat in the study area for the species.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit	CE	-	The Northern Siberian Bar-tailed Godwit is a large migratory shorebird. In Australia, the species has been recorded in the coastal areas of all Australian states. It usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. The Northern Siberian Bar-tailed Godwit breeds in northern Siberia. Potential habitat for the species in or nearby the ACT is limited to Jerrabomberra Wetlands and Lake George.	Negligible There is no potential habitat in the study area for the species.
Numenius madagascariensis Eastern Curlew	CE	-	The eastern curlew is Australia's largest shorebird and a long-haul flyer. The eastern curlew takes an annual migratory flight to Russia and north-eastern China to breed, arriving back home to Australia in August to feed on crabs and molluscs in intertidal mudflats. It is extremely shy and will take flight at the first sign of danger.	Negligible There is no potential habitat in the study area for the species.
Melanodryas cucullata cucullata Hooded Robin (southeastern form)	-	V	The Hooded Robin occupies drier eucalypt forest, woodland and scrub, grasses and low shrubs, as well as cleared paddocks with regrowth or stumps. The species uses stumps, posts or fallen timber from which to locate prey on the ground. In the ACT region, the species is found in woodland, often with scattered Yellow Box and/or Blakely's Red Gum, with long grass and low shrubs, or fallen logs.	Low The species may periodically visit the study area to forage, however it is unlikely to nest in the study area.
Petroica boodang Scarlet Robin	-	V	The Scarlet Robin is found in south-eastern Australia (extreme south-east Queensland to Tasmania, western Victoria and south-east South Australia) and south-west Western Australia. In NSW it occupies open forests and woodlands from the coast to the inland slopes, breeding in drier eucalypt forests and temperate woodlands.	Low The species may periodically visit the study area to forage, however it is unlikely to nest in the study area.
Polytelis swainsonii Superb Parrot	V	V	Found mainly in open, tall riparian River Red Gum forest or woodland. Often found in farmland including grazing land with patches of remnant vegetation. Breeds in hollow branches of tall eucalypt trees within 9 km of feeding areas.	**Moderate** The species was observed flying over the study area and may periodically visit the study area to forage. However, the species is not known to nest in the vicinity of the study area and the potential foraging habitat is not of potential importance to the species.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Rostratula australis Australian Painted Snipe	E	-	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. The species prefers freshwater wetlands, ephemeral or permanent, although it has been recorded in brackish waters.	Negligible There is no potential habitat in the study area for the species.
Amphibians				
Litoria aurea Green and Golden Bell Frog	V	-	The species is found in marshes, dams and stream sides, particularly those containing bullrushes or spikerushes. Preferred habitat contains water bodies that are unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks, although the species has also been recorded from highly disturbed areas including disused industrial sites, brick pits, landfill areas and cleared land.	Negligible There is no potential habitat in the study area for the species.
Litoria booroolongensis Booroolong Frog	E	-	The Booroolong Frog is restricted to tablelands and slopes in NSW and north-east Victoria at 200–1300 m above sea level. The species is predominantly found along the western-flowing streams and their headwaters of the Great Dividing Range, and a small number of eastern-flowing streams in the north end of its range. The Booroolong Frog occurs along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins, or near slow-flowing connected or isolated pools that contain suitable rock habitats. Streams range from small slow-flowing creeks to large rivers in dissected mountainous country, tablelands, foothills and lowland plains. Primary habitat requirements for the Booroolong Frog are extensive rock bank structures along permanent rivers. The species can occur in cleared grazing land and pasture.	Negligible There is no potential habitat in the study area for the species.
Litoria castanea Yellow-spotted Tree Frog	CE	-	The Yellow-spotted Tree Frog previously had a disjunct distribution, being recorded on the New England Tablelands and on the Southern Tablelands from Lake George to Bombala. The species has only recently (2010) been rediscovered on the Southern Tablelands. Prior to this the species had not been recorded on the Southern Tablelands since the 1970s. Found in large permanent ponds, lakes and dams with an abundance of bulrushes and other emergent vegetation, it shelters during autumn and winter under fallen timber, rocks, other debris or thick vegetation.	Negligible There is no potential habitat in the study area for the species.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Reptiles				
Aprasia parapulchella Pink-tailed Worm-lizard	V	V	The Pink-tailed Worm-lizard is a fossorial species which lives beneath surface rocks and occupies ant burrows. It feed on ants, particularly their eggs and larvae. Thought to lay eggs within the ant nests under rocks that it uses as a source of food and shelter and for thermoregulation. Key habitat features are a cover of native grasses, particularly Kangaroo Grass, sparse or no tree cover, little or no leaf litter, and scattered small rock with shallow embedment in the soil surface.	Negligible There is no potential habitat in the study area for the species.
Delma impar Striped Legless Lizard	V	V	The Striped Legless Lizard is patchily distributed in grasslands of south-eastern NSW, the ACT, north-eastern, central and south-western Victoria, and south-eastern South Australia. In the ACT, the species is known to occur at four separate locations - in grassland areas of Gungahlin, Majura and Jerrabomberra Valleys, and Yarramundi. Unsuitable habitat, roads and urban development separate these sites. Most areas where the species persists are thought to have had low to moderate levels of agricultural disturbance in the past and it has been suggested that ploughing in particular may be incompatible with the survival of the species. Until recently, the species was thought to inhabit only native grasslands dominated by species such as Tall Speargrass and Kangaroo Grass. In recent years, surveys have revealed the Striped Legless Lizard in many sites dominated by exotic species such as Phalaris, Serrated Tussock and Flatweed (Biosis Research 2012). They have also been found in several secondary grassland sites, generally within two kilometres of primary grassland.	Negligible There is no potential habitat in the study area for the species.
Tympanocryptis pinguicolla Grassland Earless Dragon	E	E	In the Canberra-Monaro region the Grassland Earless Dragon is restricted to Natural Temperate Grassland that is dominated by perennial tussock-forming species. It is known to make use of grass tussocks as well as small holes in the ground that are also used by invertebrates such as wolf spiders and crickets. The species is known to occur in suitable native grassland habitat in the Majura and Jerrabomberra valleys in the ACT and at 'Letchworth' near Queanbeyan in NSW.	Negligible There is no potential habitat in the study area for the species.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Fish and Crustacea				
Maccullochella macquariensis Trout Cod	E	E	Trout Cod is endemic to the southern Murray–Darling river system. This species has suffered major declines in range and abundance with only a single 'natural' remnant population remaining (the Murray River between Yarrawonga and Barmah). Other populations have been re-established either through historic translocation (1920s) or through the national recovery program. The species is broadly found in rivers and larger streams and rarely in smaller creeks. In the ACT, Trout Cod is currently restricted to the Murrumbidgee and Cotter rivers, where it has been reintroduced. In the Murrumbidgee River in the ACT, scattered individuals are occasionally captured throughout the Murrumbidgee, particularly near Kambah Pool and Gigerline Gorge downstream of Angle Crossing. Similarly, in the Cotter River, individuals are regularly recorded in Bendora Reservoir and occasional individuals are sampled downstream of Bendora Dam.	Negligible There is no potential habitat in the study area for the species.
Maccullochella peelii Murray Cod	V	-	The Murray Cod's natural distribution extends throughout the Murray-Darling basin ranging west of the divide from south east Queensland, through NSW into Victoria and South Australia. The species is found in the waterways of the Murray–Darling Basin in a wide range of warm water habitats that range from clear, rocky streams to slow flowing turbid rivers, billabongs and large deep holes. Murray Cod is entirely a freshwater species and will not tolerate high salinity levels.	Negligible There is no potential habitat in the study area for the species.
Macquaria australasica Macquarie Perch	E	E	Macquarie Perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their substantial tributaries.	Negligible There is no potential habitat in the study area for the species.

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Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence/Impact
Insects				
Synemon plana Golden Sun Moth	CE	E	The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut and the species has been recorded at many sites in the lowland areas of the ACT. The species occurs in Natural Temperate Grasslands and Box-Gum Grassy Woodland in which the groundcover is dominated by Wallaby Grasses *Rytidosperma* spp. It is believed that the females lay up to 200 eggs at the base of the Wallaby Grass tussocks. After hatching, the larvae tunnel underground where they remain feeding on the roots of Wallaby Grass tussocks. The species is also known to feed on the introduced species (and Weed of National Significance), Chilean Needle Grass *Nassella neesiana*.	Negligible There is no potential habitat in the study area for the species.

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