Biodiversity Assessment Report

Emergency Services, Maintenance and Training Facility

Secure Aviation

21 Nov 2020

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ACRONYMS AND ABBREVIATIONS

ACT	Australian Capital Territory
Cwth	Commonwealth
dbh	Diameter at breast height (for tree trunk diameter)
DoEE	(Cwth) Department of Environment and Energy
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwth)
ESO	Environmental Significance Opinion
ha	Hectares
Km	Kilometre
m	Metres
MNES	Matters of National environmental significance under the EPBC Act (*c.f.*)
NC Act	(ACT) *Nature Conservation Act 2014*
NSW	New South Wales
PD Act	(ACT) *Planning and Development Act 2007*
sp/spp	Species/multiple species

1 INTRODUCTION AND PROJECT BACKGROUND

1.1 Project description

PATH Co Pty Ltd have been commissioned by Secure Aviation (& Forest Track) to undertake a biodiversity assessment of the proposal to develop land at Block 45, Section 3, Hume ACT for the purpose of establishing a new Emergency Services, Maintenance and Training Facility in the ACT.

The proposed development of the site includes a number of buildings to accommodate the offices and training facilities as well as storage requirements, hardstand areas for vehicle access/manoeuvring and parking, as well as three helicopter pads to accommodate the expected number of aircraft (helicopters) for the base's operational demands. The proposed development of the site would meet the needs of the business in providing emergency services support, strategic operational support, tourism and specialised air services headquarters in the ACT. The specific details of the site development are described further in Section 1.3 below and depicted in Figure 2.

A preliminary biodiversity assessment of the subject site was undertaken by PATH Co to identify the site's ecological values, and whether these values may place a potential constraint on any future development or use of the land as intended, or otherwise affect the approvals process.

Since that report, the proposed development (and associated acquisition of the land for the purpose) was called-in by the Minister and an Environmental Impact Statement (EIS) was required to be completed. As part of this process, an Application for a Scoping Document was prepared and included information from the original Biodiversity Assessment report on the site values. The EIS Scoping Document that was then issued by the ACT Government (dated 12/2/19) and included, with reference to biodiversity matters, comments from the ACT Conservator of Flora and Fauna (and CPR) for certain additional information to be provided (included at Section 8.1.11 of the Scoping Document, and described further below) in an updated Biodiversity Assessment Report.

This Biodiversity Assessment Report has therefore been prepared to address the additional comments. In doing so, it provides a summary of the combined site survey methods and findings to clearly identify the biodiversity values of the site, as well as provides an assessment of the potential impacts of the proposed development on these values. Recommendations are also made where appropriate to mitigate or manage potential impacts.

1.2 Aims of this Assessment

The general aims of this consultancy project are to:

- Asses the biodiversity values of the site (via desktop and field-based methods).
- Consider the potential for listed threatened species or ecological communities under the EPBC Act or ACT *Nature Conservation Act 2014* (NC Act) to occur at the site.

- Consider the potential impacts of the proposed development (with specific reference to the threatened species and other potential site values raised in the Conservator's comments)
- Provide recommendations where appropriate to avoid or minimise potential impacts to biodiversity.

In addition to the general aims above, the assessment also sought to specifically address the comments received from the ACT Conservator of Flora and Fauna (Appendix A of the Scoping Document) in relation to certain biodiversity matters, including (summarily):

- Resolving the taxonomic status of the Dianella species at the site (and specifically, to confirm that it is not the listed threatened *Dianella amoena*);
- Undertaking additional assessment of the potential occurrence ay the site of the listed threatened Striped Legless Lizard (*Delma impar*)
- Providing further information on native plant species diversity and importance of wildlife linkages at the site

1.3 Description of Proposed Development

1.3.1 Construction

The headquarters/operations base will be required to provide facilities for the Forestrack operations and Secure Aviation requirement including storage of secure (operational) equipment associated with tactical, security and police operations as well as a scalable areas and facilities (including storage and serving space) required for the mobilisation of assets and resources to support larger emergency operations and or situations when they arise (e.g. 2003 Canberra bushfires).

Based on the proposed development plan for the site (Figure 2), the future development will involve the following features (including preliminary estimates of the development footprint for each element):

- 1,800m^2 for the operation's workshop
- 925m^2 for the administration building and aircraft hanger (combined)
- 200m^2 for the helipad (with an additional area of approx. 800m2 to be cleared/managed for safe take-off and landing angles)
- (approx.) 2,000m^2 hardstand, for vehicle entry, parking and manoeuvring,

Approximately 4 of the existing trees located in the north-eastern portion of the site will require removal to accommodate the development including facilitating safe take-off and landing of aircraft.

1.3.2 Operation

The proposal involves an application to purchase and development land for the purposes of developing a helicopter operations base to provide support for emergency services, forestry and related services, educational institution and tourism uses with ancillary uses supporting these functions.

Specifically, the services (air and ground) to be provided from the new headquarters will commonly relate to the following activities:

- Emergency search and rescue operations;

- Strategic and tactical operational support (Police);
- Airborne surveillance and airborne operations management support;
- Firefighting and tactical support relating to this activity;
- Community education;
- Helicopter maintenance and engineering services; and
- Forestry Site Preparation Services to Government and Private Forest Owners.

Flying of a helicopter in an out of the site for the foreseeable future will primarily be for maintenance and refurbishment. This is expected to be at a maximum of 30-35 flights per month or an average 2 in-and-out flights per day on average. Flight directions into and out of the site will generally be to/from a northerly and easterly direction (prevailing wind being considered).

Initially the facility will contain the simulator for IFR/VFR training and checks (instrument and visual flight rules operations); no actual flights will occur for this activity for the foreseeable future (up to 10 years). Training and tourism flights would occur from the airport for this time.

With regard to emergency response operations (on demand as and when required and most likely fire response and search/rescue events), this is expected to involve about 2 flights per week on average, although this is seasonally dependent in relation to fire risks. Rescue events are as and when required.

For fire response flights, the team generally would stay overnight near the fire location and therefore there is typically no return to base flight on each of those days/nights.

Flight directions into and out of the site will generally be to/from the north, north-east (prevailing being considered).

1.4 Site Context

The subject site is Block 45, Section 3 Hume, and is located on the southwestern corner of the intersection between Lanyon Drive and Sheppard Street (Figure 1). The block occupies an area of 35,613 m^2 (or 3.56 ha), and is bordered by Lanyon Drive along its north-western boundary, Sheppard Street on it eastern, south-eastern boundary, and by an industrial properties (Blocks 2 and 5 Section 3 Hume) along its western, south-western boundary. The site is located (generally) within the Hume Industrial Precinct, although is zoned NUZ1: Broadacre under the ACT Territory Plan (as opposed to an IZ Industrial Zone).

Figure 1. Study site location
(Figure source: ACTmapi, ACT Government, 2018)

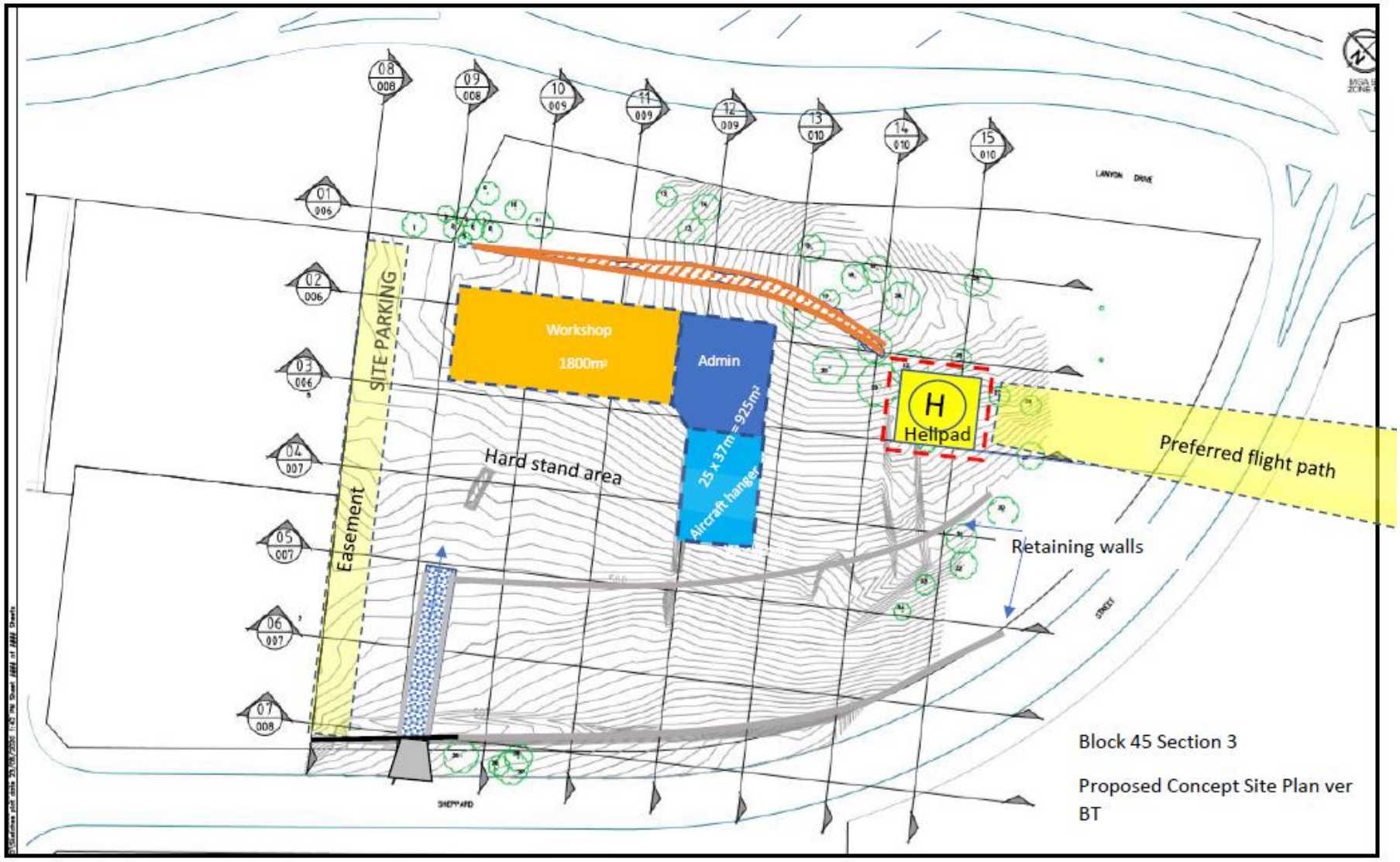


Figure 2. Proposed Development

2 ASSESSMENT APPROACH

The assessment of the site's biodiversity values included a combination of both desktop searches as well as a brief site inspection, as described further below.

2.1 Desktop Assessment

Background database searches were conducted to identify any existing known or recorded environmental values within the study site that may provide a potential to constraint to the development, or otherwise impact upon the planning and approval requirements to allow the works to proceed. These database searches include the following:

- Online Database searches including:
  - ACT ACTMapi *Significant Species, Vegetation Communities and Registered Trees* database maps (http://app.actmapi.act.gov.au/actmapi/), and
  - EPBC protected Matters Search Tool (http://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf) applying a 10 km search area centred at the mid-point of the project area). A copy of the search results is included at Appendix A.
- Commonwealth Threatened Species Profiles (http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl)
- Atlas of Living Australia (ALA) (https://www.ala.org.au/)
- Review of historic aerial imagery from the late 1950's (ACTmapi) to identify past site uses and disturbances

The results of these background searches are summarised briefly in the assessment findings below and in the Threatened Species Evaluation Table (Appendix B).

In addition to the above, consultation was undertaken with Dr Dave Albrecht from the CSIRO Herbarium in relation to the potential occurrence of *D. amoena* at the site.

2.2 Site Survey

The site biodiversity surveys for this project were undertaken in two separate stages, including the initial brief site survey for the Preliminary Biodiversity Assessment and follow-up targeted surveys for the Striped Legless Lizard as described below. A follow-up and detailed tree survey was also conducted in June 2020 once a survey plan of the existing trees was provided.

2.2.1 Initial Site Survey

An initial site inspection was conducted on 4 October 2018 to assess the terrestrial biodiversity (flora and fauna) values within the site study area, as defined by the block boundaries/bordering roads. Specifically, the site survey included the following components:

- Assess floristic values of the site including recording plant species observed at the site and identify broad vegetation conditions and types, as well as assessing the general site conditions to help inform consideration of the potential for any listed threatened flora species or ecological communities to occur at the site (as identified form the database searches)[1]
- Identify the presence of fauna habitat features such as hollow-bearing trees, fallen logs, rocky outcrops and aquatic habitats, as well as undertake preliminary fauna observations.

2.2.2 Targeted Surveys

Targeted surveys were undertaken at the site for the Striped Legless Lizard. These surveys were undertaken in accordance with the Commonwealth's *Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (CoA 2011) and which (preferentially) prescribes the use of the artificial shelter site technique.

The surveys involved the placement of roof tiles (as artificial shelter sites) in grids consisting of 50 tiles, at five metre spacing between tiles, arranged in a grid of 10 tiles by five. The guidelines prescribe as a minimum, two tile grids for sites less than 2 hectares in size, or one grid per 3 hectares for sites up to 30 hectares. For this study, three grids (totalling 150 roof tiles) were deployed within the open grassland areas across the south-western portion of the site (see Figure 3 and photos below).

The tiles were deployed in late August 2019 and checks commenced on 1/10/2019. The tiles were then checked weekly through till 5/12/2019 (in accordance with recommended survey timing which states early December as when activity levels reduce) with a total of 10 checks completed for the study (see Table 1).

Whilst conducting the above surveys, PATH-Co also undertook additional (opportunistic) observational records to supplement and add rigour to the existing site biodiversity information. This included searches for potential *D. amoena* individuals, as well as observing the avifauna species visiting the site.

[1] Note: the site survey for this preliminary assessment involved only a brief inspection and site traverse to identify the general composition of species present and the site habitat values. It was not intended to involve the collection of an exhaustive list of all flora/fauna species that may occur at the site, but rather is intended to inform the general values observed at the site to support the threatened species evaluations.

Table 1. Striped Legless Lizard Survey Dates and Conditions

Survey No	Survey Date	Start Time	Temp (0C)	Cloud	Wind (kph)	Recent Rain
Deploy	28/08/2019	12pm				Nil prev 3 days
1	1/10/2019	10.00	16	2/8	<5	Nil prev 3 days
2	9/10/2019	10.30	17	1/8	<5	11mm (evening)
3	15/10/2019	10.00	20	1/8	<5	Nil prev 3 days
4	22/10/2019	10.00	20	0/8	<5	5mm: 17/11/19
5	29/10/2019	10.30	21	2/8		Nil prev 3 days
6	6/11/2019	11.00	19	3/8	15	12mm: 4/11/19
7	12/11/2019	11.30	25	8/8	15-20	Nil prev 3 days
8	20/11/2019	10.30	24	1/8	5-10	Nil prev 3 days
9	25/11/2019	10.00	23	1/8	<5	Nil prev 3 days
10	4/12/2019	10.30	18	6/8	5-10	1mm: 2-3/12/19

Figure 3. Location (approximate) of Reptile Survey Tile Grids

3 SITE VALUES

3.1 Vegetation

3.1.1 Flora

The vegetation at the site is characterised into two broad categories, being the cleared central parts of the site (Area 1), and the outer eastern and northern portions of the site (Area 2) which retain a relatively intact native tree canopy, as described further below, and as shown in Figure 4.

Area 1: Southern portion of the site

The vegetation within the southern (and central) parts of the site (Area 1 on Figure 4; see also Photo 1) is in a highly modified condition, and is dominated largely by introduced grasses including primarily Phalaris (*Phalaris aquatica*), African Lovegrass (*Eragrostis curvula*), Fescue (*Festuca spp.*), Cocksfoot (*Dactylis glomerata*), Panic (*Panicum spp.*), and Brome (*Bromus spp.*), as well as other herbaceous (invasive) weeds such as Fennel (*Foeniculum vulgare*), Blackberry (*Rubus fruticosus agg.*), Plantain (*Plantago spp.*), Catsear (*Hypochoeris radicata*), Dandelion (*Taraxacum officinale*), Buchan Weed (*Hirschfeldia incana*), Shepherd's Purse (*Capsella bursa-pastoris*), St John's Wort (*Hypericum perforatum*) and Thistles (*Cirsium spp.* and *Sonchus spp*).

A patch of trees extends from Area 2 into the far north-eastern corner of this Area 1. As described for Area 2, this patch includes mostly regrowth Argyle Apple (*Eucalyptus cinerea*), with the groundcover vegetation in this area reflecting generally the same (exotic) species composition as for the broader central cleared parts of the site, described above. Some occasional smaller trees (saplings) were observed to occur in this area. These included ornamental fruit trees (Apples and Plums).

In general, there was very little native species observed in this central cleared areas, comprising (very) occasional native grasses such as Spear Grass (*Austrostipa spp.*), Poa (*Poa spp.*)and Common Wheatgrass (*Elymus scaber*) On the whole, exotic species were observed to account for well over 50% of the overall species composition in this area.

It was also noted that later in the year during the Striped Legless Surveys that the overall condition of the grassland appeared to deteriorate both through the effects of the dry/drought conditions through most of the later half of the year, and the increased dominance of introduced weeds, including notably African Lovegrass.

This part of the site has also been subject to previous (and relatively recent) disturbances, including its use as a construction site compound (or similar form of use) during works on the Monaro Highway and Lanyon Drive intersection (see Figure 5 below for aerial imagery of the site from 2009). The area was also slashed in late November 2019 and would appear that this activity is performed on a relatively regular basis at the site.

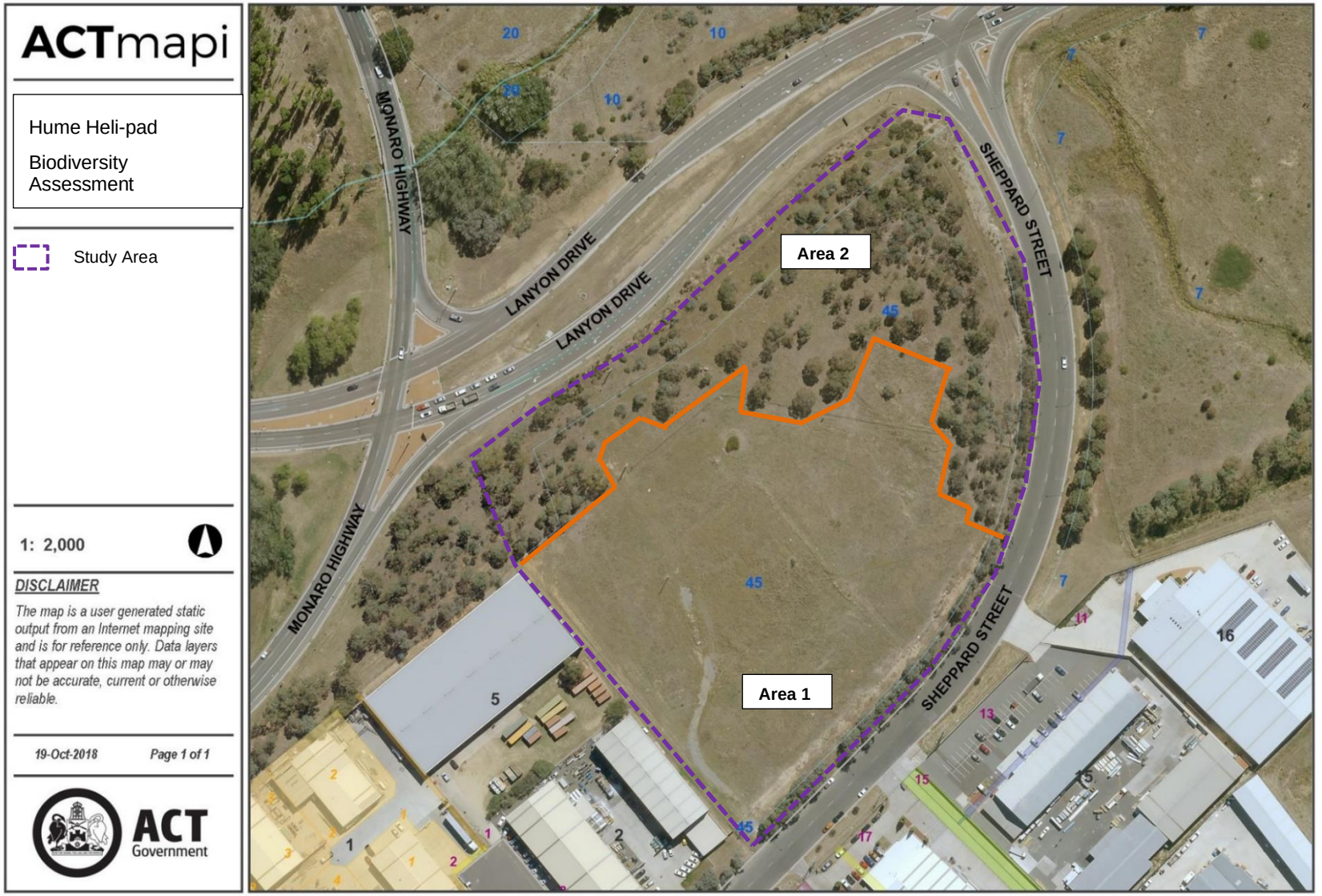


Figure 4. Study Area and features
(Image source: ACT Government ACTmapi: http://actmapi.act.gov.au/)

Figure 5. Aerial photography of site from 2009 showing previous disturbance in the southwest portions of the site

Area 2: Northern portion of the site

The northern portion of the site (Area 2; see also Photos 2 - 5) supports a relatively intact native tree canopy, comprising predominantly Brittle Gum (*Eucalyptus mannifera)* with some occasional Argyle Apple (*E. cinerea*) and Red Box (*E. ploy*anthemos), mainly in the eastern portions of the site as well as a low number of Blakely's Red Gum (*E. blakelyi*), Yellow Box (*E. melliodora*) and Apple Box (*E. bridgesiana*) individuals also scattered amongst the trees in the woodland patches.

Given the observed typical age and size class (approx. 12-16 m height and on average 400 – 500 mm trunk diameters (dbh) for large specimens), none of these trees are considered likely to be remnant trees (i.e. occurring pre-development of Canberra), and it is also likely that many of these trees are planted specimens (as noted below under the ACTmapi vegetation communities database layers), although some may have naturally regenerated from the plantings or the soil seed bank from the former vegetation at the site, pre-clearing.

Area 2 was observed to have a moderately modified understorey. The central and eastern parts of Area 2, and extending north to the intersection of Lanyon Drive and Sheppard Street, supported a relatively dense shrubby understorey, consisting primarily

of Cootamundra Wattle (*Acacia baileyana*) and Wedge-leaf Wattle (*Acacia pravissima*) with some minor regrowth specimens of the eucalypt species mentioned above (see Photo 3). Some (occasional) introduced exotic shrub varieties (weeds) including Briar Rose (*Rosa rubiginosa*) and Hawthorn (*Cratageus spp*.) were also observed to be present.

The groundcover layers throughout Area 2 were observed to support predominantly introduced grasses and weed varieties, generally similar to those mentioned for Area 1 above, although the overall cover and density of groundcover vegetation in Area 2 was, in most place, less than that observed for Area 1 (i.e. around some of the rocky outcrops; see Photo 5). This reduced biomass in the groundcover vegetation layers is likely attributable to competition and shading from the surrounding trees.

Very few native groundcover species were observed in Area 2, and included only a small number of Speargrass (*Austrostipa spp*), Kangaroo Grass (*Themeda triandra*), and Native Geranium (*Geranium solanderi*). As with Area 1, the exotic species accounted for well over 50% of the overall species composition in this area.

A list of the flora species observed at the site is included at Appendix C.

The likelihood of the site supporting any listed threatened flora species, or the site vegetation to meet any criteria for identification as a listed threatened ecological community is discussed further below.

3.1.2 Threatened flora

There was no evidence of any local threatened flora species within the site.

A review of the ACTmapi Significant Species database also does not identify any records of any listed threatened flora as occurring either within or immediately adjacent to the site. The nearest records of any threatened flora species to the site is for the Small Purple-pea (*Swainsona recta*) located within/near the NSW State Rail Corridor, south of Johns Place, records for the Button Wrinklewort (*Rutidosis leptorrhynchoides*) also within the rail corridor, north or Lanyon Drive, and records of the Hoary Sunray (*Leucochrysum albicans* var. *tricolor*) within the rail corridor and surrounding parts of the Jerrabomberra Valley and Symonston area. Based on the known ecology of these species and the modified nature of the groundcover vegetation throughout the site, it is considered unlikely that these species would occur at the site.

As noted previously, a query was made in the Conservator's comments as to whether the recorded specimens of the Pale Flax-lily *Dianella longifolia* at the site could possibly be the threatened Matted Flax-lily *D. amoena*, listed as endangered under the EPBC Act Dr Dave Albrecht from the CSIRO Herbarium was contacted to discuss the features of *D. amoena* which he stated were in contrast to *D. longifolia*. Dr Albrecht also concluded that *D. amoena* has not previously been recorded in the ACT, and based on the specimen examples held by the Herbarium, is of the belief that this species is unlikely to occur in the ACT. Given the reported distribution of the species is well outside of the ACT, and on the basis of the discussions with Dr Albrecht, it is considered unlikely this species would occur at the site.

With regard to other threatened flora species included in the EPBC PMST results (Appendix A), the previous clearing of large parts of the site, including the degree of

weed infestation in the understorey layers throughout the site, as well as other features such as lack of suitable habitat for certain species, suggest that there is little potential of any of these species occurring at the site. Refer to the threatened species evaluations (Appendix B) for further information on the potential likelihood of occurrence of these species at the site.

3.1.3 Threatened ecological communities

The site does not support any identifiable threatened ecological communities.

A review of the ACTmapi Significant Species database also does not identify any listed threatened communities occurring in or near this area. The ACTmapi Vegetation Communities layer database (based on the mapping of Baines et al, 2013) shows the treed parts the site as supporting *APN: Amenity planting native*.

The EPBC PMST revealed two listed threatened ecological communities that may have the potential to occur in the area, these include the following:

- *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (critically endangered ecological community (CEEC) under the EPBC Act); and/or *Yellow Box Red Gum Grassy Woodland* (endangered ecological community (EEC) under the ACT NC Act); and
- *Natural Temperate Grassland of the South Eastern Highlands* (critically endangered ecological community (CEEC) under the EPBC Act); and/or *Natural Temperate Grassland* (endangered ecological community (EEC) under the ACT NC Act).

In considering the potential for either community to occur at the site, the Natural Temperate Grassland community can be ruled out on the basis of the highly modified nature of the open grassland areas dominated almost exclusively by introduced species as described above.

The White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland community (Box Gum Woodland) is characterised by having a canopy tree species composition consisting of either of the three species named as being a dominant or co-dominant species in the canopy, or, having a grassland area that is naturally derived from this community (i.e. supports the requisite grassland species and condition that are identified in the listing criteria for this community, and as per the criteria set out in the EPBC Act Policy Statement: *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (DEH 2006).

With respect to the vegetation at the site, as stated above the treed northern parts of the site (Area 2) were observed to support planted specimens of predominantly *E. mannifera* with some *E. cinerea* and *E. polyanthemos* and very few *E. blakelyi* or *E. melliodora*. Given this tree composition and that the understorey vegetation was observed to be dominated largely by introduced exotic species, with very few native (non-grassy) groundcover species present, the treed parts of the site therefore would not meet the definition of the Box Gum Woodland community.

The open cleared areas of the site (i.e. Area 1) is dominated by exotic pastures and weeds and would not meet the species composition and condition requirements to be mapped as a Derived Native Grassland either.

Given the above, the site does not support any identifiable listed threatened ecological community.

In addition to the above, the trees at the site were considered for their potential to be considered as mature native trees in the context of the listing under the ACT *Nature Conservation Act 2014* for the Key Threatening Process *The loss of mature native trees (including hollow-bearing trees) and a lack of recruitment*. Under this listing, mature trees are defined as those with a trunk diameter of at least 50 cm at breast height (dbh). As per the tree survey information provided with the application and summarised in Figure 6 below, four of the trees at the site would meet this criteria, including Trees 20, 22, 23, and 30. All other trees at the site were recorded to have a diameter of less than 50 cm(dbh).

In addition, none of the trees were observed to support hollows and consequently, the trees at the site are not believed to meet the criteria under this KTP listing which accordingly should not apply.

Table 2. Summary of tree species recorded at the site.

Tree No.	Species
1	*Eucalyptus polyanthemos*
2	*Eucalyptus polyanthemos*
3	*Eucalyptus polyanthemos (?)*
4	*Eucalyptus polyanthemos*
5	*Eucalyptus polyanthemos*
6	*Eucalyptus polyanthemos*
7	*Eucalyptus polyanthemos*
8	*Eucalyptus polyanthemos*
9	*Eucalyptus mannifera*
10	*Eucalyptus mannifera*
11	*Eucalyptus mannifera*
12	*Eucalyptus polyanthemos*
13	*Eucalyptus mannifera*
14	*Eucalyptus mannifera*
15	*Eucalyptus mannifera*
16	*Eucalyptus mannifera*
17	*Eucalyptus mannifera*
18	*Eucalyptus mannifera*
19	*Eucalyptus mannifera*
20	*Eucalyptus mannifera*
21	*Eucalyptus mannifera*
22	*Eucalyptus mannifera*
23	*Eucalyptus mannifera*
24	*Eucalyptus mannifera*

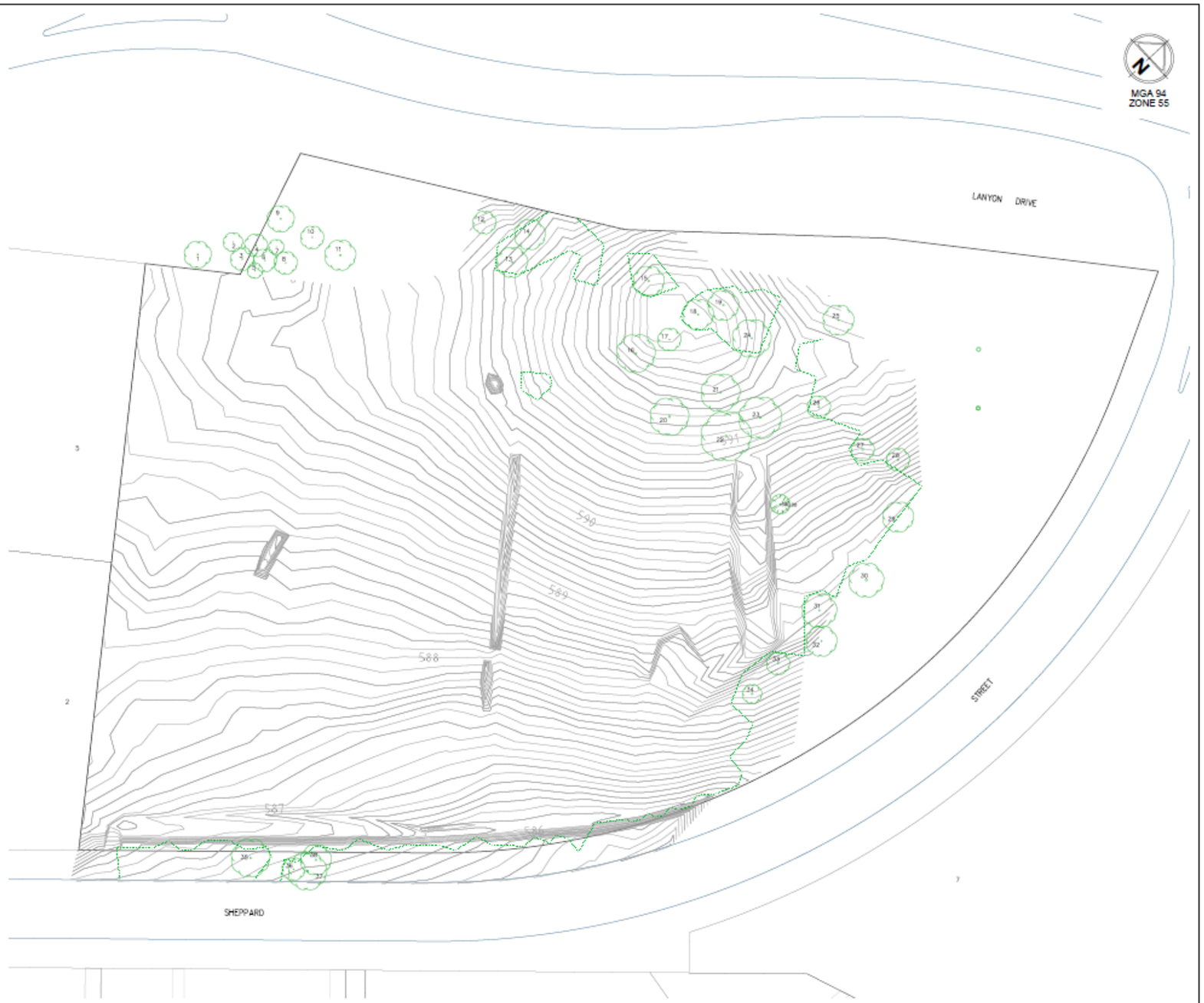
25	*Eucalyptus mannifera*
26	*Eucalyptus mannifera*
27	*Eucalyptus mannifera*
28	*Eucalyptus mannifera*
29	*Eucalyptus cinerea*
30	*Eucalyptus polyanthemos*
31	*Eucalyptus polyanthemos*
32	*Eucalyptus polyanthemos*
33	*Eucalyptus cinerea*
34	*Eucalyptus cinerea*
35	*Eucalyptus cinerea*
36	*Eucalyptus cinerea*
37	*Eucalyptus cinerea*
38	*Eucalyptus cinerea*

LEGEND

EXISTING SURFACE —588—

EXISTING TREES

EXISTING TREES			
NUMBER	HEIGHT (m)	RADIUS (m)	RL (m)
1	9.5	0.150	589.32
2	7.5	0.100	589.20
3	9.5	0.150	589.49
4	8.5	0.175	589.31
5	8.5	0.100	589.39
6	9.0	0.125	589.21
7	7.5	0.075	589.05
8	8.0	0.125	589.05
9	11.5	0.150	589.07
10	9.5	0.125	588.86
11	11.5	0.200	589.69
12	7.0	0.150	590.11
13	10.5	0.200	590.70
14	11.0	0.200	590.36
15	12.0	0.200	592.05
16	12.0	0.225	591.96
17	7.5	0.125	592.16
18	9.5	0.175	592.26
19	10.5	0.200	592.11
20	9.5	0.250	591.43
21	10.5	0.150	591.71
22	11.0	0.250	591.19
23	11.5	0.250	591.28
24	9.0	0.150	591.80
25	11.5	0.175	591.07
26	11.0	0.200	591.12
27	9.5	0.225	590.33
28	12.0	0.200	589.87
29	10.5	0.200	589.06
30	9.0	0.250	588.65
31	7.0	0.150	588.92
32	9.0	0.150	588.34
33	8.5	0.150	588.40
34	8.0	0.200	588.01
35	9.5	0.200	586.11
36	6.0	0.125	585.84
37	10.5	0.225	585.86
38	10.0	0.200	586.06



DRAFT

JOHN RANDALL CONSULTING

Designed: MP
Checked: JKR
Authorised: #####
Date: 22-06-2020

PART BLOCK 45 SECTION 3
HUME
EXISTING TREES
LAYOUT
TCCS
-

Dwg No: 307927CX003
Rev: -

Figure 6. Tree Survey Plan

3.2 Fauna and habitats

3.2.1 Fauna values at the site

The fauna species encountered during the site survey, or considered likely to occur at the site on a regular basis, is limited mainly to common fauna types, as described below. A list of species actually observed at the site is included at Appendix C.

Avifauna

The avifauna (bird) species observed during the site survey included primarily common species that are well-adapted to urban and peri-urban environments and are often seen throughout the ACT and surrounding region. These include species such as Crested Pigeons (*Ocyphaps lophotes*), Sulphur-crested Cockatoos (*Cacatua galerita*), Galahs (*Eolophus roseicapilla*), Crimson (*Platycercus elegans*) and Eastern Rosellas (*P. eximius*), Australian Magpie (*Cracticus tibicen*), Pied Currawongs (*Strepera graculina*), Noisy Miners (*Manorina melanocephala*), Superb Fairy Wrens (*Malurus cyaneus*) and Willy Wagtails (*Rhipidura leucophrys*), as well as the introduced Indian Myna (*Acridotheres tristis*).

The northern parts of the site (i.e. Area 1) provides relatively good tree cover for shelter/resting/roosting habitat for birds, as well as some suitable foraging habitat for granivorous and nectivorous bird species though the (limited) variety of flowering trees and shrubs, and grasses (for seed-eating species).

No tree hollows were observed in any of the trees at the site, and so there is no suitable breeding habitat for any hollow-dependant bird species (although these species still may visit to forage at the site from time to time, as evidenced by the presence of Galahs and Rosellas for example).

The potential for the site to support any listed threatened bird species is discussed further below.

Mammals

No mammals were directly observed at the site during the brief daytime inspection, although some evidence of mammals visiting the site was observed (by burrows and scats). The inspection noted that the site generally provided minimal suitable habitat features for native mammals. Specifically, there was limited arboreal habitat features for native mammals. No tree hollows were observed in any of the trees, which is an important breeding habitat requirement for many native arboreal mammals such as gliders and microbats, as well as possums (although possums can also establish dreys in non-hollow-bearing trees). Consequently, the site is considered unlikely to support any arboreal, hollow-dependant native mammal species. However, some foraging habitat for native arboreal mammals is present in the form of flowering trees and shrubs which may be either fed directly upon, or provide food for prey species such as insects which may then be fed upon by species such as microbats. As such, some native arboreal mammals may visit the site occasionally for foraging, but are unlikely to be a permanent resident of the site (such as through the establishment of a breeding site).

The site provides some limited habitat for native ground-dwelling mammals. This includes potential foraging habitat for kangaroos and wombats, although in general, this

appeared to be limited with little evidence of any regular grazing at the site. Evidence of use at the site by native ground-dwelling mammals included observations of Macropod (e.g. Kangaroos) and Wombat (*Vombatus ursinus*) scats as well as scratchings/diggings presumably by a Short beaked echidna (*Tachyglossus aculeatus*). Other evidence of mammal use at the site included burrows and scats of the introduced European Rabbit (*Oryctolagus cuniculus*).

In terms of potential breeding/nesting habitat for native ground-dwelling fauna, the site inspection noted there were some rocky outcrops located along the northern margins of the site in Area 2, however, these rocks were typically heavily embedded with little crevices or other holes/burrows beneath the rocks observed. Given these values, the site may provide some limited nesting habitat for very small mammals, with no suitable nesting habitat for medium to large sized mammals. Additionally, the site inspection noted a lack of other suitable ground structures such as fallen logs, required for shelter for many smaller ground-dwelling mammals. Consequently, the site is considered unlikely to support any smaller native ground-dwelling mammal species (although introduced small mammals such as mice, rats are considered likely to occur at the site).

The potential for the site to support any listed threatened mammal species is discussed further below.

Reptiles

The habitat values at the site for reptiles is limited mainly to the occurrence of the rocky outcrops mentioned above (refer to Photo 5 for example of this habitat feature). As noted above, the majority of these rocky areas contained large rocks that were heavily embedded, with fewer loose/partially embedded surface rocks. Consequently, whilst the site provides good habitat opportunities for basking reptiles (an important requirement for many species), the number of opportunities for reptiles to shelter beneath rocks (particularly for longer-term winter hibernation etc) is limited to only a few noted observations of such features.

The initial site survey included a number of searches beneath suitable rocks (able to be turned over). During this, a single reptile record was made of a medium-sized Eastern Blue-tongued Lizard (*Tiliqua scincoides scincoides*) – see Photo 6.

Based on the low abundance of rocky habitat and the degraded nature of the groundcover, the site was regarded as having only limited value as habitat for reptiles. Notwithstanding this, the comments from the Conservator included a requirement for further information on the potential occurrence of the Vulnerable Striped Legless Lizard (*Delma impar*) at the site. To address this requirement, a targeted survey was undertaken using roof tiles as described in the survey methods.

During these surveys, the target species, *D. impar*, was not recorded at the site (or any other threatened reptile species), although a number of more common reptiles were recorded during the tile surveys, but in very low numbers. These included the Delicate Skink, *Lampropholis delicata* and Grass Skink, *L. guitchenoti*, Eastern Brown Snake *Pseudonaja textilis,* Boulenger's Skink *Morethia boulengeri* and Eastern Striped Skink *Ctenotus robustus.*

A single Jacky Lizard *Amphibolurus muricatus* was also briefly glimpsed amongst a pile of broken concrete/rocks/rubble in the central western portion of the site (6/11/19).

Amphibians

The site does not support any regular or intermittent aquatic habitats. Consequently, the site does not support potential breeding habitat for, and is therefore considered unlikely to support, any amphibians on a regular basis, and in particular, is considered unlikely to support any listed species as discussed further below.

3.2.2 Threatened fauna

No threatened fauna species were recorded within the site during the survey.

A review of the ACTmapi Significant Species database also does not identify any habitat or records of any listed threatened fauna as occurring either within or immediately adjacent to the site.

The nearest records of any threatened fauna species to the site include the following:

- Striped Legless Lizard (*Delma impar*). Records (including mapped potential habitat) for this species occurs north of Lanyon Drive and extends further north through the Symonston and Jerrabomberra Valley rural/broadacre areas. As noted above, this species was not seen during the targeted tile surveys.
- Grassland Earless Dragon (*Tympanocryptis pinguicolla*). Records (including mapped potential habitat) for this species occurs north of Lanyon Drive and extends further north through the Symonston and Jerrabomberra Valley rural/broadacre areas. As noted above, this species was not seen during any of the site surveys.
- Pink-tailed Worm-lizard (*Aprasia parapulchella*). Records (including mapped potential habitat) for this species occurs in a small area located about 500 m northeast of the site, on the other side of Monaro Highway. Very few rocks are present at the site. Some rocks were turned at the site where possible and this species was not seen.
- Golden Sun Moth (*Synemon plana*). Records (including mapped potential habitat) for this species occurs north of Lanyon Drive and extends in scattered locations further north through the Symonston and Jerrabomberra Valley rural/broadacre areas. This species was not seen during any of the visits to the site to conduct the tile surveys, which included some days in late October to late November that were suitable flying conditions for moths. Additionally, the site does not provide suitable habitat for this species.
- Perunga Grasshopper (*Perunga ochracea*). Records (including mapped potential habitat) for this species occurs north of Lanyon Drive and extends in scattered locations further north through the Symonston and Jerrabomberra Valley rural/broadacre areas. This species was not seen during any of the visits to the site.

Based on the habitat requirement of these species and the observed available habitats within the site, it is considered unlikely that any of these species would occur at the site on a regular basis, or would rely on the site for important habitat. Further consideration of the habitat requirements and likely occurrence at the site is provided for each of these species individually in the Threatened Species Evaluation Table at Appendix B.

Threatened fauna species (other than the ones discussed above) included in the EPBC PMST search results were considered for their potential to occur at the site, and include a number of bird, mammal, reptile and amphibian species as described further below.

The bird species listed in the EPBC PMST and their nearest records on the ALA website include the following:

- Regent Honeyeater (*Anthochaera (Xanthomyza) Phrygia*). Nearest record is within remnant woodland near the (former) Mugga Quarry, approximately 4 km northwest of the site
- Painted Honeyeater (*Grantiella picta*) Nearest record is within remnant woodland east of the Queanbeyan residential areas, approximately 4 km east of the site
- Superb Parrot (*Polytelis swainsonii*). Nearest record is east of and midway along the Monaro Highway, near the Alexander Maconochie Centre, approximately 1.5 km north of the site
- Swift Parrot (*Lathamus discolour*). Nearest record is within remnant woodland near the (former) Mugga Quarry, approximately 4 km northwest of the site

In general, there is considered to be little potential for these species to occur at the site on a regular basis, or otherwise rely on the site for important habitat, with little or no suitable breeding habitat, and minimal suitable foraging habitat for any of these bird species. Notwithstanding this, it cannot be completely ruled out that these species, given their mobility and wide distributions, could potentially visit the site on an infrequent basis.

The threatened mammal species listed in the EPBC PMST and their nearest records on the ALA website include the following:

- Large-eared Pied Bat (*Chalinolobus dwyeri*). Nearest record is east of Braidwood, and north of Bateman's Bay, approximately 85 km east of the site.
- Spotted-tail Quoll (*Dasyurus maculatus*). Nearest records are east of Queanbeyan, near Googong, and a single record near Woden, more than 7 km from the site.
- Greater Glider (*Petauroides volans*). Nearest records are east of Braidwood along the coastal ranges and escarpment, and in the Brindabellas, more than 30 km from the site
- Brush-tailed Rock-wallaby (*Petrogale penicillata*). Nearest record is near Greenway, approximately 10 km west of the site.
- Koala (Phascolarctos cinereus). Nearest records are east of Queanbeyan, near The Ridgeway, more than 8 km east of the site.
- Grey-headed Flying-fox (*Pteropus poliocephalus*). This species has multiple records throughout the ACT region, although none within 4 km of the site (although it may visit the site on occasion). Importantly, there is no recorded flying-fox camp within or near the site, with the nearest known camp at Commonwealth Park, approximately 10 km north of the site.

Based on the observed habitat values, the site is considered unlikely to support any of these species. Specifically the site is considered too small, isolated and without the structural complexity required to provide suitable habitat conditions for these species. The one exception to this is the Grey-headed Flying-fox which may visit the site from time

to time for foraging/feeding, however the site does not contain a camp/colony and therefore is considered to be of minor importance for this species.

Threatened reptiles included in the database searches include the Pink-tailed Worm-lizard, Striped Legless Lizard, Grassland Earless Dragon. As described above, these threatened reptiles are considered unlikely to occur at the site.

Threatened amphibians included in the database searches include the Green and Golden Bell Frog (*Litoria aurea*), Booroolong Frog (*L. booroolongensis*), Yellow-spotted Bell Frog (*L. castanea*) and Growling Grass Frog (*L. raniformis*). As stated above, the site does not support any aquatic habitat features and consequently these species are not considered likely to occur in or near the site.

The Golden Sun Moth was also included in the EPBC PMST results. This species has not been previously recorded from the local area, and as stated above, was not seen at any time and based on its known ecology and habitat requirements, is considered unlikely to occur at the site.

3.2.3 Ecological Connectivity

Ecological connectivity is an important factor in determining overall habitat quality for almost all (native) fauna. Fauna movement is of vital importance in establishing viable populations of animals as it assists in breeding between individuals of different local sub-populations and populations which maintains genetic diversity, and also allows animals to be able to move between habitats either in response to seasonal factors or to exploit habitat resources in other areas (such as migratory species). Ecological connectivity also enables some species to move to new areas if the habitat quality of their original environment becomes degraded or otherwise unsuitable for them to persist there.

The subject site is not considered likely to play an important role in maintaining ecological connectivity in the local area. Specifically, the site is located within (although at the outer margins of) an industrial estate and is bordered by an existing industrial scale warehouse and supporting industry uses on the adjacent block to the west, and by roads on all other sides, including a major road to the north (Lanyon Drive). Given this, and the small size of the site, as well as the lack of any specific important habitat features (such as larger areas of more mature trees with hollows and an undisturbed understorey), the site is unlikely to be regularly used by most fauna types as part of a movement corridor, with the possible exception of common, highly mobile species such as the birds listed above. In addition, the much larger open areas of unleased land in the Symonston and Jerrabomberra Valley broadacre/rural areas to the north of the site, are considered more likely to be used by fauna, and thus are strategically the more important corridors that maintain ecological connectivity in the area.

3.3 Site photos

Photo 1. View of Area 1

Photo 2. View from Area 1 into Area 2

Photo 3. View of dense Acacia understorey in Area 2

Photo 4. View south of Area 2 along north-western boundary

Photo 5. Rocky outcrops in Area 2

Photo 6. Blue-tongued Lizard beneath rock in Area 2

4 PRELIMINARY ASSESSMENT OF POTENTIAL IMPACTS

The proposal would involve the construction and operation of a helicopter operations base, including the construction of buildings and other site infrastructure, as well as the operation (flying) of helicopters into and out of the site, as described in Section 1 above. Consequently, the potential impacts of the project may involve either or both construction and operational impacts to biodiversity, as discussed further below.

4.1 Construction Impacts

The potential impacts associated with the construction of the proposed heli-pad facility are primarily associated with the removal of vegetation, and include the following:

- Impacts to native flora.
- Impacts to native fauna
- Loss of ecological functions and processes

4.1.1 Impacts to native flora from clearing of vegetation

The proposed vegetation clearing associated with the project includes:

- Removal of 4* existing native trees at the site – being trees 27, 28, 29 and a small, unnumbered tree, directly within the helipad (see Figure 2)
- Removal of groundcover vegetation

(*Note: Three of the proposed trees (27-29) to be removed are necessitated by the required safe approach and take-off vectors as opposed to direct removal to accommodate buildings or other structures; only one tree is required to be removed for the helipad).

The potential impacts to native flora associated with the clearing of the vegetation at the site may include:

- Loss of flora species diversity
- Disturbance to surrounding areas of retained native vegetation during construction including indirect impacts such as the risk of spreading noxious and environmental weeds further across the site

Loss of flora species diversity

As noted previously, the site supports two distinct areas of vegetation, including the modified open grassland area in the southern and western portions of the site and the treed woodland areas across the northern and eastern parts of the site.

The majority of the vegetation clearing for the project occurs in the modified open grassland area. The vegetation in this area is in a highly disturbed and modified condition and is dominated by introduced weed species, including a significant portion of African Lovegrass as well as other invasive weed species. This area therefore does not support an unusual or otherwise rich diversity of native flora, and importantly, is unlikely to support any listed threatened flora species or ecological community.

The treed portions across the northern and eastern parts of the site supports a small but moderately intact native woodland vegetation community. As noted previously

however, the existing trees in this area are all common species, are immature specimens likely to have been planted less than 50 years ago, and collectively, do not form part of the Box Gum Woodland TEC or form habitat considered likely to support any listed threatened flora species.

The proposed development will result in the removal of up to 4 of the existing trees at the site. As noted, three of these trees are required to be removed to accommodate a safe take-off and landing zone to the east of the helipad. Based on the CASA safety guidelines and basic helicopter operations for safe take off and landing, there is a 4.5^0 angle of repose that must be clear of any obstructions such as trees, power/telegraph poles and the like. Based on this, the existing trees located within the take-off and landing angles shown on the development plan will likely require removal (or as stated, heavy pruning at a minimum to keep below the safe height limits).

As the clearing of many of these trees may involve only (heavy) pruning/lopping, with the lower trunk and root zone possibly able to be left, the impacts to groundcover vegetation in this area is much smaller than what it appears.

In addition to the above, some rehabilitation planting of the understorey vegetation within the area beneath flight paths will take place to ensure this area remains neat and tidy and well-maintained for the continued operation of flights from the site. This planting will comprise suitable native species that are drought-tolerant and hardy and capable of withstanding the increased wind associated with the overhead helicopter flights. This planting will compensate for the loss of some of the trees by increasing the overall species diversity at the site, particularly with regards to flowering plants and an increased shrubby mid-storey layer in parts of the site.

Given the above, the proposed clearing of the trees in the northern and eastern parts of the site is considered unlikely to significantly affect flora species diversity.

Indirect disturbance impacts during construction

The vegetation clearing also has the potential to result in the spread of noxious weeds. As noted in Section 3, the site already supports a large abundance of noxious weeds and it is therefore considered unlikely that the project will significantly contribute to the spread of weeds. Notwithstanding this, weed hygiene protocols will be implemented during construction to prevent the movement of weeds around and off the property, and prevent the introduction of any new weeds onto the site.

4.1.2 Impacts to native fauna

The potential impacts of the construction phase of the project on native fauna include the following:

- Loss of habitat for breeding and foraging
- Direct impacts through injury or death during habitat clearing activities

Loss of habitat

As stated in Section 3, the native fauna habitat values of the site include some limited shelter and foraging opportunities for common arboreal fauna (being primarily birds) provided by the native tree canopy in the northern parts of the site (Area 2), as well as some limited shelter opportunities for reptiles provided by the rocky outcrops, also within

Area 2. Based on the proposed development plan (Figure 3), it is likely that the project will result in the loss of some these habitat values through earthworks and vegetation clearing during the construction phase.

As also noted in Section 3, although some native fauna species were observed or are considered likely to occur at the site, and which may be affected by these works, all of these species are common and widespread in the area, and would occupy (or be capable) of occupying other habitats in the surrounding area. Importantly, no habitat features such as hollow-bearing trees or suitable rocky outcrops that provide potential habitat for certain threatened fauna species were observed at the site, and as described previously, the site is considered unlikely to support any listed threatened fauna species. Given this, there are unlikely to be any impacts to threatened fauna as a consequence of habitat loss during the construction phase of the project.

Notwithstanding the above, although the potential impacts are not considered significant and likely to occur only to common species, it is still important to ensure that where possible, impacts to all native fauna are avoided or minimised. Consequently, it will be important to ensure that appropriate controls are put in place during the construction phase to minimise potential impacts to native fauna. Some preliminary management recommendations are provided in Section 5.

Direct impacts to fauna during construction

Direct impacts to native fauna through injury death could occur during the construction phase as a result of resident animals (at the time of construction) being crushed/struck by machinery and equipment. This could potentially occur primarily during the felling of trees or the removal of rocks and other excavation works.

Fauna species considered to be particularly at risk from these impacts include (nesting) birds in trees, and reptiles beneath rocks or in other structures such as grass tussocks or (small) underground burrows. Other direct impacts to fauna by death or injury could also occur through entrapment of resident animals within pits and trenches.

No bird nests or tree hollows were observed in any of the trees to be removed, and these mobile fauna types are likely to easily avoid these construction impacts. The species most likely to be at risk from this impact are mainly the common reptiles mentioned in Section 3. As stated above, the site is considered likely to support only a limited number of these common species, with little potential of any listed threated fauna species occurring at the site that may be affected by the development. Consequently, these impacts are not regarded as significant.

Notwithstanding the above, it is still important to ensure that where possible, impacts to all native fauna, whether common species or otherwise, are avoided or minimised. Consequently, it will be important to ensure that appropriate controls are put in place during the construction phase to minimise potential impacts to native fauna. Management recommendations are provided in Section 5.

4.1.3 Loss of ecological functions and processes

The Conservator's comments included in the EIS Scoping Document noted that:

> *The tree plantings, particularly on the northern part of the proposed development are part of a locally important linkage that assists wildlife and are utilised by a host*

of species moving across the landscape including birds, bats and many invertebrates (particularly beetles and moths). The EIS should address how this connectivity will be maintained - either by the retention of existing plantings or a reconfiguration in which there are only small breaks.

The site is considered likely to play only a minor role in maintaining ecological connectivity in the broader area. The key reason for this statement is the combination of multiple factors that have played a role in reducing the site's importance in this area including the upgrades to the Monaro Highway and Lanyon Drive intersections, including the upgrade to the Sheppard Street intersection on the corner, the high traffic volumes on these major roads, as well as the growth/expansion of the Hume Industrial Precinct bordering the site to the west and south. From these activities, the site has become increasingly isolated from other nearby woodland or grassland areas, and given it's small size, degree of disturbance to the groundcover vegetation, and the lack of any other notable habitat at the site (such as hollow-bearing trees or terrestrial habitat structure).

These reduced values combined with the fact that there is no nearby habitats to the south or west of the site mean that the site is now almost entirely fragmented and isolated with only the most mobile fauna (i.e. birds) likely to use the site on a regular basis as part of a larger movement corridor patch. For these mobile animals, there are other existing and more important linkages available for use in these eastern parts of the ACT, such as through the larger Jerrabomberra Valley grasslands or further north and west around the Box Gum Woodlands in Symonston and Mugga.

It is also important to note that the proposed future upgrades to the Monaro Highway, particularly the flyover bridge over Lanyon Drive and the David Warren Road extension to the Sheppard Street intersection, all of which form the north-eastern border of the site, immediately adjacent to where the existing trees are located, will further reduce the value of the site as an important ecological linkage, irrespective of the proposed development of the site under this assessment.

In addition to the above, some rehabilitation planting of the understorey vegetation within the area beneath flight paths will take place to ensure this area remains neat and tidy and well-maintained for the continued operation of flights from the site. This planting will include native species and will aim to compensate for the loss of some of the trees by increasing the overall species diversity at the site, particularly with regards to flowering plants and an increased shrubby mid-storey layer in parts of the site which could improve habitat for some native fauna.

Given the above factors, the proposal is considered unlikely to significantly reduce ecological connectivity in the local area.

4.2 Operational impacts

The potential operational impacts of the project are associated primarily with the flying of helicopters into and out of the site. As noted in the project description, it is anticipated that, for the foreseeable future, there would be on average 2 flights per day into/out of the site, although this number would vary seasonally, and particularly in

association with fire danger levels. It is also likely that in the early stages of operation, the number of daily flights would be lower until operational capacities were achieved.

The potential impacts that may occur are associated primarily with alienation impacts from operation of aircraft and direct impacts through collision with helicopters. These are discussed further below.

4.2.1 Alienation impacts from operation of aircraft

In theory, a regular or high volume of flights in a particular area have the potential to disturb animals to the point where they no longer occupy or utilise that space. This is known as habitat displacement or habitat alienation. Habitat alienation has been demonstrated to occur as a consequence of a number of developments overseas, including airports and offshore wind farms where rows of turbines create a barrier, although little information is available to demonstrate this in Australian (Masden et al. 2009, Hull and Muir 2013, EPHC 2010, Hull 2013). Locally, habitat alienation for raptors due to increasing urbanisation is already a phenomenon documented in Canberra (e.g. Olsen & Fuentes 2005).

Although there is limited information available at this time on the likely flight patterns/frequency to assess whether the project might result in any alienation impacts to wildlife, it is noted that the site lies in close proximity to the Canberra Airport, and particularly, the main landing approaches from the south. Additionally, there is an existing heli-pad located near the AMC, less than 600 m north of the site for the Southcare Helicopter Base.

Given these existing operations, there is likely to already be some degree of habituation of animals, particularly avifauna, to aircraft in this area, and consequently the project does not introduce a new impact to the area that local fauna have not previously experience (and currently experience). In addition, the anticipated low number of daily flights (approximately 2 per day) is unlikely to create significant aircraft traffic volumes in the area. Consequently, there is unlikely to be cumulative impacts through the low level of increased aircraft flights.

Further to the above, it has been noted during the regular site visits as part of the biodiversity surveys for this assessment that typically only a small number of common birds (and some common reptiles) were seen at the site. These species are all relatively well adapted to urban environments and human activities, and all have stable and widespread populations in the south-eastern regions of Australia. Although there is a chance that some animals may become disturbed during the initial project operations, these species are considered likely to be able to eventually habituate to and then tolerate the proposed activities without any notable decline in population numbers.

The site is unlikely to support, or provide important habitat for, any listed threatened species and also is not considered to be an important linkage for threatened birds or other terrestrial fauna whereby their use of the site could be affected by the proposed operations through becoming alienated from the habitats at the site. For most mobile species such as birds, there are large areas of open space that can be used for movements to the east of the site along the eastern margins of the Act border.

Given the above, it is considered unlikely that there would be any significant alienation impacts to any listed native species and particularly to any threatened species at the site itself, where the most frequent level of flights will occur (i.e. will experience all take-offs and landings, irrespective of the destination), and hence risk of alienation impacts are expected to be the greatest.

Potential alienation risks to the threatened species beyond the immediate environs of the site during flights are beyond the scope of this assessment. However, given the existing aircraft operations in the local area, it is considered likely that threatened species that may occur in the surrounding area would already have some degree of habituation to the proposed operations. Furthermore, numerous studies indicate that many species (especially avifauna species) are capable of habituating to aircraft, and there is no reason to indicate that (threatened) species in the local would not be able to adequately habituate to the proposed operational flights to avoid impacts to any local populations.

Alienation impacts to the (common) species known or considered likely to occur at the site are considered unlikely to be substantial or otherwise notable in terms of the extent of impact on local populations. As stated, the fauna (and avifauna species in particular), are all common and widespread in the region, are well adapted to urban environments, and as stated above, are likely to already be reasonable well habituated to aircraft operations in this area, and are expected to eb able to habituate to the presence of aircraft proposed for this project.

4.2.2 Direct impacts through collision with helicopters

Aircraft operations may have the potential to result in impacts to native fauna through direct collisions with aircraft that result in either injury or death to animals. For slower moving aircraft like helicopters, particularly at landing and take-off where the risk of collision is greatest for most species (except high-flying species like swifts), the risk of collision is somewhat reduced. For helicopters in particular, it is likely that the extensive wind buffeting caused by the helicopter blades would deter most fauna from coming near enough to the aircraft to be struck.

As also described above for alienation impacts, it is likely that most fauna would habituate to the presence/operation of helicopters at the site (noting helicopter flights already occur nearby to the site for the Southcare Helicopter) and so the risk of collisions would be further reduced.

Notwithstanding the above, in the early stages of operations before resident fauna have had a chance to habituate to the new operating of helicopters at the site, there is a chance that some fauna may accidentally be struck by the aircraft. As noted previously, the site has been found to support predominantly common species of avifauna, most of which are well adapted to human environments and vehicles, particularly in this local area where there are both ground and airborne vehicles in regular operation. Additionally, all of the species recorded at the site occur in stable populations across large parts of eastern Australia. Consequently, in the (unlikely) event that some of these animals are struck and killed by helicopter operations from the site, these mortalities are unlikely to result in any impact to the viability of any local populations of the species most likely to use the site and be at risk of collisions.

4.3 Cumulative Impacts

As stated previously, without having an understanding of the current level of flights by other existing operations in this region and the existing impacts these may be having on native species, it is not possible to quantify the potential cumulative impacts of operations that would occur if the development were to proceed.

Nevertheless, as stated above, the presence of existing aircraft operations in the local area, and the ability of native fauna to adapt or habituate to these impacts, would suggest that a significant cumulative impact to biodiversity would occur as a consequence of the project.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This Biodiversity Assessment Report was prepared on behalf of Secure Aviation to consider the potential ecological impacts associated with the proposed development of a new Emergency Services, Maintenance and Training Facility at Block 45 Section 3 Hume, ACT.

This assessment involved a combination of desktop and field survey based assessment techniques, including both a preliminary and general site assessment in October 2018 followed by targeted surveys at the site for threatened reptiles conducted by weekly visits to the site throughout early Spring to early Summer 2019.

From this assessment approach, it was found that the site supports some marginal biodiversity values, limited primarily to the occurrence of the patch of woodland vegetation across the north-eastern portions of the site. This treed area comprised primarily planted native trees dominated by Brittle Gums, and with a modified/disturbed understorey/groundcover vegetation layer. The trees were all of a relatively young/immature age, with trunk diameters below 50 cm (dbh) and none of the trees were found to support any hollows or other nesting habitat features.

Collectively these trees do not form part of the listed threatened Box Gum Woodland ecological community and also, are not regarded as meeting the criteria of a 'mature' tree as defined in the ACT Nature Conservation Key Threatening Process listing for the *The loss of mature native trees (including hollow-bearing trees) and a lack of recruitment*.

The groundcover vegetation across the majority of the site, and specifically in the areas proposed to be developed, are in a highly disturbed condition, with low native species richness or diversity, and dominated by numerous invasive weeds. This area is considered unlikely to support any listed threatened flora species and does not constitute any form of a native grassland community or a threatened ecological community, such as a Box Gum Woodland Derived Native Grassland or Natural Temperate Grassland.

The site is also considered unlikely to play an important role with regards to fauna habitat. The treed parts of the site provide some value for common native birds, and there is some limited habitat for a small number of common reptiles. Importantly, the site is unlikely to support habitat for any listed threatened species. There are no important arboreal habitat features such as hollows or large nests within any of the trees at the site, and there is also a lack of suitable ground structure for terrestrial fauna.

In order to address comments from the ACT Conservator, a targeted survey for the threatened Striped Legless Lizard was undertaken in Spring/Summer 2019 to confirm the possible presence of species at the site. No Striped Legless Lizards or other threatened fauna were recorded during these repeated surveys.

On the whole, given the observed condition and types of vegetation present at the site, and the limited habitat values there-in, combined with the history of disturbance to this parcel of land, the site is considered unlikely to support any listed threatened species or ecological community. Furthermore, given the site's location within an industrial precinct, and bordered by development on all sides, including industrial uses/buildings to the west, and major roads on all other sides, the site is not considered likely to contribute to broader ecological processes such as forming part of a wildlife movement corridor to assist with breeding or dispersal functions. The proposed upgrades to the Monaro Highway and Lanyon Drive arrangements in coming years will further reduce the site's role or importance in this respect.

The proposed development of an Emergency Services, Maintenance and Training Facility at the site may have the potential to result in some impacts to biodiversity. These include both potential construction and operation impacts and include the loss or degradation of vegetation, and impacts to native fauna, including loss of habitat during construction and direct impacts through injury or death during the operational stage of the project.

With regard to the construction impacts. the majority of the site clearing for the project will occur in the open grasslands in the southwestern portion of the site. Given the identified low values of this area, this clearing is not anticipated to result in any significant or otherwise unacceptable biodiversity impacts.

The proposed development will require the clearing of 4 of the existing trees in the north-eastern portions of the site. The removal of the 4 trees at the site is also considered unlikely to result in any significant or unacceptable impacts to biodiversity conservation. As noted, these trees support limited foraging habitat mainly for common birds, with no nesting habitats such as hollow-bearing trees observed in any of the trees. These species are noted as being capable of avoiding these types of clearing impacts.

The operational impacts of the proposal are also considered to be of an acceptable level. As noted, the operations anticipate about 2 flights per day on average from the site. Given this low volume of flights, as well as existing aircraft operations in the nearby area, as well as the likelihood of the existing common fauna species at the site to be able to habituate to and tolerate the new activity, it is considered unlikely that the proposed operations would result in a significant or otherwise unacceptable impact to biodiversity.

Based on the conclusions above, it is not considered necessary to refer this action to the Commonwealth in accordance with the provisions of the EPBC Act given the unlikelihood of any significant impacts to any threatened entities, and would not result in any contraventions of the ACT Nature Conservation Act.

Notwithstanding the above conclusions, it is still important to ensure that where possible, impacts to all native species, whether common or otherwise, are avoided or minimised. Consequently, it will be important to ensure that appropriate controls are put in place during the construction phase to minimise potential impacts to native fauna. Some preliminary management recommendations are provided below.

5.2 Recommendations

Given the (albeit low) potential for the development to result in impacts to biodiversity during both the construction and operation phases, early recommendations to avoid limit these impacts for each project stage, including the continuing design of the project are provided below.

5.2.1 Construction measures to avoid or reduce impacts

Preliminary recommended measures for consideration to avoid or reduce impacts to biodiversity during the construction phase include primarily the development of a construction flora and fauna management plan. This plan should ideally include the following measures:

- During construction, vegetation clearing should be minimised to the extent required to complete the works. In particular, any trees (proposed to be retained) are to be protected in accordance with applicable ACT Tree Protection Guidelines.
- During clearing of trees in Area 2, a fauna spotter should be engaged to ensure that (in the unlikely event) any resident fauna are captured and relocated, or otherwise managed in a manner to avoid death to injury to fauna.
- A fauna spotter should also be employed for the removal of the rocky outcrops in Area 2. Ideally, the fauna spotter should conduct a pre-clearance of rocks (where possible, i.e. can be easily turned over), to ensure no fauna are residing beneath them that could be injured or killed during the rock removal.
- Removed rocks should be collected for replacement elsewhere as supplementary habitat. The location of this should be discussed with the ACT Government, as it may be that there is more benefit in relocating the rocks into a nearby reserve area where records of threatened reptiles occur, rather than seeking to place them elsewhere in the site (where they would not be of as great value).
- Establishment of sediment and erosion controls (in accordance with best practice) to prevent impacts of earthworks on adjacent stormwater system.
- Establishment of appropriate weed management measures to ensure that weeds are not spread from the works area.

5.2.2 Operational measures to avoid or reduce impacts

There are no specific recommendations believed necessary to protect any biodiversity matter of conservation significance during the operational phase of the project. Notwithstanding this, some preliminary considerations for possible impact management and mitigation measures include the development of an avifauna incident procedure that provides a process for recording any fauna incidents (such as collisions with avifauna), along with a defined set of triggers (based on the nature of the incident) for further management action (if required).

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APPENDIX A. EPBC PMST Results

APPENDIX B. Threatened Species Evaluations

The tables in this appendix present the habitat evaluation for threatened species, ecological communities and endangered populations included in the database search results using a 5 km buffer around project site, for those identified as potentially occurring in the area according to the Commonwealth EPBC *Protected Matters Search Tool*[2], as well as records of species in the local area included in the ACT Government's ACTMapi online mapping database.

It was assumed that this search area and use of government databases would bring in all of the relevant species, although the list of species below omits many irrelevant ones found in aquatic habitats (i.e. fish species), or typically found within large waterbodies or coastal areas.

The likelihood of occurrence is based on presence of habitat, proximity of nearest records and mobility of the species (where relevant).

An assessment of potential impacts to these entities is not provided here given that no design and siting plans have yet been prepared upon which a detailed consideration of the likely impacts can be based.

The following classifications are used:

Presence of habitat

Present:	Potential or known habitat is present within the study area
Marginal:	Habitat present is not typical but may be suitable or habitat type is suitable but condition and microhabitat requirements of species are not present
Absent:	No potential or known habitat is present within the study area

Likelihood of occurrence

None:	Species known or predicted within the locality but no suitable habitat present within the study area
Unlikely: study area	Species known or predicted within the locality but unlikely to occur in the
Possible:	Species could occur in the study area
Present:	Species was recorded during the field investigations

[2] This online tool is designed for the public to search for matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is managed by the Commonwealth Department of the Environment, Water, Heritage and the Arts.

B.1 Evaluation of the likelihood of EPBC threatened flora species and ecological communities

Species	Description of habitat	Presence of habitat	Likelihood of occurrence
Flora			
Mauve Burr-daisy *Calotis glandula* V EPBC	The Mauve Burr-daisy is typically found in montane and subalpine grasslands in the Australian Alps, including subalpine grassland (dominated by *Poa* spp.), and montane or natural temperate grassland dominated by Kangaroo Grass (*Themeda australis*) and Snow Gum (*Eucalyptus pauciflora*) Woodlands on the Monaro and Shoalhaven area. It is apparently common on roadsides in parts of the Monaro, though it does not persist for long in such sites, and appears to be a coloniser of bare patches, which explains why it often occurs on roadsides. The species does not persist in heavily-grazed pastures of the Monaro or the Shoalhaven area.	Absent	None
Trailing Hop-bush Dodonaea procumbens V EPBC	The Trailing Hop-bush is widely but patchily distributed across south-eastern Australia, where it occurs in New South Wales, Victoria and South Australia. This species grows in low-lying, often winter-wet areas in woodland, low open forests, heathland and grasslands, on sands and clays. Most populations in New South Wales occur either in in natural grassland or grassy woodland of Snow Gum (*Eucalyptus pauciflora*), usually on crests or slopes and on tilted sediments.	Absent	None
Black Gum *Eucalyptus aggregata* V EPBC	The Black Gum is a rare species found from Capertee and Bathurst in central New South Wales, south through the central and southern tablelands. It typically grows in low lying areas with soils that are generally poorly drained, alluvial or swampy, and also in areas where there are natural frost hollows.	Absent	None

Species	Description of habitat	Presence of habitat	Likelihood of occurrence
Ginninderra Peppercress *Lepidium ginninderense* V EPBC	This short-lived forb species is known from only one site on Belconnen Naval Station, on the Ginninderra Creek floodplain, growing in grassland.	Absent	None
Basalt Peppercress *Lepidium hyssopifolium* E EPBC	This short-lived forb species occurs in a variety of habitats including woodland with a grassy understorey and grassland. It appears to respond to disturbance, having appeared after soil disturbance at one site near Bungendore.	Marginal	Unlikely, due to rarity. Species not observed at the site
Hoary Sunray *Leucochrysum albicans subsp. albicans var. tricolor* E EPBC	This species may be locally common on the Southern Tablelands,. It grows in natural and secondary grasslands and grassy woodlands, often colonising disturbed sites such as road verges and other areas with thin soils, but does not persist well in grazed situations.	Marginal	Unlikely – species was not observed at the site
Omeo Stork's-bill *Pelargonium sp. Striatellum* E EPBC	The Omeo Stork's-bill is known to occur in New South Wales, with four populations known in the Southern Tablelands at altitudes of 680–1030 metres above sea level, and in habitats that are usually located just above the high water level of irregularly inundated or ephemeral lakes.	Absent	None
Pale Pomaderris *Pomaderris pallida* E-EPBC	The Pale Pomaderris is currently known from the ACT, southern NSW and eastern Victoria. In the ACT, this species is scattered along the Cotter, Paddys and Murrumbidgee Rivers and through the Molonglo Gorge. The Pale Pomaderris is found at numerous small sites along the plateau edge and very steep upper slopes and cliffs of river valleys at 480-600 m above sea level. The ACT sites are only on the eastern banks of the rivers, with an aspect ranging from north-westerly through westerly to southerly. The soils are shallow, pale brown sandy loams over granite rock and large, exposed granite boulders may be present.	Absent	None

Species	Description of habitat	Presence of habitat	Likelihood of occurrence
Tarengo Leek Orchid *Prasophyllum petilum* E-EPBC	Known from three sites on the Southern Tablelands, at Boorowa, and Captain's Flat in NSW and Hall in the ACT, growing in grassland, Box-Gum Woodland or moist grassy flats, with kangaroo grass or wallaby grasses (*Austrodanthonia spp*). Flowers Oct-Nov (Bishop 1996).	Marginal	Unlikely – species was not observed at the site
Button Wrinklewort *Rutidosis leptorhynchoides* E EPBC	This perennial forb grows in scattered populations in natural temperate grassland or grassy woodland on the Southern Tablelands. It is known from the Red Hill Nature Reserve	Marginal	Unlikely – species was not observed at the site
Small purple-pea *Swainsona recta* E EPBC	Grows in grassland or grassy woodland on the Southern Tablelands and western slopes.	Marginal	Unlikely - not found within the site
Austral Toadflax *Thesium australe* V EPBC	This species is found in small populations across eastern NSW, on the coast and from the Northern to Southern Tablelands. It occurs in grassland or grassy woodland, sometimes in damp sites, and is almost invariably associated with kangaroo grass (*Themeda australis*).	Marginal – level of ongoing disturbance likely to be too high	Unlikely - not found within the site
EEC's			

Species	Description of habitat	Presence of habitat	Likelihood of occurrence
Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory	Natural Temperate Grassland occurs on ridges, crests, hillsides, undulating plains, valleys and lower slopes, creeks, drainage lines and river flats. It is usually associated with heavy textured soils with low nutrient levels. Natural temperate grassland comprises of closed grassland, grassland and open grassland whose biomass is dominated by two or more of the perennial native tussock grasses *Themeda triandra* (Kangaroo Grass), *Austrodanthonia spp* (*wallaby grasses*), *Austrostipa spp* (speargrasses), *Bothriochloa macra* (Red Grass, Red-leg Grass) and/or *Poa* spp (snowgrasses). Mature tussock grasses range in height from moderately tall (25–50 cm) to tall (50–100 cm) (Commonwealth Endangered Species Scientific Subcommittee 2000). The spaces between the dominant grass tussocks are occupied by graminoids (grasses and grass-like plants) and a wide range of forbs (herbaceous, non-graminoid plants) which may comprise up to 70% of all plant species and form a distinct, lower layer of vegetation (Environment ACT 2005). Many forbs are from the daisy family (Asteraceae), or are lilies or native legumes. The perennial native grasses together with the native graminoids and forbs usually comprise more than 50% of the total plant cover (Environment ACT 2005).	Absent	None
Box Gum Woodland CEC EPBC	White Box, Yellow Box, Blakely's Red Gum Woodland (commonly referred to as Box-Gum Woodland) is an open grassy woodland community (sometimes occurring as a forest formation) , in which the dominant species are White Box *Eucalyptus albens*, Yellow Box *E. melliodora* or Blakely's Red Gum *E. blakelyi*.	Absent – condition of understorey vegetation and canopy species not consistent with mapping criteria	None

Species	Description of habitat	Presence of habitat	Likelihood of occurrence
CE EPBC = listed as Critically Endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.* E EPBC = listed as Endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.* V EPBC = listed as Vulnerable under the Commonwealth *EPBC Act 1999*		CEEC EPBC = Critically Endangered Ecological Community listed under the Commonwealth *EPBC Act 1999* EEC EPBC = Endangered Ecological Community listed under the Commonwealth *EPBC Act 1999*	

B.2 Evaluation of the likelihood and extent of impact on threatened fauna

The fauna species list is derived from a search of the EPBC Protected Matters Search Tool, both utilising a 10km buffer around the subject site. With regards to the evaluations provided below for each species included in the search results, fish species and marine waterbirds/shorebirds were collectively discounted from the evaluations given the complete lack of any identifiable suitable aquatic habitat that could potentially support these species.

Species and Status	Description of habitat[3]	Presence of habitat	Likelihood of occurrence
Aves			
Regent Honeyeater *Anthochaera phrygia* E EPBC	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia, particularly Box-Ironbark woodland, and riparian forests of River She-oak. Birds are also found in drier coastal woodlands and forests in some years. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. The species is a generalist forager, mainly feeding on nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks or in mistletoe clumps.	Very marginal. The site does not provide breeding habitat,	Unlikely
Painted Honeyeater *Grantiella picta* V EPBC	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution The species inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.	Absent. Lack of suitable woodland vegetation and very little mistletoe present on trees.	Unlikely

Species and Status	Description of habitat[3]	Presence of habitat	Likelihood of occurrence
Swift Parrot *Lathamus discolor* E EPBC	Abundance of flowering eucalypts and banksias is required by this species, whose range includes southern Queensland to South Australia. This nectar feeder can gather in large groups when feed trees are in flower. It breeds in Tasmania and migrates to the south-east mainland between March and October.	Marginal. Some flowering trees in the surrounding area. No breeding habitat (breeds only in Tasmania)	Unlikely
Superb Parrot *Polytelis swainsonii* V EPBC	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west, although the species has been moving south into the ACT in recent years (OEH, 2018). Inhabits Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. Nests in large tree hollows. Species known to be used for nesting are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants.	Marginal. No Hollow-bearing trees present so no breeding habitat. Possible marginal foraging habitat.	Unlikely
Australian Painted Snipe *Rostratula australis* E EPBC	Little is known of the ecology, habitat requirements and reproductive biology of Australian Painted Snipe. They feed in shallow water or at the waters' edge and on mudflats. Most records of Australian Painted Snipe are from temporary or infrequently filled freshwater.	Absent	None
EPBC Migratory Species			
Fork-tailed swift *Apus pacificus* M EPBC	The Fork-tailed Swift is almost exclusively aerial. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh.	Marginal	Unlikely
White-throated needletail *Hirundapus caudacutus*	This species is almost exclusively aerial. It has been recorded in the airspace above woodlands, forests and farmlands. It feeds on flying insects. This species migrates to Australia from mid-October and is a regular summer migrant until April when it returns to the northern hemisphere to breed.	Marginal	Unlikely

Species and Status	Description of habitat[3]	Presence of habitat	Likelihood of occurrence
M EPBC			
Black-faced Monarch *Monarcha mlanopsis* M EPBC	The Black-faced Monarch is found along the coast of eastern Australia, becoming less common further south. It is found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating. Resident in the north of its range, but is a summer breeding migrant to coastal south-eastern Australia.	Absent, site is outside normal range	Unlikely
Satin Flycatcher *Myiagra cyanoleuca* M EPBC	This species is normally found in heavily vegetated gullies in tall forests, woodlands wherever a shrub layer is present. During migration it is often found in coastal forests, woodlands and trees in open country.	Absent	None
Rufous Fantail *Rhipidura rufufrons* M EPBC	This species generally prefers wetter habitats. It is found in the undergrowth of rainforests, and wet eucalypt forests and gullies.	Absent	None
Latham's Snipe *Gallinago hardwickii* M EPBC	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation. However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity.	Absent	None
Mammals			
Large-eared Pied Bat, Large Pied Bat *Chalinolobus dwyeri* V EPBC	Roosting habitat typically consists of sandstone cliffs and fertile woodland valley habitat within close proximity of each other.	Absent.	None

Species and Status	Description of habitat[3]	Presence of habitat	Likelihood of occurrence
Spotted-tailed Quoll *Dasyurus maculatus* E EPBC	This species is found in a variety of habitat types including rainforest, open forest, woodland, coastal heath and inland riparian forest from the subalpine zone to the coastline. Species requires hollow bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites.	Absent. The site is too small and isolated with lack of denning habitat	None
Greater Glider *Petauroides Volans* V - EPBC	The greater glider is the largest gliding possum in Australia, and is largely restricted to eucalypt forests and woodlands in eastern Australia. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The species has relatively low persistence in small forest fragments, and disperses poorly across vegetation that is not native forest. Modelling suggests that they require native forest patches of at least 160 km2 to maintain viable populations.	Absent. The site is too small and isolated	None
Brush-tailed Rock-wallaby *Petrogale penicillata* V - EPBC	This species inhabits rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks.	Absent. The site is too small and isolated and does not support any suitable rocky habitats	None
Koala *Phascolarctos cinereus* V EPBC	This species inhabits eucalypt woodlands and forests over a broad but fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts; they are also know from several sites on the southern tablelands.	Absent. The site is too small and isolated	None
Grey-headed Flying-fox *Pteropus poliocephalus* V EPBC	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria. Occur in rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source, commonly found in gullies, close to water, or in vegetation with a dense canopy. The closest is likely to be the large colony at Batemans Bay. Forage on the nectar and pollen of native trees, in particular *Eucalyptus*, *Melaleuca* and	Marginal – lack of suitable feed trees and no camp trees present in area	Unlikely – potential occasional visitor

Species and Status	Description of habitat[3]	Presence of habitat	Likelihood of occurrence
	Banksia, and fruits of rainforest trees and vines. Travel up to 50 km to forage.		
Amphibians			
Green and Golden Bell Frog *Litoria aurea* V - EPBC	The Green and Golden Bell Frog occurs mainly along coastal lowland areas of eastern NSW and Victoria. The furthest inland record of the species is at a recently discovered population near Hoskinstown in the Southern Tablelands (referred to as the Molonglo population) (Osborne et al. 2008). The species was previously known from elsewhere in the Southern Tablelands, but is now considered to have disappeared from the ACT and central slopes around Bathurst. Green and Golden Bell Frogs have been found in differing habitat in NSW and Victoria. In NSW, the species commonly occupies disturbed habitats, and breeds largely in ephemeral ponds , but also need various other habitats for different aspects of their life cycle including foraging, breeding, over-wintering and dispersal.	Absent	None
Booroolong Frog *Litoria booroolongensis* E EPBC	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.	Absent	None
Yellow-spotted Tree Frog *Litoria castanea* E EPBC	Requires large permanent ponds or slow flowing 'chain-of-ponds' streams with abundant emergent vegetation such as bulrushes and aquatic vegetation. Adults are active during spring and summer and bask on sunny days, and moves and forages at night on grassy banks.	Absent	None

Species and Status	Description of habitat[3]	Presence of habitat	Likelihood of occurrence
Growling Grass Frog Litoria raniformis V EPBC	This species is found mostly amongst emergent vegetation, including *Typha sp.* (bullrush), *Phragmites sp.* (reeds) and *Eleocharis sp.*(sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams.	Absent	None
Reptiles			
Pink-tailed Worm-lizard *Aprasia parapulchella* V EPBC	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South West Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. The species inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites.	Absent. No suitable rocky outcrops are present within the site.	None.
Striped Legless Lizard *Delma impar* V EPBC	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes and possibly the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. Also in the ACT, Victoria and south-eastern South Australia. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component and in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass *Themeda australis*, *Austrostipa* spp,. *Poa* spp., and occasionally wallaby grasses *Rytidosperma* spp. Goes below ground or under rocks or logs over winter.	Absent. No suitable shelter sites and site is too small and isolated to support population of this species. Targeted surveys conducted and species not found.	Unlikely.
Grassland Earless Dragon	The grassland earless dragon is a native grassland specialist inhabiting natural temperate grasslands (as described above in Appendix A), where it occupies burrows of the wolf spider (*Lycosa*	Absent	None

Species and Status	Description of habitat[3]	Presence of habitat	Likelihood of occurrence
Tympanocryptis pinguicolla E EPBC	spp.) and wood cricket (*Coorabooramа canberrae*), embedded surface rocks and tussocks.		
Insects			
Golden Sun Moth *Synemon plana* CE EPBC	The golden sun moth has been recorded in native grasslands and grassy woodlands containing wallaby grass (*Austrodanthonia* spp.), speargrass (*Austrostipa* spp.), and Bothriochloa, as well as in degraded grasslands dominated by the exotic Chilean needlegrass (*Nassella nessiana*), a weed of national significance.	Marginal	Unlikely

CE EPBC = listed as Critically Endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

E EPBC = listed as Endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

V EPBC = listed as Vulnerable under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

M EPBC = listed as Migratory under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

CAMBA = Chinese-Australia Migratory Bird Agreement

JAMBA = Japan-Australia Migratory Bird Agreement

APPENDIX C: Flora and fauna records.

C.1 FLORA SURVEY RESULTS

Relative abundance is given by a cover abundance scale (modified Braun-Blanquet):

1 1 to a few individuals present, less than 5% cover
2 many individuals present, but still less than 5% cover
3 5 - < 20% cover
4 20 - < 50% cover
5 50 - < 75% cover
6 75 - 100% cover

Cover/abundance scores relate to general abundance over the development site, not to representative quadrats.

*Introduced species are preceded by an asterisk.

Scientific name	Common name	Abundance
TREES & SHRUBS		
Acacia baileyana	Cootamundra Wattle	1-2
Acacia pravissima	Wedge-leaved Wattle	1-2
**Cratageus spp.*	Thorn tree	0-1
Eucalyptus blakelyi	Blakely's Red Gum	0-1
Eucalyptus cinerea	Argyle Apple	2
Eucalyptus mannifera	Brittle Gum	2
Eucalyptus melliodiora	Yellow Box	0-1
Eucalyptus polyanthemos	Red Box	1
**Malus sp.*	Apple	0-1
**Prunus spp.*	Plum	0-1
**Rosa rubiginosa*	Sweet Briar	0-1
**Rubus fruticosus* spp. agg.	Blackberry	1-2
FORBS, GRASSES & GRAMINOIDS & VINES		
**Aira spp.*	Hairgrass	0-1
**Anagallis arvensis*	Scarlet Pimpernel	0-1
Austrostipa bigeniculata	Tall Speargrass	0-1
**Avena spp*	Oat	0-1
**Bromus* sp.	a Brome	1
*Capsella bursa-pastoris	Shepherd's Purse	2
**Centaurium spp.*	Centaury	0-1
**Cirsium vulgare*	Black or Spear Thistle	0-1
**Conyza spp.*	A Fleabane	0-1
Cynodon dactylon	Couch (seeded var)	0-1

Scientific name	Common name	Abundance
**Dactylis glomerata*	Cocksfoot	1-2
**Echium plantagineum*	Paterson's Curse	0-1
Elymus scaber	Common Wheat Grass	0-1
**Eragrostis curvula*	African Lovegrass	2
**Erodium spp.*	Storksbill	1-2
**Fescue sp.*	Fescue	1-2
Geranium solanderi	Native Geranium	0-1
**Hirschfeldia incana*	Buchan Weed	2-3
**Hypericum perforatum*	St John's Wort	0-1
**Hypochaeris radicata*	Cat's Ear, Flatweed	2
**Lactuca serriola*	Prickly Lettuce	0-1
**Lolium perenne*	Perennial Ryegrass	0-1
**Malva neglecta*	Dwarf Mallow	1
**Phalaris aquatica*	Phalaris	3
**Plantago lanceolata*	Ribwort Plantain	1-3
**Plantago varia*	Variable Plantain	1-2
Poa spp	Poa Tussock	0-1
**Salvia spp.*	Sage	1
**Sanguisorba spp*	Sheep's Burnet	1
**Sonchus spp*	Sow Thistle	0-1
**Stachys spp.*	Lambs ears	0-1
**Taraxacum officionale*	Dandelion	1-3
**Tolpis barbata*	Hawkweed	0-1
**Trifolium spp.*	Clover	1
**Verbena* sp.	Purpletop	1

C2. FAUNA SPECIES LIST

*Introduced species are preceded by an asterisk.

Scientific name	Common name	Observation Method
BIRDS		
**Acridotheres tristis*	Common/Indian Myna	Observed
Anthochaera carunculata	Red Wattlebird	Heard
Cacatua galerita	Sulphur-crested Cockatoo	Heard
Corvus coronoides	Australian Raven	Observed
Cracticus tibicen	Australian Magpie	Observed
Dacelo novaeguineae	Laughing Kookaburra	Observed
Eolophus roseicapillus	Galah	Observed
Grallina cyanoleuca	Magpie-lark	Observed
Malurus cyaneus	Superb Fairy Wren	Observed
Manorina melanocephala	Noisy Miner	Observed
Ocyphaps lophotes	Crested Pigeon	Observed
Platycercus elegans	Crimson Rosella	Observed
Platycercus eximus	Eastern Rosella	Observed
Rhipidura leucophrys	Willy Wagtail	Observed
Strepera graculina	Pied Currawong	Observed/heard
MAMMALS		
Macropus spp.	A macropod	Evidence (scats)
**Oryctolagus cuniculus*	European Rabbit	Evidence (burrows/scats)
Vombatus ursinus	Common Wombat	Evidence (scats)
REPTILES		
Ctenotus robustus	Eastern Striped Skink.	Tile Survey
Lampropholis delicata	Delicate Skink	Tile Survey
Lampropholis guitchenoti	Grass Skink,	Tile Survey
Morethia boulengeri	Boulenger's Skink	Tile Survey
Pseudonaja textilis	Eastern Brown Snake	Tile Survey
Tiliqua scincoides scincoides	Eastern Blue-tongued Lizard	Found beneath rock