Mugga Quarry overburden expansion

Environmental significance assessment

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Mugga Quarry overburden expansion - environmental significance assessment

1. Scope

The area under consideration is shown in Figure 1. A preliminary biodiversity assessment (EMM 2017) found that a threatened vegetation community was present, and that there was potential habitat for a number of threatened species.

The scope of the current project is to:

- conduct detailed field surveys to map vegetation and threatened communities, and to identify threatened fauna and habitats
- carry out targeted searches for threatened species known or likely to occur in the study area (ACT *Nature Conservation Act 2014*, Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*); NC Act (2014)

The results of the above surveys will provide input to:

- proposed amendments to the stockpile locations to avoid and/or minimise impacts to biodiversity constraints
- assessment of the significance at the Commonwealth level for impact on *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland,* to determine if a referral to the Commonwealth government is required
- determining if offsets would be required, based on the final design.

Figure 1. Proposed Mugga Quarry overburden expansion area.

2. Threatened community definitions

2.1 Commonwealth

The EPBC listed threatened community *White Box–Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (BGGW&DG) is described in DEH (2006a).

In order to be included in this ecological community, a patch must be larger than 0.1 ha and have a predominantly native understorey (at least 50% of the perennial vegetation cover in the ground layer is made up of native species), and the current or previously most common overstorey species must be one or more of the eucalypts named above. The definition includes patches with both a native understorey and an overstorey of eucalypts, and those where a native understorey exists but the trees have been cleared. In the absence of an intact overstorey, the original community is inferred from remnant trees, position in the landscape and the adjacent vegetation communities.

Patches with an overstorey of eucalypts but without a substantially native understorey are considered degraded and no longer a viable part of the ecological community, as the native understorey is 'effectively irretrievable'.

The ground layer must meet a further quality condition to be included in the listed community: the ground layer must contain at least 12 native, non-grass understorey species (forbs, shrubs, ferns and sedges), and at least one understorey species should be an 'important species' (e.g. grazing-sensitive, regionally significant or uncommon species; such as Kangaroo Grass or orchids. See list in DEH 2006b). If a patch does not meet this last standard, it may still be in the listed community if it is greater than 2 hectares and contains sufficient mature trees or natural eucalypt regeneration.

2.2 Australian Capital Territory

The similar (but broader) Box-Gum community listed under the ACT *Nature Conservation Act 2014* is Yellow Box *E. melliodora* - Red Gum *E. blakelyi* Grassy Woodland (YBRGGW, as defined in ACT Government 2004). This is an open woodland community in which:

- *E. melliodora* and/or *E. blakelyi* contribute 40% or more of the crown cover, and
    - there is a species-rich understorey of native tussock grasses, herbs and scattered shrubs (understorey is not exotic pasture or 'degraded beyond recovery')

  OR

- *E. melliodora* and/or *E. blakelyi* are likely to have formerly contributed 40% or more of the crown cover but the trees have been removed or reduced, and
    - there is a species-rich native understorey of native tussock grasses, herbaceous species and scattered shrubs.

Excluded from the community are remnants that are substantially or severely modified, though these may provide valuable habitat for fauna. Substantially modified remnants are likely to have little tree regeneration and an understorey containing a low diversity of native species (usually disturbance tolerant native grasses), with a high cover of exotic perennial species and annual exotics (ACT Government 2004).

2. Methods

2.1 Desktop survey

A desktop survey was undertaken to determine threatened species and communities likely to be present on the site. Sources consulted included:

- ACT Government Action Plans for threatened species and communities
- Previous ecological reports on the Mugga Quarry (Crawford 1996, EMM 2017)
- ACTmapi (http://www.actmapi.act.gov.au/), the ACT Government's interactive mapping service, which contains data on species and communities listed under the EPBC and NC Acts
- Canberra Nature Map (http://canberra.naturemapr.org/), a site where the public and ACT government share data on the location and abundance of plants and animals in the Canberra region
- Canberra Ornithologists' Group website and publications
    - http://canberrabirds.org.au/
    - http://bioacoustics.cse.unsw.edu.au/archives/html/canberrabirds/
- eBird (http://ebird.org/content/australia/), an online program which allows data sharing on the presence, absence and abundance of bird species.

2.2 Field survey

The site was visited on 2, 3, 7 and 8 November 2017. The winter and early spring had been dry and the site was heavily grazed by kangaroos and rabbits, but by early November there had been sufficient plant growth for vegetation survey. Vegetation patches were walked over, vegetation types were identified from the ACT list, and a list of species present was made for each vegetation type (Appendix 1).

Recorded vegetation types were assessed against the minimum threshold criteria for the Commonwealth and ACT listed communities. Low condition vegetation was recorded separately from moderate to good condition vegetation, and the zones were mapped using a GPS and aerial photographs.

The site was assessed for its suitability as habitat for a number of threatened species which are known to occur in local Yellow Box – Red Gum Grassy Woodland (Table 1). Three 2 hectare/20 minute bird surveys were carried out on 3 and 7 November, and a bird list was kept during other field work.

The survey method for assessing moderate to high condition vegetation was that used for the ACT Environmental Offsets Calculator (ACT Government 2016), which allows the site value to be assessed

for each vegetation zone by measuring condition attributes in two 20 x 20 metre quadrats and 50 metre transects (Figure 2).

3. Results

3.1 Desktop survey

Most of the area covered by the Mugga Quarry extension proposal is broadly mapped as YBRGGW, with a small area on the northern boundary also mapped as BGGW&DG (ACT Government 2004, ACTmapi).

Recent records of Spotted-tail Quolls are very uncommon in the ACT, and are generally from large areas of forested habitat with a complex understorey west of the city (ACT Government 2005). A 2010 record from Charnwood was described by an ACT government land manager as rare for the urban area (http://www.abc.net.au/news/2010-02-17/quoll-spotted-in-canberra/334656).

There is usually a camp of hundreds to thousands of Grey-headed Flying-foxes in Commonwealth Park on the northern edge of Lake Burley Griffin, where breeding and overwintering sometimes occur. Highest numbers have been recorded in dry years, and most observations of flying and feeding animals are from the suburban areas of Canberra, where they feed in gardens and parks (personal observations, COG chatline archive). This camp is not currently identified as one of the 43 nationally important camps (defined as camps that have contained ≥ 10,000 grey-headed flying-foxes in more than one year in the last 10 years, or have been occupied by more than 2,500 animals permanently or seasonally every year for the last 10 years) (Dept of Environment, 2015).

The Little Eagle is known to nest in several places in the ACT. The closest recently occupied nest site to Mugga Quarry is west of Kambah (Olsen *et al*., 2016), and single birds or pairs have recently been seen nearby at Callum Brae Nature Reserve, Mt Mugga Mugga, Symonston, Red Hill and Isaacs (eBird, Canberra Nature Map, Michael Mulvaney pers. comm. 2017).

Crawford (1996) recorded two Brown Treecreepers at Mugga Quarry, and the most recent nearby records are from Mt Mugga Mugga in 2000, Callum Brae Nature Reserve in 2002/2007 (eBird, Canberra Nature Map) and West Jerrabomberra Nature Reserve in 2005/2007 (Canberra Nature Map). The two nature reserves have had quarterly COG bird surveys for the past ten years or more, and Callum Brae is visited often by other birdwatchers.

Hooded Robins have disappeared from woodlands on the fringes of Canberra, and are now restricted to larger woodland remnants. The nearest most recent record of the species was a single bird in 2012, 10 km north-west of Mugga Quarry (eBird).

There are numerous records of Varied Sittellas from the adjacent Callum Brae Nature Reserve between 2002 and 2017 (eBird, Canberra Nature Map).

The Painted Honeyeater is an occasional migrant to the ACT, and is associated with dense populations of mistletoes in woodland and forest (ACT Government 2004). The most recent records have been from Mt Ainslie in 2002 and the Murrumbidgee Corridor in 2013/14 (eBird). The Regent Honeyeater is now also rarely recorded in the ACT, with the most recent records in the district being single birds at Coolemon Ridge Nature Reserve in 2008 and Jerrabomberra Wetlands Reserve in 2015 (eBird, ACT Government 2004).

Superb Parrots are sparsely distributed in the ACT during the breeding season, when they nest in hollows in large eucalypts (ACT Government 2004). There are records of small numbers in the Callum Brae Nature Reserve in 2016 and 2017, and in Garran and Red Hill to the north from 2015 to 2017 (eBird, Canberra Nature Map).

Swift Parrots nest in Tasmania, and are occasionally seen feeding in eucalypts in the ACT in autumn and winter, probably during their northern migration (ACT Government 2004). There have been occasional sightings of the species in the last five years in the suburbs to the west and north-west of Mugga Quarry (Torrens, Mawson, O'Malley, Garran), but none in the nearby woodlands (eBird, Canberra Nature Map).

The White-winged Triller is an uncommon, breeding, summer migrant to the ACT, numbers vary from year to year, and they are most often recorded in woodlands outside the city area (ACT Government 2004). There are several records from the last five years from Callum Brae Nature Reserve, West Jerrabomberra Nature Reserve and on Mugga Lane adjacent to the Mugga Quarry, including some in November and December 2017 (eBird, Canberra Nature Map).

There are records of Pink-tailed Worm-lizard within 2 km of Mugga Quarry at Mt Mugga Mugga and Isaacs Ridge (ACTmapi, Canberra Nature Map).

Searches for threatened flora records on ACTmapi, Canberra Nature Map and in ACT threatened species Action Plans showed occurrences of Hoary Sunray within 1-2 km north, east and west of the site at Callum Brae Nature Reserve and Isaacs Ridge; and Small Purple-pea 3 km to the south on Long Gully Road. Button Wrinklewort populations occur further away at Red Hill and Jerrabomberra East Nature Reserves. The two threatened orchid species occur in high quality vegetation in very restricted areas further away at Hall and Majura ACT (ACT Government 2004, Frawley 2010).

Table 1. Threatened species and vegetation communities potentially present at site.

Threatened species	**Common name**	**Conservation status**	
		EPBC Act 1999	**NC Act 2014**
Dasyurus maculatus	Spotted-tailed Quoll	Endangered	Vulnerable
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	
Anthochaera phrygia	Regent Honeyeater	Critically endangered	Endangered
Climacteris picumnus	Brown Treecreeper		Vulnerable
Daphoenositta chrysoptera	Varied Sittella		Vulnerable
Grantiella picta	Painted Honeyeater	Vulnerable	Vulnerable
Hieraaetus morphnoides	Little Eagle		Vulnerable
Lalage sueurii	White-winged Triller		Vulnerable
Lathamus discolor	Swift Parrot	Critically endangered	Vulnerable
Melanodryas cucullata	Hooded Robin		Vulnerable
Petroica boodang	Scarlet Robin		Vulnerable
Polytelis swainsonii	Superb Parrot	Vulnerable	Vulnerable
Aprasia parapulchella	Pink-tailed Worm-lizard	Vulnerable	Vulnerable
Perunga ochracea	Perunga Grasshopper		Vulnerable
Arachnorchis (Caladenia)	Canberra Spider Orchid	Critically	Endangered

actensis		endangered	
Leucochrysum albicans	Hoary Sunray	Endangered	
Prasophyllum petilum	Tarengo Leek Orchid	Endangered	Endangered
Swainsona recta	Small Purple-pea	Endangered	Endangered
Rutidosis leptorrhynchoides	Button Wrinklewort	Endangered	Endangered
Threatened vegetation communities			
White Box–Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland (BGGW&DG)		Critically endangered	
Yellow Box-Red Gum Grassy Woodland (YBRGGW)			Endangered

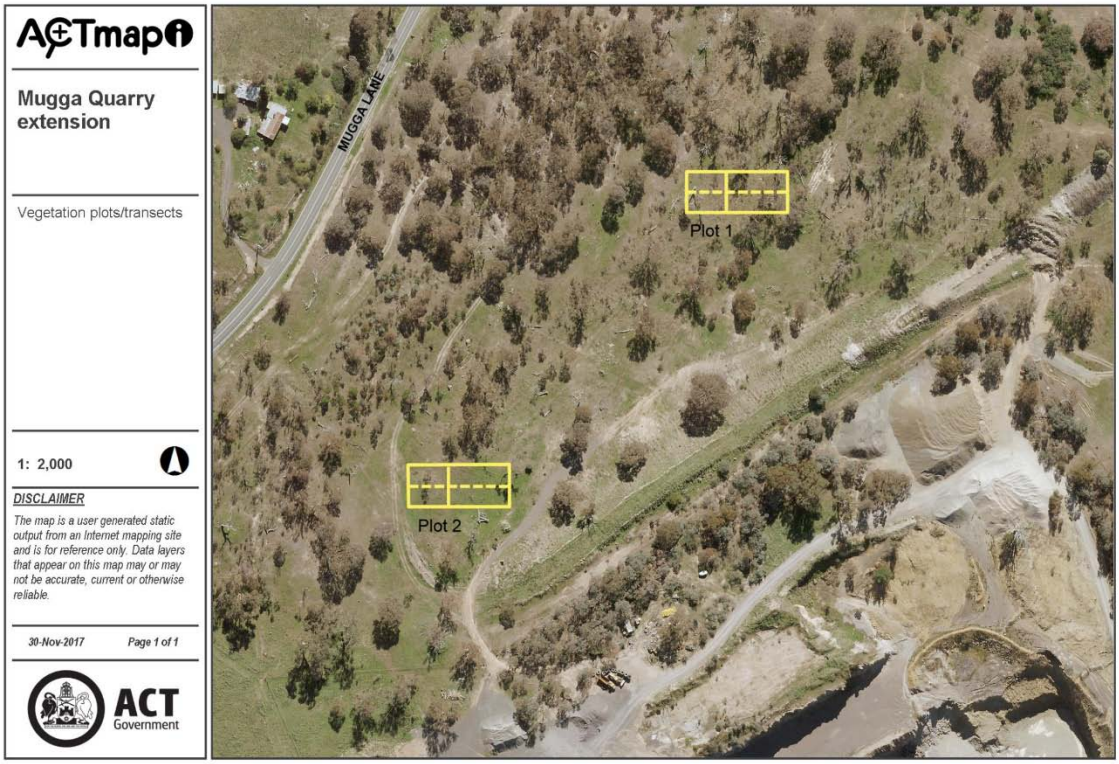

Figure 2. Location of vegetation assessment plots.

3.1 Vegetation condition

The site showed various degrees of vegetation clearing and disturbance, mostly associated with the former layout of fences. Some old trees were present (diameter 1.3-1.8 metres), and some contained hollows suitable for native birds and mammals. Some of these are shown in Figure 3, but this is not a complete survey. Most of the other eucalypts most appeared to be less than 50 years old and much of the regeneration was quite recent, probably occurring since grazing was removed. Exotic species including Ryegrass, Phalaris and Subterranean Clover occurred across the site, reflecting previous pasture improvement and stock grazing.

Although there were many native species present in parts of the understorey, there were few grazing-sensitive species (few lilies and daisies, no native orchids or legumes etc). No threatened plant species were found, and their absence in the survey and the condition of the vegetation suggested that none are likely to be present on the site. Native shrubs were also rare, and most of the mid-storey native species were in two fenced plantations. Planted species have been excluded from the species list, except where they have spread outside the plantations (Appendix 1).

Logs and fallen branches were common, and it is likely that the quarry warning signs on the roadside fence have inhibited public firewood collection (Photograph 1).

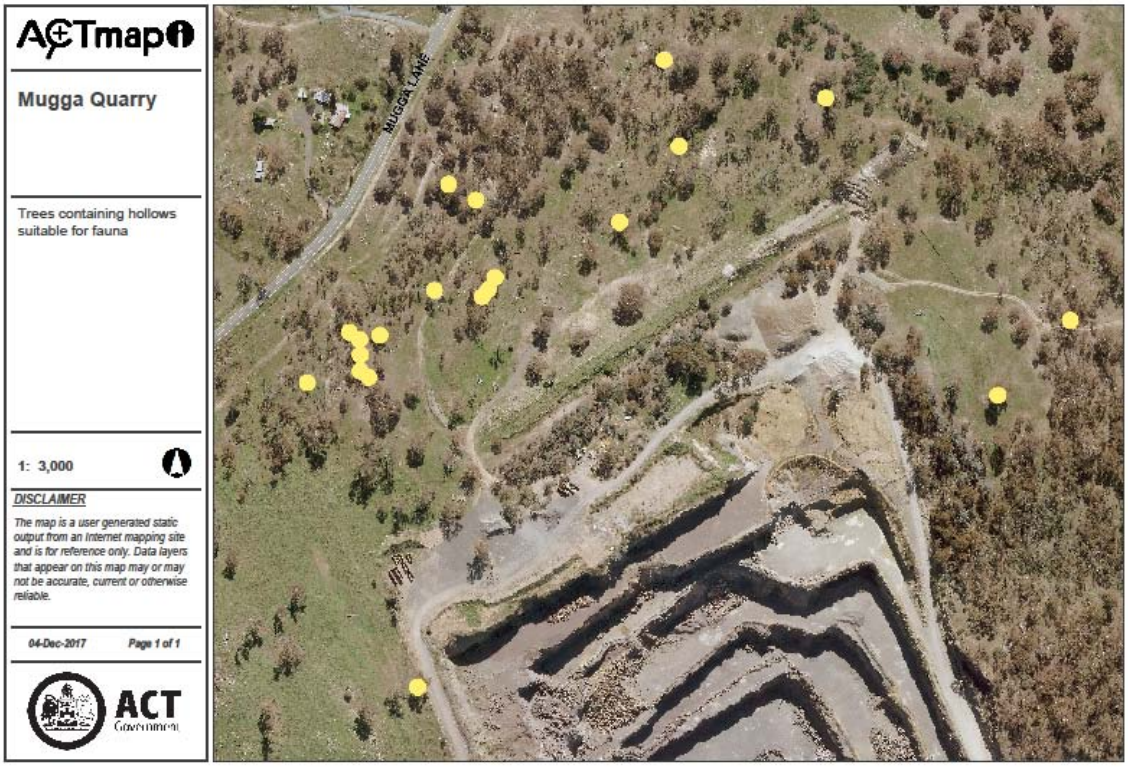

Figure 3. Location of hollow-bearing trees.

Photograph 1. Low to moderate condition woodland, with Yellow Box, Red Gum, regeneration, diverse native-dominated ground layer, logs and stag.

3.2 Vegetation mapping

Vegetation communities found on the site were the threatened White Box–Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland (BGGW&DG, EPBC Act) and Yellow Box *E. melliodora* - Red Gum *E. blakelyi* Grassy Woodland (YBRGGW/ACT16, NC Act), and *E. macrorhyncha* Tableland Grass/Shrub Forest (ACT 25) (Figure 4, Table 2, Appendix 1).

Table 2. Vegetation communities at the site

Vegetation community	**Area (ha)**	**Comments**
BGGW&DG and YBRG, moderate condition	2.50	Some overstorey regeneration, moderately diverse native-dominated understorey.
BGGW&DG and YBRG, low condition	6.24	Less overstorey regeneration, low diversity in native-dominated understorey.
Former BGGW&DG and YBRGGW, very low condition	3.24	Few mature trees, no tree regeneration, ground layer with a few native grasses, very few native forbs, and many exotic species.
Eucalyptus macrorhyncha Tableland Grass/Shrub Forest	2.84	Dominated by *E. rossii*.
Cleared	1.97	Non-native understorey. Contains three isolated Red Box (*E. polyanthemos*) trees
Total	**16.79**	

Plot and Transect 1 were in an area of woodland in moderate condition which met the threshold criteria for both threatened communities, with mature trees and mixed-age overstorey regeneration (Figures 2, 4). The 20 x 20 m quadrat had a native-dominated ground layer with 20 native species, including 15 forbs, of which five were 'important species'.

Plot and Transect 2 were in lower condition woodland, but still met the criteria for the threatened communities (Photographs 1 and 2, Appendix 1). The site values for these plots are summarised in Table 3, using the format from the ACT Environmental Offsets Calculator (ACT Government 2016).

Table 3. Site values from transects and plots

Parameter	Plot 1	Plot 2
Native plant species richness in 20x20m plot	22	16
Number of large trees in 20x50m plot	4	0
Overstorey regeneration in whole zone	RG+YB	RG
Total length of fallen logs in 20x50m plot	49	2
Native overstorey cover in 50 metre transect	13	0
Native mid-storey cover in 50 metre transect	2	0
Native groundcover (grasses) in 50 metre transect	20	23
Native groundcover (shrubs) in 50 metre transect	14	0
Native groundcover (other) in 50 metre transect	32	2
Exotic plant cover in 50 metre transect	22	19

A 3.24 ha area in the south-west of the site was not considered to meet the minimum threshold for either threatened community, and matched the definition of 'substantially modified lowland woodland' (ACT Government 2004). Such woodlands have low native species diversity without the seed store that would allow regeneration, reduced ecological function, and limited resilience to weeds and other disturbance, and their ground layer is considered to be 'degraded beyond recovery' (ACT Government 2004). In this south-western area, few mature trees remained, there was no eucalypt regeneration, and the understorey showed evidence of previous pasture improvement and possibly ploughing. Thirteen native understorey species were found in the whole area. These were disturbance-tolerant native grasses and forbs, with almost all of the native cover provided by two or three species of grasses, and most of the native forbs being present in very low numbers. There were 40 annual and perennial exotic species in the ground layer, and bare ground was extensive (Photograph 3). It is possible (but was difficult to determine) that native grasses constituted more than 50% of the *perennial* vegetation in this area, as much of the exotic vegetation was annual. However, live and dead exotic annual vegetation constituted over 60% of the vegetation in the ground layer, and given the very low native species diversity and the extent of bare ground, the area is considered to be beyond recovery (Photograph 3).

A 1.97 ha area on the southern boundary of the site did not contain any native groundcover vegetation. The area contained three isolated Red Box trees.

Photograph 2. Low to moderate condition woodland, with Red Gum, Red Box, some regeneration, fallen branches and diverse native-dominated ground layer.

Photograph 3. Degraded former woodland community, with few native species in the weedy ground layer.

Figure 4. Vegetation communities.

Red = moderate quality Box-Gum woodland (EPBC and NC Act threatened communities)

Orange = low quality Box-Gum woodland (EPBC and NC Act threatened communities)

Mugga Quarry overburden expansion – Environmental Significance Assessment. Rowell, 2017.

Yellow = very low quality Box-Gum woodland (not EPBC or NC Act threatened community due to degraded understorey)

Mauve = local and non-local plantings of native trees and shrubs over mainly native understorey (included in above categories)

Green = Tableland Grass/Shrub Forest, dominated by *E. rossii*.

Not mapped = cleared area containing isolated Red Box trees.

Black boundary is extent of community, boundaries matching polygon colour are extent of current survey.

3.3 Fauna records and habitat

There were occasional minor outcrops of rock on the site. These were mostly in woodland, separated by over 100 metres, and had few or none of the separate shallowly-embedded rocks usually associated with the Pink-tailed Worm-lizard. This may be due to past removal of rocks when the site was grazed by stock, and/or due to commercial or private collecting of rocks for landscaping.

Thirty-two species of native birds were recorded on the site (Table 4). This included a pair of White-winged Trillers (vulnerable in the ACT), which were probably nesting on the site. Other species seen which are usually associated with large areas of intact woodland habitat included Brown Goshawk, Dusky Woodswallow, Grey Butcherbird, Horsfield's Bronze-cuckoo, Leaden Flycatcher, Sacred Kingfisher, White-throated Gerygone, White-throated Treecreeper and Tree Martin. The Leaden Flycatchers were nesting in a Red Gum, and a Sulphur-crested Cockatoo was seen attending a large nest hollow in another Red Gum.

Two Wedge-tailed Eagles were present on each day of the survey, flying over the site or resting in one of two mature Yellow Box trees which contained large nests. These nest trees can be seen at the south-easternmost point of the survey of the low quality vegetation in the western paddock, one just inside the paddock fence and the other across the perimeter road in the quarry area itself (Figure 4).

Little Eagles were not observed on the site, despite recent records in the vicinity. The high population of rabbits on the site would represent a desirable food source for Little Eagles, but it is likely that the Wedge-tailed Eagles which have been nesting on the site for many years (Boral site manager, pers. comm.) would keep Little Eagles away.

The Perunga Grasshopper was not observed on the site. These grasshoppers are difficult to detect, and even targeted surveys in areas where they are known to occur are often unsuccessful as they tend to 'freeze' when disturbed, or to jump once and then burrow into a tussock. They are sometimes found during close searching of the ground layer in vegetation quadrats and transects. The species mostly occurs in Natural Temperate Grassland, but is also sometimes found in disturbed grassland and in woodland. It is considered unlikely to be present, as it was not detected during the quadrat and transect surveys, the woodland is moderately disturbed, and the site is well-separated from the preferred habitat of NTG.

Table 4. Bird species observed at Mugga Quarry site, November 2017.

Common name	**Comments**
Australian Kestrel	Four birds seen
Australian Magpie	Common on site
Australian Raven	Common on site
Black-faced Cuckoo-shrike	
Brown Falcon	
Brown Goshawk	One immature bird
Brown-headed Honeyeater	Single bird feeding in mistletoe
Buff-rumped Thornbill	
*Common Mynah	Common on site
*Common Starling	Common on site
Crested Pigeon	
Crimson Rosella	Common on site
Dusky Woodswallow	In same area each day, probably nesting
Eastern Rosella	Common on site
Galah	Common on site
Grey Butcherbird	
Grey Fantail	
Horsfield's Bronze-cuckoo	
Leaden Flycatcher	Nesting
Magpie-lark	
Noisy Friarbird	
Noisy Miner	
Pied Currawong	
Red-browed Firetail	
Rufous Whistler	
Sacred Kingfisher	

Striated Pardalote	
Sulphur-crested Cockatoo	Common on site. One seen at nest hollow
Superb Fairy-wren	
Tree Martin	
Wedge-tailed Eagle	Two adult birds, often near two nest trees.
Weebill	
Welcome Swallow	
White-throated Gerygone	
White-throated Treecreeper	
White-winged Chough	
White-winged Triller	Vulnerable in the ACT. In same area each day, probably nesting.
Willie Wagtail	
Yellow-faced Honeyeater	
Yellow-rumped Thornbill	

*introduced species

4. Conclusions

- the Mugga Quarry overburden extension area contains 8.74 ha of low to moderate quality White Box–Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland (BGGW&DG) and Yellow Box-Red Gum Grassy Woodland (YBRGGW), 3.24 ha of very low condition woodland which is not considered to meet the criteria for the threatened communities, 2.84 ha of *E. macrorhyncha* Tableland Grass/Shrub Forest (dominated by *E. rossii*) in moderate condition and 1.97 ha of cleared area containing isolated Red Box trees.

- The site is too disturbed and too far from known recent records to represent habitat for the Spotted-tailed Quoll, and does not contain enough large eucalypts to provide significant feeding habitat for Grey-headed Flying-foxes or Swift Parrots.

- The woodland is of sufficient quality, size and connectivity to provide potential feeding habitat and/or nest sites for several of the threatened bird species in Table 1. Those considered likely to occur at the site, (based on quality and quantity of habitat and locations of recent records) are White-winged Triller, Varied Sittella, Scarlet Robin and Superb Parrot.

- Hollow-bearing trees on the site contain shelter and breeding sites for a number of native mammals and birds. If these trees are to be removed, it should be done outside the spring-summer breeding period, and occupancy of hollows should first be checked by an ecologist.

- There is no (or very little) habitat for the Pink-tailed Worm-lizard in the overburden extension area, due to the paucity of suitable surface rocks.

- The Perunga Grasshopper was not recorded but there is some potential habitat in open woodland and clearings dominated by native grasses. The species is considered unlikely to be present, as the vegetation is moderately to highly disturbed and well-separated from the preferred habitat of Natural Temperate Grassland.

- Extension of the Mugga Quarry overburden area would result in some loss and fragmentation of threatened Box-Gum communities and habitat for at least four species of birds and one grasshopper listed as vulnerable in the ACT, and one bird listed as nationally vulnerable.

5. References

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Dr Michael Mulvaney, pers. comm. November 2017. Conservation Planning and Research, Natural Policy Branch, Environment and Sustainable Development, ACT Government.

Online resources:

ACTmapi (http://www.actmapi.act.gov.au/)

Canberra Nature Map (http://canberra.naturemapr.org/)

Canberra Ornithologists' Group website and publications

http://canberrabirds.org.au/

http://bioacoustics.cse.unsw.edu.au/archives/html/canberrabirds/

eBird (http://ebird.org/content/australia/)

Appendix 1. Plant species recorded in the vegetation communities at Mugga Quarry.

Species **(P = present)** **('important species', EPBC list)**	**EECs - low to moderate condition**	**Very low condition Box-Gum woodland**	**Tableland dry shrubby woodland**
Native grasses			
Aristida ramosa	P	P	P
Austrostipa bigeniculata	P	P	
Austrostipa scabra	P	P	
Bothriochloa macra	P	P	
Chloris truncata	P		
Elymus scaber	P		
Microlaena stipoides	P	P	
Panicum effusum	P	P	
Rytidosperma carphoides	P		
Rytidosperma pallidum			P
Rytidosperma sp.	P	P	P
Native forbs			
Acaena ovina	P		
Calotis lappulacea	P		
Carex appressa			
Carex inversa		P	
Chamaesyce drummondii	P	P	
Cheilanthes sieberi	P		P
Chrysocephalum apiculatum	P		
Chrysocephalum semipapposum	P		P
Convolvulus erubescens	P	P	
Crassula sieberiana	P		

Cymbonotus lawsonianus	P		
Daucus glochidiatus	P		
Einadia nutans	P		P
Erodium crinitum	P		
Euchiton sp.	P		
Geranium solanderi	P	P	
Gonocarpus tetragynus	P		
Goodenia hederacea	P		P
Haloragis heterophylla	P		
Hydrocotyle laxiflora	P		P
Hypericum gramineum	P		
Juncus australis	P		
Juncus filicaulis	P		
Juncus subsecundus	P		
Lomandra bracteata	P		
Lomandra coriacea	P		
Lomandra filiformis	P		
Lomandra multiflora	P		P

Species **(P = present)** **('important species', EPBC list)**	**EECs - low to moderate condition**	**Very low condition Box-Gum woodland**	**Tableland dry shrubby woodland**
Oxalis perennans	P		
Rumex brownii	P	P	
Schoenus apogon	P		
Senecio quadridentatus	P		P
Solenogyne dominii	P		
Tricoryne elatior	P		
Triptilodiscus pygmaeus	P		
Vittadinia cuneata	P	P	
Vittadinia muelleri	P		
Vittadinia gracilis	P		
Wahlenbergia communis	P		P
Wahlenbergia stricta			P
Xerochrysum viscosum	P		P
Native trees and shrubs			
Acacia baileyana	P		P
Acacia dealbata	P		P
Acacia decurrens	P		P
Acacia implexa	P		P
Amyema pendulum	P		
Brachychiton populneum		P	
Cassinia quinquefaria	P		P
Eucalyptus blakelyi	P		P
Eucalyptus bridgesiana	P	P	P
Eucalyptus dives	P		

Eucalyptus melliodora	P	P	
Eucalyptus polyanthemos	P		P
Eucalyptus rossii	P		P
Rubus parvifolius	P	P	P
Solanum cinereum		P	
Exotic grasses			
Aira sp.	P	P	
Briza maxima		P	
Briza minor	P		
Bromus hordeaceus	P	P	
Hordeum sp.		P	
Lolium rigidum		P	
Nassella trichotoma	P	P	
Paspalum dilatatum	P		
Phalaris aquatica	P	P	
Vulpia sp.	P	P	

Species **(P = present)**	**EECs - low to moderate condition**	**Very low condition Box-Gum woodland**	**Tableland dry shrubby woodland**
Exotic forbs			
Acetosella vulgaris	P	P	
Anagallis arvensis	P		
Arctotheca calendula	P	P	
Carduus tenuiflorus		P	
Carthamus lanatus	P	P	
Centaurium erythraea	P	P	
Conyza bonariensis	P	P	
Cotula sp.	P		
Cyperus eragrostis	P	P	
Echium plantagineum	P	P	
Echium vulgare		P	
Erodium cicutarium	P	P	
Foeniculum vulgare		P	
Fumaria muralis		P	
Galium aparine		P	
Hirschfeldia incana	P		
Hypericum perforatum	P	P	P
Hypochaeris glabra	P	P	
Hypochaeris radicata	P		
Malva parviflora		P	
Marrubium vulgare		P	
Modiola caroliniana		P	
Onopordum acanthium	P	P	

Oxalis sp.	P		
Parentucellia latifolia	P		
Paronychia brasiliana	P	P	
Petrorhagia nanteuilii	P		
Plantago lanceolata	P	P	
Salvia verbenaca	P	P	
Solanum nigrum		P	
Trifolium angustifolium		P	
Trifolium arvense	P		
Trifolium dubium	P	P	
Trifolium campestre		P	
Trifolium subterraneum	P	P	
Verbascum thapsus		P	
Verbascum virgatum	P		
Exotic shrubs and trees			
Celtis australis	P	P	
Chamaecytisus palmensis	P		
Sorbus domestica		P	
Rosa rubiginosa	P	P	
Rubus fruticosus	P	P	