

Appendix 9

Ecology Assessment

(Total No. of pages including blank pages = 58)

(Note: A colour version of this Appendix is available on the Project CD)

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22 May 2015

Mitchell Bland

RW Corkery & Co Pty. Ltd

62 Hill Street,

ORANGE NSW 2800

Re: Proposed modification to consent – Dargues Gold Mine, Majors Creek, NSW.

Dear Mitchell,

Thank you for engaging **EnviroKey** to carry out an assessment of the potential impacts to terrestrial biodiversity and their habitats as a result of the proposed modification (Modification 3) to the Dargues Gold Mine, Majors Creek NSW.

Background

The NSW Office of Environment & Heritage (OEH) recently provided comment to the NSW Department of Planning & Environment (DOC15/76761) with regard to Modification 3. Concerns raised by OEH that will be addressed by this letter report are:

- Whether the regenerating wattle community corresponds to the Tablelands Basalt Forest endangered ecological community (EEC).
- Whether additional species should be considered in the assessment of impacts.
- Potential cumulative impacts associated with the original approval and modification.

Concerns relating to the use of cyanide, the operation of the tailings storage facility and aquatic impacts to Spring Creek are beyond the scope of this letter report.

This letter report contains the results of this assessment which has adequately considered the biodiversity within the study area by:

- Adequately conducting a desktop review to consider known and potentially occurring terrestrial threatened biota within the locality.

Envirokey Pty. Ltd
PO Box 7231 Tathra NSW 2550 t 02 6494 5422
www.envirokey.com.au info@envirokey.com.au

ABN 35150812570

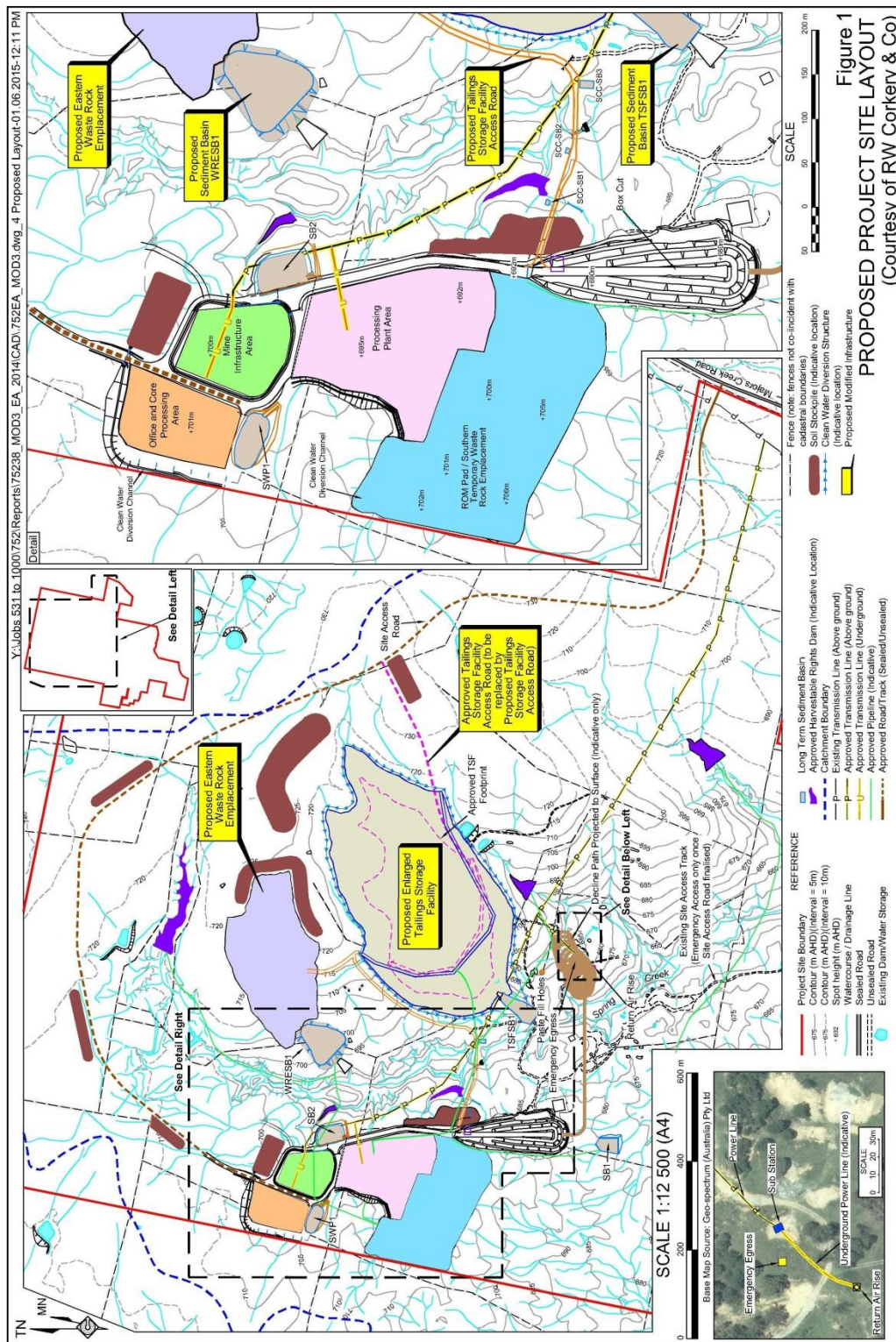


- Relying on the previously prepared Ecology Assessment and Land & Environment Court proceedings in relation to the Project Site.
- Adopting the precautionary principle in the assessment of impact.
- Providing appropriate recommendations to mitigate potential impacts to an acceptable level.

Overview of the proposed modification

The Proposed Modification would include the following components or activities (Figure 1).

- An amendment to the Project Site to accommodate the recently purchased "Slings" property.
- A minor increase to the total resource to be extracted and associated extension of the life of the mine.
- Construction and use of the Eastern Waste Rock Emplacement.
- Construction and use of a vehicle crossing over Spring Creek to permit direct access between the box cut and the Tailings Storage Facility and proposed Western Waste Rock Emplacement.
- Final processing of gold concentrate on site to produce gold doré or unrefined gold bars using a conventional carbon-in-leach (CIL) processing plant.
- Construction of an enlarged Tailings Storage Facility to permit storage of additional tailings that would be produced as a result of the additional ore to be processed and the on-site final processing of gold concentrate.
- A range of minor adjustments to the conditions of MP10_0054 to further clarify the intent of the conditions.





Field survey

EnviroKey have a good understanding of the biodiversity of the study area. While no specific flora and fauna surveys have been conducted implicitly to inform this letter report, EnviroKey have conducted flora and fauna monitoring across the Project Site in accordance with the Biodiversity Management Plan (BMP) since Autumn 2014. The results of this monitoring can be viewed online at <http://www.unitymining.com.au/wp-content/uploads/2013/09/2015-DGM-Flora-and-Fauna-Monitoring.pdf>. Data collected during the flora and fauna monitoring as well the data contained within Gaia (2010), were considered in the preparation in this letter report.

Desktop review

A desktop analysis of threatened and migratory biota was completed to source information on threatened and migratory biota that might use the resources of the study area. Information was sought from the BioNET - the Atlas of NSW Wildlife (which includes flora) for records of threatened flora and fauna recorded within a five kilometre radius of the Project Site (OEH 2015a). Similarly, information on threatened and migratory species listed under the EPBC Act that could occur in the locality was sourced using the Protected Matters Search Tool by applying a five kilometre buffer around the Project Site (DotE 2015). Combined, this desktop review identified existing records for 9 species of flora, 21 threatened species of fauna, 10 migratory species of fauna and five threatened ecological communities (Table 3). An additional species, Majors Leek Orchid is added to Table 3 as it was an omission from the records of OEH despite being known from the locality.

In a locality context, data interrogation of the South Coast Integration Vegetation Index (SCIVI) (Tozer *et al.* 2006) was completed across a five kilometre buffer to gain an appreciation of the extant of vegetation communities (Table 1) as a surrogate for fauna habitat (Table 2) in the wider landscape.

Table 1: Extent of vegetation communities according to SCIVI within the locality.

Vegetation Community	Area (hectares)
Cleared	5615.24
Temperate Dry Rainforest	4.14
Tableland Swamp Meadow	4.64



Tableland Ridge Forest	99.97
Southern Tableland Flats Forest	515.57
Frost Hollow Grassy Woodland	671.76
Southern Range Wet Forest	3.37
Braidwood Dry Forest	77.44
Mountain Wet Fern Forest	140.55
Clyde-Deua Ridgetop Forest	1.93
Grey Myrtle Dry Rainforest	17.00
Tableland Flats Grassland	210.56
Araluen Scarp Grassy Forest	515.60

Table 2: Extent of fauna habitats based on using the SCIVI data as a surrogate within the locality.

Fauna Habitat	Area (hectares)
Cleared	5615.24
Rainforest	21.14
Forest	1354.42
Woodland	671.76
Grassland	215.20

Of relevance to this assessment, community 4 Regenerating Wattles was described in Gaia (2010) as containing patches of Black Wattle and Blackwood up to 5m high and often containing Broom and/or Blackberry in the shrub layer and exotic grasses, such as Rye Grass in the groundcover. This community is restricted to areas of prior agricultural disturbance.

Community 7 Native-dominated Pasture covers the majority of the Project Site and was described in RWC (2010) as being of low-diversity and forming a continuum with Community 6 – Native Grassland and Community 8 – Exotic-dominated pasture. This community has previously been the subject of extensive grazing and agriculture, including application of phosphorus-based fertiliser.



In order to characterise the potential to impact on threatened and migratory biota as a result of the proposed modification, an evaluation of the likelihood of occurrence within the vicinity of the Project Site was conducted with consideration of the following factors:

- The presence of potential habitat.
- Condition of and approximate extent of potential habitat.
- Species occurrence within study area and wider locality.
- Knowledge and experience of the Principal Ecologist.

The following criteria are applied to each entity to determine the likelihood of threatened and migratory biota occurrence:

- No (no suitable habitat present and the species not previously recorded within the locality; or in the case of flora, Project Site previous surveyed and species not present).
- Unlikely (no suitable habitat is present, species has limited dispersal capability but previously recorded within the locality).
- Possible (suitable habitat present and the species known from the locality; or no suitable habitat present but the species is regarded as highly nomadic or has a high dispersal capability).
- Yes (known to occur within the vicinity of the Project Site).

Legend for Table 3

V = Vulnerable

E = Endangered

CE = Critically Endangered

M = Migratory

POP = Endangered Population

TSC = NSW *Threatened Species Conservation Act 1995*

EPBC = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

FM = NSW *Fisheries Management Act 1994*

Table 3: Assessment of the known or predicted threatened and migratory biota known from the locality and their likelihood of occurrence within the study area.

Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
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AMPHIBIANS



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
Giant Burrowing Frog <i>Heleioporus australiacus</i> V TSC V EPBC	The Giant Burrowing Frog is distributed in south eastern NSW and Victoria, and appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. In these areas, it is found in heath and forest on a variety of soil types except those that are clay based and required 2 nd or 3 rd order stream for breeding purposes.	No	No	No
Heath Frog <i>Litoria littlejohni</i> V TSC V EPBC	This species breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation, and hunts for invertebrate prey either in shrubs or on the ground.	No	No	Unlikely
Stuttering Frog <i>Mixophyes balbus</i> E TSC V EPBC	Stuttering Frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. Considered to have disappeared from Victoria and to have undergone considerable range contraction in NSW, particularly in south-east NSW. Found in rainforest and wet, tall open forest in the foothills and escarpment	No	No	No



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
	on the eastern side of the Great Dividing Range.			
REPTILES				
Broad-headed Snake <i>Hoplocephalus bungaroides</i> E TSC V EPBC	The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney.	No	No	No
MICROCHIROPTERAN BATS				
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i> V TSC	Prefers moist habitats, with trees taller than 20m. Generally roosting in eucalypt hollows, but has also been found under loose bark on trees and buildings.	Yes	Yes	Yes
Eastern Bentwing-bat <i>Miniopterus orianae oceanensis</i> V TSC	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	No	Yes	Possible
BIRDS				
Fork-tailed Swift <i>Apus pacificus</i> M EPBC	Mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea.	No	No	No
Great Egret <i>Ardea alba</i> M EPBC	Great Egrets prefer shallow water, particularly when flowing, but may be seen on any watered area.	No	No	No
Cattle Egret <i>Ardea ibis</i>	The Cattle Egret is found in grasslands, woodlands and wetlands, and is not common	No	No	Possible



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
M EPBC	in arid areas. It also uses pastures and croplands, especially where drainage is poor. It will also forage at garbage dumps, and is often seen with cattle and other stock.			
Australasian Bittern <i>Botaurus poiciloptilus</i> V TSC E EPBC	Favours permanent freshwater wetlands with tall, dense vegetation, particularly 9mergent9 (Typha spp.) and spikerushes (Eleocharis spp.).	No	No	No
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i> V TSC	In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas.	Yes	Yes	Yes
Speckled Warbler <i>Chthonicola sagittata</i> V TSC	The Speckled Warbler lives in a wide range of <i>Eucalyptus</i> dominated communities that have a grassy understorey, often on rocky ridges or in gullies.	No	Yes	Possible
Varied Sittella <i>Daphoenositta chrysoptera</i> V TSC	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. They inhabit eucalypt woodlands and prefer rough-barked trees and mature trees with hollows or dead branches.	Yes (by EnviroKey)	Yes	Yes
Latham's Snipe <i>Gallinago hardwickii</i>	Latham's Snipe are seen in small groups or singly in	No	Yes	Possible



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
M EPBC	freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture.			
White-bellied Sea-eagle <i>Haliaeetus leucogaster</i> M EPBC	The species is normally seen perched high in a tree, or soaring over waterways and adjacent land, particularly along coastlines, lakes and rivers.	No	No	No
Eastern Osprey <i>Pandion cristatus</i> V TSC M EPBC	A large, water-dependent bird of prey, distinctive in flight and when perched. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes.	No	No	No
Rainbow Bee-eater <i>Merops ornatus</i> M EPBC	It is most often found in open forests, woodlands and shrublands, and cleared areas, usually near water. It will be found on farmland with remnant vegetation and in orchards and vineyards. It will use disturbed sites such as quarries, cuttings and mines to build its nesting tunnels.	No	No	No
Black-faced Monarch <i>Monarcha melanopsis</i> M EPBC	They are found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating	No	Yes	Unlikely
Satin Flycatcher	The Satin Flycatcher is found	No	Yes	Unlikely



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
<i>Myiagra cyanoleuca</i> M EPBC	in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests.			
Scarlet Robin <i>Petroica boodang</i> V TSC	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	Yes by Gaia	Yes	Yes
Flame Robin <i>Petroica phoenicea</i> V TSC	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys.	Yes by Gaia	Yes	Yes
Rufous Fantail <i>Rhipidura rufifrons</i> M EPBC	A rainforest and wet sclerophyll inhabitant.	No	No	No
Australian Painted Snipe <i>Rostratula australis</i> E TSC V EPBC	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	No	No	No
Painted Snipe <i>Rostratula benghalensis s. Lat</i> M EPBC	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	No	No	No
Diamond Firetail <i>Stagonopleura guttata</i> V TSC	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum <i>Eucalyptus pauciflora</i>	No	Yes, at Majors Creek by EnviroKey	Possible



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
	Woodlands.			
Regent Honeyeater <i>Anthochaera phrygia</i> CE TSC E EPBC M EPBC	Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	No	No	No
Swift Parrot <i>Lathamus discolor</i> E TSC E EPBC	Favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i> , Spotted Gum <i>Corymbia maculata</i> , Red Bloodwood <i>C. gummifera</i> , Mugga Ironbark <i>E. sideroxylon</i> , and White Box <i>E. albens</i> .	No	No	No

MAMMALS

Spotted-tailed Quoll <i>Dasyurus maculatus</i> V TSC E EPBC	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Yes, by Gaia	Yes	Yes
Koala <i>Phascolarctos cinereus</i> V TSC V EPBC	Inhabit eucalypt woodlands and forests. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.	No	Yes	Unlikely
Long-nosed Potoroo <i>Potorous tridactylus</i> V TSC V EPBC	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of	No	No	No

Envirokey Pty. Ltd
PO Box 7231 Tathra NSW 2550 t 02 6494 5422
www.envirokey.com.au info@envirokey.com.au

ABN 35150812570



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
	tea-trees or melaleucas. A sandy loam soil is also a common feature.			
Grey-headed Flying-fox <i>Pteropus poliocephalus</i> V TSC V EPBC	Occur in subtropical and temperate 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 and are commonly found in gullies, close to water, in vegetation with a dense canopy.	No	No	Unlikely

FLORA

Thick-lipped Spider-orchid <i>Caladenia tessellata</i> E TSC V EPBC	The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.	No	No	No
Araluen Gum <i>Eucalyptus kartzoffiana</i> V TSC V EPBC	Araluen Gum is found in the Araluen, Bendethera and Majors Creek area, south of Braidwood. Grows near rivers, in grassy or shrubby woodland or in wet sclerophyll forest on moderately fertile sandy soil on granite.	No	Yes	No
Black Gum <i>Eucalyptus aggregata</i> ¹³ V TSC	Grows in the lowest parts of the landscape. Grows on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small	No	Yes	No



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
	rivers.			
Bog Grevillea <i>Grevillea acanthifolia</i> <i>subsp. paludosa</i> E TSC E EPBC	Bog Grevillea is known from two small populations: Nalbaugh National Park south-east of Bombala; Bega Swamp near Bemboka. The species is found in peaty swamps. Within such habitat it grows on densely vegetated low hummocks.	No	No	No
Basalt Pepper-cress <i>Lepidium</i> <i>hyssopifolium</i> E TSC E EPBC	In NSW, there is a small population near Bathurst, one populations at Bungendore, and one near Crookwell. The species was also recorded near Armidale in 1945 and 1958; however it is not known whether it remains in this area. The species occurs in a variety of habitats including woodland with a grassy understorey and grassland.	No	No	No
Hoary Sunray <i>Leucochrysum</i> <i>albicans</i> var. <i>tricolor</i> E EPBC	The Hoary Sunray occurs at relatively high elevations in woodland and open forest communities, in an area roughly bounded by Goulburn, Albury and Bega. Associated with Grassland and grassy woodland	No	Yes	Unlikely
Omeo Stork's-bill <i>Pelargonium</i> sp. <i>Striatellum</i> E TSC E EPBC	Known from only 3 locations in NSW, with two on lake-beds on the basalt plains of the Monaro and one at Lake Bathurst. A population at a fourth known site on the Monaro has not been seen in recent years. It has a narrow habitat that is usually just above the high-water level of irregularly inundated or	No	No	No



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
	ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities.			
Majors Creek Leek Orchid <i>Prasophyllum</i> sp. Majors Creek CE TSC	<i>Prasophyllum</i> sp. Majors Creek is known from a single, unreserved population near Majors Creek, approximately 70 km south-east of Canberra. It is likely that the species was once more widespread before its discovery in 1992, however extensive clearing and fragmentation of native vegetation in the Majors Creek district is likely to have markedly reduced suitable habitat (Copeland 2008). The habitat at the known site is a grassland dominated by <i>Themeda australis</i> on a moist brown loamy soil	No	Yes	Potential habitat identified by Gaia (2010). Further assessment applied.
Monaro Golden Daisy <i>Rutidosis leiolepis</i> V TSC V EPBC	Found in Natural Temperate Grassland on the Monaro with a single record in the township of Majors Creek	No	Yes, a single record in Majors Creek township	No
Austral Toadflax <i>Thesium australe</i> V TSC V EPBC	Occurs in grassland or grassy woodland often in association with Kangaroo Grass.	No	No	No
THREATENED ECOLOGICAL COMMUNITIES				
Lowland Grassy Woodland in the South East Corner Bioregion EEC TSC CEEC EPBC	Lowland Grassy Woodland in the South East Corner bioregion is currently known to occur within the Bega Valley, Eurobodalla and Palerang Local Government Areas. The community	No	No	No



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
	typically occurs in undulating terrain up to 500 m in elevation on granitic substrates (e.g. adamellites, granites, granodiorites, gabbros, etc.) but may also occur on locally steep sites and on acid volcanic, alluvial and fine-grained sedimentary substrates.			
Araluen Scarp Grassy Forest in South East Corner Bioregion EEC TSC	Araluen Scarp Grassy Forest in the South East Corner Bioregion an open forest or grassy woodland dominated by Maiden's Gum (<i>Eucalyptus maidenii</i>), Yellow Box (<i>E. melliodora</i>) and Forest Red Gum (<i>E. tereticornis</i>) in the canopy. This community is largely restricted to the escarpment and associated ridges on the northern and western sides of the Araluen valley, occurring typically on sandy loams derived from granite, usually on steep slopes between approximately 200 and 700 metres in altitude. This distribution falls within a rain shadow zone, where mean rainfall is between approximately 890 and 1000 mm per annum.	No	Yes	No
Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory EEC EPBC	Natural Temperate Grassland is a natural grassland community dominated by a range of perennial grass species and, in highly intact sites, containing a large range of herbaceous species including daisies, peas, lilies,	No	Yes	No

Envirokey Pty. Ltd
PO Box 7231 Tathra NSW 2550 t 02 6494 5422
www.envirokey.com.au info@envirokey.com.au

ABN 35150812570



Species Scientific Name Legal Status	Habitat	Recorded during previous surveys	Recorded previously in locality	Likelihood of species occurring within Project Site
	and orchids.			
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions EEC TSC	Tableland Basalt Forest is an open forest or woodland that typically occurs on undulating or hilly terrain about 600–900 m above sea level, on relatively fertile loam or clay soils derived primarily from basalt, but which may also be derived from mudstones, granites, alluvium and other substrates. This community has an open canopy of eucalypts with sparse small trees and shrubs and a dense ground cover of herbs and grasses. Common trees include Ribbon Gum (<i>Eucalyptus viminalis</i>), Narrow-leaved Peppermint (<i>E. radiata subsp. radiata</i>), Mountain Gum (<i>E. dalrympleana subsp. dalrympleana</i>) and White Sally or Snow Gum (<i>E. pauciflora</i>).	Yes	Yes	Yes
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions EEC TSC	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland mainly occurs on valley floors, margins of frost hollows, footslopes and undulating hills between approximately 600 and 1400 m in altitude. It occurs on a variety of substrates including granite, basalt, metasediments and Quaternary alluvium.	No	No	No



Based on the evaluation completed in Table 3, 11 threatened biota and two migratory species were found to occur, or potentially occur within the study area. Given this known or potential occurrence, further assessment of these biota is undertaken.

Potential impacts

The Environmental Assessment (EA) – Modification 3 (Report No. 752/38) prepared by RW Corkery & Co, provides the detail of the potential impacts of the proposed modification. According to the EA, the proposed modification would result in direct impacts to 19.7 hectares to native vegetation as follows:

- Community 4 - Regenerating Wattles (0.2ha).
- Community 7 - Native-dominated Pasture (19.5ha).

OEH has raised concerns that the vegetation communities within the Project Site for the modification may comprise an Endangered Ecological Community (EEC).

Communities 1 and 2 have been acknowledged by the Proponent to form a component of the Tablelands Basalt Forest EEC. However, these communities would not be impacted by the proposed modification.

Work completed for the Ecology Assessment (Gaia 2010) indicates that vegetation Community 7 (native-dominated pasture) is not an EEC. A review of the expert report prepared by Gregory Stone for the Land and Environment Court also confirms this.

Similarly, Gaia (2010) confirm that Community 4 (Regenerating Wattles) comprises small patches of Black Wattle (*Acacia mearnsii*) and Blackwood (*Acacia melanoxlyn*), an indication of previous disturbance activity (likely the result of historical mining or grazing) and that this community is characterised by an understorey of exotic flora such as Broom, Blackberry and exotic grasses. With Gaia (2010) indicating that Community 4 is dominated by exotic flora, and only a single characteristic species for the Tablelands Basalt Forest EEC (Blackwood – a species also common in other vegetation communities) occurring within Community 4, that community is not considered part of any EEC.

Based on the previous Ecology Assessment and the proceedings of the Land and Environment Court, Community 4 and Community 7 are not part of any EEC.

Cumulative impact

The following table provided by RWC details the area of cumulative disturbance with consideration of the original approval, Modification 2 and proposed Modification 3.



Vegetation Community	Area to be disturbed (ha)			Total Area within Gaia (2010) Survey Area (ha)
	Original Application ¹	Modification 2 (2013)	Modification 3	
1 – Ribbon Gum – Snow Gum Grassy Open Forest	0.1	0.1	0.1	28.2
2 – Fragmented Ribbon Gum – Snow Gum Grassy Open Forest	0.1	0.1	0.1	7.1
3 – Woody Weeds Shrubland	0.1	0.1	0.1	30.1
4 – Regenerating Wattles	-	-	0.2	18.5
5 – Exotic Vegetation	0.2	0.2	0.1	5.6
6 – Native Grassland	0.2	0.2	0.2	0.2
7 – Native-dominated Pasture	23.6	25.3	44.8	280.1
8 – Exotic-dominated Pasture	-	0.3	0.5	2.5
9 – Largely Disturbed Land	2.2	2.2	0.5	23.1
10 – River Peppermint Open Forest	-	-	-	1.3
Total	26.5	28.5	46.6	396.6
Note 1: Areas of disturbance are consistent with Figure 4.17 of RWC (2010a). This does not include minor areas between individual infrastructure items				
Source: After RWC (2010a) Figure 4.17 and RWC (2013a) Table 10 and Figure 14				

This table confirms that cumulative impacts are only relevant to Community 7 as the impact has increased from 23.6 hectares (original application) to 44.8 hectares (Modification 3) (19.5 hectares). While Community 4 would also be impacted by the proposed modification, no previous impacts have occurred. Cumulative impact is not relevant to the remaining vegetation communities. Given this, the following impact assessment considers cumulative impact by assessing total loss to each community type in the context of that remaining within the original assessed Project Site (based on Gaia 2010). Notwithstanding, the Project Site has now increased substantially since the acquisition of the 'Slings Property' directly adjacent to the south-west.



In Section 5A of the EP&A Act are seven factors which are to be considered when determining if a proposed development or activity *'is likely to have a significant effect on the threatened species,*

Impact assessment (TSC Act)

In Section 5A of the EP&A Act are seven factors which are to be considered when determining if a proposed development or activity *'is likely to have a significant effect on the threatened species, populations or ecological communities, or their habitats'*. These seven factors must be taken into account by consent or determining authorities when considering a development proposal or development application. This enables a decision to be made as to whether there is likely to be a significant effect on the species (DECC 2007).

Table 3 found that 11 threatened biota were known to, or have the potential to occur within the Project Site based on the evaluation completed. One flora species, although never previously detected within the Project Site despite extensive survey effort, is included within this assessment given the proximity of the proposed modification to the identified potential habitat. The biota are:

- Eastern False Pipistrelle
- Eastern Bentwing-bat
- Gang-gang Cockatoo
- Speckled Warbler
- Varied Sittella
- Scarlet Robin
- Flame Robin
- Diamond Firetail
- Spotted-tailed Quoll
- Majors Creek Leek Orchid
- Tablelands Basalt Forest EEC

Eastern False Pipistrelle

- (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,



The Eastern False Pipistrelle is a forest dependant microbat species (Churchill 2008) that has been recorded within the Project Site. Habitat essential to the lifecycle of these species includes forest (foraging habitat) that contains HBT (roost and breeding sites).

OEH (2015b) identify that the main threats to this species as being:

- Loss of foraging habitat.
- Loss of HBTs.
- Application of pesticides in or adjacent to foraging areas.
- Predation by feral cats and foxes.
- Introduction of exotic pathogens, specifically known White-nosed fungus.
- Potential for large scale wildfire to impact on resource availability in surrounding habitat.

Of these, only the first threat is of potential relevance when considering the impacts of the proposed modification. The proposed modification would result in the removal of approximately 19.7 hectares (or up to 45 hectares cumulatively) and comprises known foraging habitat. However, given that microchiropteran bats are regarded as highly mobile fauna that extend their foraging ranges over tens of kilometres (Barclay *et al.* 2000; Pavey 1998; Pavey and Burwell 2004; Pennay and Freeman 2005), the loss of regenerating wattles and native-dominated pasture is considered negligible in the context of the potential habitat in the locality (2,262 hectares) and that of the project site (at least 235 hectares of native dominated pasture remaining, as well as other vegetation types) that would remain unaffected by the proposed modification. This is more evident in the context of the local reserves including Bendoura State Forest, Berlang State Forest and Deua National Park.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Eastern False Pipistrelle is not listed as an endangered population.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:



- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Eastern False Pipistrelle is not listed as an endangered ecological community.

(d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
 - (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
 - (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
- (i) The proposed modification would result in direct impacts to 19.7 hectares of vegetation (19.5 hectares of native-dominated pasture and 0.2 hectares of regenerating wattle). From a cumulative impact, up to 44.8 hectares of native-dominated pasture would be affected.
 - (ii) Given the nature of the proposed modification, the extent of habitat in the surrounding area and the mobility of the species, no area of habitat is likely to be become fragmented or isolated.
 - (iii) Grassland and regenerating wattles are unlikely to comprise important habitat for this species (marginal foraging habitat only). Indeed, records to date for this species across the Project Site have only been in forested areas. The proposed modification would not remove, modify, fragment or isolate habitat that is of long-term importance to the species in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would



be affected, indicate that the proposed modification would be consistent with such a plan should it exist.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will result in the removal of 19.7 hectares (19.5 hectares of native-dominated pasture). Cumulatively, up to 44.8 hectares of native-dominated pasture would be affected. This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares) that would remain unaffected by the proposed modification.

Conclusion

This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a '*significant effect*' on Eastern False Pipistrelle or their habitat.

Eastern Bentwing-bat

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Eastern Bentwing-bat are cave dwellers and depend on the presence of roost sites such as caves or mine shafts, tunnels or old buildings (Baudinette *et al.* 1994; Churchill 2008; Dwyer 1962; 1968). Habitat essential to the lifecycle of these species includes forest (open and dense), heath and scrubs (foraging habitat) that contains suitable roosting habitat (caves, culverts, bridges, old buildings).

OEH (2015b) identify that the main threats to this species are:

- Damage to or disturbance of roosting caves, particularly during winter or breeding.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.
- Predation by feral cats and foxes.



- Introduction of exotic pathogens, specifically known White-nosed fungus.
- Threat of cave entrances being blocked for human safety reasons. Also, vegetation encroaching and blocking cave entrances.
- Potential for large scale wildfire to impact on resource availability in surrounding habitat. Direct threats at caves from fire.
- Weeds (blackberry) encroaching over cave entrances restrict access; need to ensure sympathetic control techniques for blackberry.

Of these, only the second threat is of potential relevance when considering the impacts of the proposed modification. The proposed modification would result in the removal of approximately 19.7 hectares comprises marginal potential foraging habitat. However, given that microchiropteran bats are regarded as highly mobile fauna that extend their foraging ranges over tens of kilometres (Barclay *et al.* 2000; Pavey 1998; Pavey and Burwell 2004; Pennay and Freeman 2005), the loss of 19.7 hectares of regenerating wattles and native-dominated pasture is considered negligible in the context of the potential habitat in the locality (2,262 hectares) that would remain unaffected by the proposed modification. In the context of cumulative impact, the loss of up to 44.8 hectares of native-dominated grassland is also considered negligible. This is more evident in the context of the local reserves including Bendoura State Forest, Berlang State Forest and Deua National Park and that no roosting or maternity sites would be affected by the proposed modification.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

- (b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Eastern Bentwing-bat is not listed as an endangered population.

- (c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Eastern Bentwing-bat is not listed as an endangered ecological community.



(d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
- (i) The proposed modification would result in direct impacts to 19.7 hectares of vegetation (19.5 hectares of native-dominated pasture and 0.2 hectares of regenerating wattle). Cumulatively, up to 44.8 hectares of native-dominated pasture would be affected.
- (ii) Given the nature of the proposed modification, the extent of habitat in the surrounding area and the mobility of the species, no area of habitat is likely to be become fragmented or isolated.
- (iii) Grassland and regenerating wattles are unlikely to comprise important habitat for this species (marginal foraging habitat only). No roosting or maternity sites would be affected. The proposed modification would not remove, modify, fragment or isolate habitat that is of long-term importance to the species in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would be affected, indicate that the proposed modification would be consistent with such a plan should it exist.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.



The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will result in the removal of 19.7 hectares (19.5 hectares of native-dominated pasture). Cumulatively, up to 44.8 hectares of native-dominated pasture would be affected. This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares) that would remain unaffected by the proposed modification.

Conclusion

This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a '*significant effect*' on Eastern Bentwing-bat or their habitat.

Gang-gang Cockatoo

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Gang-gang Cockatoo is distributed from southern Victoria through south and central-eastern New South Wales (Morcombe 2004). In New South Wales they have been recorded from the south-east coast to the Hunter region, and inland to the Central Tablelands and South-west slopes (OEH 2015b). In summer, this species is generally found in tall mountain forests, showing a preference for more mature wet sclerophyll forests. However, in winter, the species often occurs at lower altitudes in drier more open eucalypt forests, where some pairs remain for the spring, breeding in the forests of the coastal plains which appears to be common in the Eurobodalla and Bega Valley LGA (pers.obs). This species is reliant on the presence of nest sites – medium sized hollows high in trees, suitable foraging habitat and it is known to favour old growth attributes for nesting and roosting.

OEH (2015b) identify the following threats to this species:

- Clearing of vegetation and degradation of habitat may reduce the abundance of optimal foraging and roosting habitat;
- Individual pairs show high fidelity to selected nesting trees (choosing nesting hollows of particular shape, position and structure), with clearing and frequent fire posing a threat to continued successful breeding;
- Climate change may alter the extent and nature of its preferred habitat (cool temperate vegetation); and



- Susceptible to Psittacine cirovirus disease (PCD) which is spread through contaminated nest chambers. PCD is known to have increased near Bowral in the southern highlands of New South Wales over the past decade and constitutes a further threat to the species.

Of these, only the first and second threats are of potential relevance when considering the impacts of the proposed modification. The proposed modification would result in the removal of approximately 19.7 hectares of native-dominated pasture. A known nesting tree is in the vicinity of the proposed modification, but would not be directly impacted. In the context of the species and potential for impact, existing Statement of Commitments relating to the retention of all areas of Ribbon Gum Forest through a Biodiversity Management Plan are considered appropriate for the long-term viability of the known nesting tree. From a foraging habitat perspective, only 0.2 hectare of regenerating Acacias would be directly impacted by the proposal. This is considered negligible in the context of the potential habitat that remains in the locality (2,262 hectares) that would remain unaffected by the proposed modification. This is more evident in the context of the local reserves including Bendoura State Forest, Berlang State Forest and Deua National Park.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction provided that the nest tree is offered a level of protection through adequate identification, onsite induction of personnel and exclusion fencing.

- (b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

While an endangered population of Gang-gang cockatoo does occur, the determination by the NSW Scientific Committee is of no relevance to the study area, or the Palerang LGA.

- (c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
- is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
 - is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Gang-gang Cockatoo is not listed as an endangered ecological community.



(d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
 - (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
 - (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
- (i) The proposed modification would result in direct impacts to 0.2 hectares of potential foraging habitat (regenerating wattle). No cumulative impact is relevant.
- (ii) Given the nature of the proposed modification, the extent of habitat in the surrounding area and the mobility of the species, no area of habitat is likely to be become fragmented or isolated.
- (iii) Regenerating wattles are unlikely to comprise important habitat for this species (marginal foraging habitat only). The known nesting tree would remain protected and additional safeguards are recommended. The proposed modification would not remove, modify, fragment or isolate habitat that is of long-term importance to the species in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would be affected, indicate that the proposed modification would be consistent with such a plan should it exist.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.



The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will result in the removal of 0.2 hectare of potential foraging habitat. This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares) that would remain unaffected by the proposed modification.

Conclusion

This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a 'significant effect' on Gang-gang Cockatoo or their habitat.

Speckled Warbler

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Speckled Warbler occurs in a wide variety of eucalyptus dominated habitats with the understory being dominated by native grasses a characteristic of occupied habitat. Rocky ridges and gullies are also considered preferred habitat.

Typical habitat has been described by OEH as to include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. To date, Speckled Warbler has not been recorded within the Project Site despite intensive field surveys for the initial approval and post-monitoring as part of consent conditions.

OEH (2015b) identify the following threats to this species:

- Due to the fragmented nature of the populations and their small size the species is susceptible to catastrophic events and localised extinction.
- Clearance of remnant grassy woodland habitat for paddock management reasons and for firewood.
- Poor regeneration of grassy woodland habitats.
- Modification and destruction of ground habitat through removal of litter and fallen timber, introduction of exotic pasture grasses, heavy grazing and compaction by stock and frequent fire.

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- Habitat is lost and further fragmented as land is being cleared for residential and agricultural developments. In particular, nest predation increases significantly, to nest failure rates of over 80%, in isolated fragments.
- Nest failure due to predation by native and non-native birds, cats, dogs and foxes particularly in fragmented and degraded habitats.

The proposed modification would result in the removal of approximately 19.7 hectares of which only the 0.2 hectare of regenerating Acacia could be considered marginal, potential habitat. No cumulative impact is of relevance. This is considered negligible in the context of the potential habitat that remains on the Project Site, and in the locality (2,262 hectares) that would remain unaffected by the proposed modification. This is more evident in the context of the local reserves including Bendoura State Forest, Berlang State Forest and Deua National Park.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Speckled Warbler is not listed as an endangered population.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Speckled Warbler is not listed as an endangered ecological community.

(d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and



- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
 - (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
 - (i) The proposed modification would result in direct impacts to 0.2 hectares of potential foraging habitat (regenerating wattle). No cumulative impact is of relevance to this species.
 - (ii) Given the nature of the proposed modification, the extent of habitat in the surrounding area and the mobility of the species, no area of habitat is likely to be become fragmented or isolated.
 - (iii) Regenerating wattles are unlikely to comprise important habitat for this species (marginal comparative with preferred habitat). The proposed modification would not remove, modify, fragment or isolate habitat that is of long-term importance to the species in the locality.
- (e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.

- (f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would be affected, indicate that the proposed modification would be consistent with such a plan should it exist.

- (g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to



environmental change. The proposed modification will result in the removal of 0.2 hectare of potential foraging habitat. This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares) that would remain unaffected by the proposed modification.

Conclusion

This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a 'significant effect' on Speckled Warbler or their habitat.

Varied Sittella

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands, with a nearly continuous distribution in NSW from the coast to the far west (Morcombe 2004; OEH 2015a; b). It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. It builds a cup-shaped nest of plant fibres and cobweb in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. Varied Sittella has been recorded within forested areas of the Project Site.

OEH (2015b) identify the following threats to Varied Sittella:

- Apparent decline has been attributed to declining habitat. The sedentary nature of the Varied Sittella makes cleared land a potential barrier to movement.
- The Varied Sittella is also adversely affected by the dominance of Noisy Miners in woodland patches.
- Threats include habitat degradation through small-scale clearing for fencelines and road verges, rural tree decline, loss of paddock trees and connectivity, 'tidying up' on farms, and firewood collection.

The proposed modification would result in the removal of approximately 19.7 hectares or 5% of the study area, of which only the 0.2 hectare of regenerating *Acacia* could be considered marginal, potential habitat. This is considered negligible in the context of the potential habitat that remains on the Project Site, and in the locality (2,262 hectares) that would remain unaffected by the proposed modification. This is more evident in the context of the local



reserves including Bendoura State Forest, Berlang State Forest and Deua National Park. No cumulative impact is of relevance.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

- (b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Varied Sittella is not listed as an endangered population.

- (c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Varied Sittella is not listed as an endangered ecological community.

- (d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
- (i) The proposed modification would result in direct impacts to 0.2 hectares of potential foraging habitat (regenerating wattle). No cumulative impact is of relevance.
- (ii) Given the nature of the proposed modification and the extent of habitat in the surrounding area, no area of habitat is likely to be become fragmented or isolated.



(iii) Regenerating wattles are unlikely to comprise important habitat for this species (marginal comparative with preferred habitat). The proposed modification would not remove, modify, fragment or isolate habitat that is of long-term importance to the species in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would be affected, indicate that the proposed modification would be consistent with such a plan should it exist.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will result in the removal of 0.2 hectare of potential foraging habitat. This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares) that would remain unaffected by the proposed modification. No cumulative impact is of relevance.

Conclusion

This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a '*significant effect*' on Varied Sittella or their habitat.

Scarlet Robin

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

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Scarlet Robin occurs in open forests and woodlands from the coast to the inland slopes and in winter, dispersing birds are known to appear in the east of the inland plains (OEH 2012b). The Scarlet Robin is considered sensitive to habitat fragmentation and the reductions of structural complexity of habitat and native ground covers. (Barrett *et al.* 2007; Watson *et al.* 2001). The species has been recorded within the forested areas of the Project Site.

OEH (2015b) identify the following threats to Scarlet Robin:

- Historical habitat clearing and degradation.
- Habitat modification due to overgrazing.
- Reduction of size of remnant patches.
- Reduction in the structural complexity of habitat, including reductions in canopy cover, shrub cover, ground cover, logs, fallen branches and leaf litter.
- Reduction of the native ground cover in favour of exotic grasses.
- Loss of nest sites, food sources and foraging sites, such as standing dead timber, logs and coarse woody debris from depletion by grazing, firewood collection and 'tidying up' of rough pasture.
- Predation by over-abundant populations of Pied Currawong (*Strepera graculina*) which are supported by planted exotic berry-producing shrubs; this pressure, in addition to that from other native and exotic predators, may be a potentially severe threat to the breeding success of Scarlet Robin populations.
- Predation by feral cats (*Felis catus*).
- Robbing of nests and predation of fledglings by rats.
- Isolation of patches of habitat, particularly where these patches are smaller than 30 ha, and in landscapes where clearing has been heavy or where remnants are surrounded by cropping or stock grazing.
- Habitat for the Scarlet Robin may become unsuitable if dense regeneration occurs after bushfires or other disturbances.

The proposed modification would result in the removal of approximately 19.7 hectares or 5% of the study area, of which only the 0.2 hectare of regenerating Acacia could be considered marginal, potential habitat. This is considered negligible in the context of the potential habitat that remains on the Project Site, and in the locality (2,262 hectares) that would remain unaffected by the proposed modification. This is more evident in the context of the local reserves including Bendoura State Forest, Berlang State Forest and Deua National Park. No cumulative impact is of relevance to this habitat type.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.



- (b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Scarlet Robin is not listed as an endangered population.

- (c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Scarlet Robin is not listed as an endangered ecological community.

- (d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
 - (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
 - (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
- (i) The proposed modification would result in direct impacts to 0.2 hectares of potential foraging habitat (regenerating wattle). No cumulative impact is of relevance to this habitat type.
 - (ii) Given the nature of the proposed modification and the extent of habitat in the surrounding area, no area of habitat is likely to be become fragmented or isolated.
 - (iii) Regenerating wattles are unlikely to comprise important habitat for this species. The proposed modification would not remove, modify, fragment or isolate habitat that is of long-term importance to the species in the locality.

- (e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.



- (f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would be affected, indicate that the proposed modification would be consistent with such a plan should it exist.

- (g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will result in the removal of 0.2 hectare of potential foraging habitat. This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares) that would remain unaffected by the proposed modification.

Conclusion

This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a '*significant effect*' on Scarlet Robin or their habitat.

Flame Robin

- (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Flame Robin breeds in upland, moist eucalypt forests and woodlands spending winter in more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains (OEH 2015b). They often occurs in recently burnt areas, however habitat becomes unsuitable as vegetation closes up following regeneration (OEH 2015b).

OEH (2015b) identify the following threats to Flame Robin:

- Clearing and degradation of breeding habitat.

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- Degradation of wintering habitat.
- Degradation and simplification of habitat by overgrazing and removal of standing dead timber, logs and coarse woody debris.
- Nest predation by native and exotic predators, including artificially large populations of Pied Currawong (*Strepera graculina*) in some areas.
- Habitat for this species may become unsuitable if dense regeneration occurs after bushfires or other disturbances.

The proposed modification would result in the removal of approximately 19.7 hectares. With consideration of a potential cumulative impact, up to 44.8 hectares of native-dominated pasture would have been impacted should the proposed modification be approved. This is considered negligible in the context of the potential habitat that remains on the Project Site, and in the locality (2,262 hectares of forests and woodland, and 5,615 hectares of cleared farmland) that would remain unaffected by the proposed modification. This is more evident in the context of the local reserves including Bendoura State Forest, Berlang State Forest and Deua National Park.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Flame Robin is not listed as an endangered population.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Flame Robin is not listed as an endangered ecological community.

(d) in relation to the habitat of a threatened species, population or ecological community:



- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
- (i) The proposed modification would result in direct impacts to 19.7 hectares of potential habitat. From a cumulative perspective, up to 44.8 hectares would be affected should the proposed modification be approved, from the original consent.
- (ii) Given the nature of the proposed modification and the extent of habitat in the surrounding area, no area of habitat is likely to be become fragmented or isolated.
- (iii) Regenerating wattles and native-dominated pasture are unlikely to comprise important habitat for this species. The proposed modification would not remove, modify, fragment or isolate habitat that is of long-term importance to the species in the locality.

- (e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.

- (f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would be affected, indicate that the proposed modification would be consistent with such a plan should it exist.

- (g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated



populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will result in the removal of 19.7 hectares of potential foraging habitat. From a cumulative perspective, up to 44.8 hectares would be affected should the proposed modification be approved, from the original consent.

This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares of forests and woodland, and 5,615 hectares of cleared farmland) that would remain unaffected by the proposed modification.

Conclusion

This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a 'significant effect' on Flame Robin or their habitat.

Diamond Firetail

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Diamond Firetail is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South-western Slopes and the North-west Plains and Riverina (Morcombe 2004; OEH 2015b). Although they are not commonly found in coastal districts, there are records from near Sydney, the Hunter Valley and the Bega Valley (OEH 2015b). They are considered relatively sedentary; however, many populations are known to disperse, especially during drought periods. They are known to build bottle-shaped nests in trees and bushes and preferentially choose mistletoe as a nest site (Cooney and Watson 2005). It has declined in numbers in many areas and has disappeared from parts of its former range with Reid (1999) identifying it as a 'decliner' in a review of bird species' status in the NSW sheep-wheatbelt. Extensive field surveys to date have not detected Diamond Firetail within the vicinity of the proposal.

OEH (2015b) identify the following threats to Diamond Firetail:

- Clearing and fragmentation of woodland, open forest, grassland and mallee habitat for agriculture and residential development, and firewood collection.
- Poor regeneration of open forest and woodland habitats.
- Invasion of weeds, resulting in the loss of important food plants.
- Modification and destruction of ground- and shrub layers within habitat through: removal of native plants, litter and fallen timber; introduction of exotic pasture grasses; heavy grazing and compaction by stock; and frequent fire.



- Predation of eggs and nestlings by increased populations of native predators such as the Pied Currawong *Strepera graculina*.
- Risk of local extinction due to small, isolated populations.

The proposed modification would result in the removal of approximately 19.7 hectares or 5% of the study area, of which only the 0.2 hectare of regenerating Acacia could be considered marginal, potential habitat. No cumulative impact is of relevance to this habitat type. This is considered negligible in the context of the potential habitat that remains on the Project Site, and in the locality (2,262 hectares) that would remain unaffected by the proposed modification. This is more evident in the context of the local reserves including Bendoura State Forest, Berlang State Forest and Deua National Park.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Diamond Firetail is not listed as an endangered population.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Diamond Firetail is not listed as an endangered ecological community.

(d) in relation to the habitat of a threatened species, population or ecological community:

- the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
- whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and



- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
 - (i) The proposed modification would result in direct impacts to 0.2 hectares of potential foraging habitat (regenerating wattle).
 - (ii) Given the nature of the proposed modification and the extent of habitat in the surrounding area, no area of habitat is likely to become fragmented or isolated.
 - (iii) Regenerating wattles are unlikely to comprise important habitat for this species. The proposed modification would not remove, modify, fragment or isolate habitat that is of long-term importance to the species in the locality.
- (e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.

- (f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would be affected, indicate that the proposed modification would be consistent with such a plan should it exist.

- (g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will result in the removal of 0.2 hectare of potential foraging habitat. This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares) that would remain unaffected by the proposed modification.

Conclusion

Envirokey Pty. Ltd
PO Box 7231 Tathra NSW 2550 t 02 6494 5422
www.envirokey.com.au info@envirokey.com.au

ABN 35150812570



This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a 'significant effect' on Diamond Firetail or their habitat.

Spotted-tailed Quoll

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Spotted-tailed Quoll can be found along the east coast and tablelands of NSW where it has been recorded in a variety of habitat types including coastal heath, forests, woodlands and rainforests where it uses fallen logs and rocky outcrops as den sites (Menkhorst and Knight 2010; OEH 2015b; Ruibal *et al.* 2010). The species is largely nocturnal and solitary, foraging through areas characterised by dense vegetation and substantial layers of ground litter. Females are known to occupy home ranges up to 750 hectares while males as large as 3,500 hectares (OEH 2015b).

OEH (2015b) identify the following threats to this species:

- Loss, fragmentation and degradation of habitat.
- Accidental poisoning during wild dog and fox control programs. Deliberate poisoning, shooting and trapping may also be an issue.
- Competition with introduced predators such as cats and foxes.

The proposed modification would result in the removal of approximately 19.7 hectares or 5% of the study area, of which only the 0.2 hectare of regenerating Acacia could be considered marginal, potential habitat. This is considered negligible in the context of the potential habitat that remains on the Project Site, and in the locality (2,262 hectares) that would remain unaffected by the proposed modification. This is more evident in the context of the local reserves including Bendoura State Forest, Berlang State Forest and Deua National Park. No cumulative impact is of relevance to this habitat type.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Spotted-tailed Quoll is not listed as an endangered population.



(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Spotted-tailed Quoll is not listed as an endangered ecological community.

(d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
- (i) The proposed modification would result in direct impacts to 0.2 hectares of potential foraging habitat (regenerating wattle). No cumulative impact is of relevance to this habitat type.
- (ii) Given the nature of the proposed modification and the extent of habitat in the surrounding area, no area of habitat is likely to be become fragmented or isolated.
- (iii) Regenerating wattles are unlikely to comprise important habitat for this species. The proposed modification would not remove, modify, fragment or isolate habitat that is of long-term importance to the species in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would



be affected, indicate that the proposed modification would be consistent with such a plan should it exist.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will result in the removal of 0.2 hectare of potential foraging habitat. This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares) that would remain unaffected by the proposed modification.

Conclusion

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Spotted-tailed Quoll or their habitat.

Majors Creek Leek Orchid

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Majors Creek Leek Orchid is known from only one population, located at the cemetery within the village of Majors Creek where it is known from a grassy groundcover of Kangaroo and Poa Grass dominated by a woodland of Swamp Gum. The species appears high susceptible to grazing, and is known from only the single, ungrazed site.

Previous ecology surveys across the Project Site have failed to reveal the presence of Major Creek Leek Orchid. However, one small area of potential habitat was identified by Gaia (2010), which is well clear of the proposed modification. Given the past, extensive grazing history of the Project Site prior to the mine approval, it is highly probable that no suitable habitat remains.

OEH (2015b) identify the following threats to Majors Creek Leek Orchid:

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- Previous threats appear to have been loss, degradation and fragmentation of habitat and populations to residential, infrastructure and agricultural developments.
- Current threats are inappropriate mowing regimes, especially if this occurs in spring and summer when above-ground parts are present.
- May be threatened by competition from other plant species (e.g. Kangaroo Grass, Snowgrass).
- May be threatened by inappropriate tree and shrub planting.
- Particularly vulnerable to chance extinctions because only one known population exists.
- Plants could be threatened by earthworks.
- Plants may be threatened by illegal collection.
- Plants may be threatened by trampling.

Of these, only the first threat is of potential relevance when considering the potential impacts of the proposed modification. The proposed modification would result in the removal of approximately 19.7 hectares or 5% of the study area, none of which would occur within the area mapped as potential habitat for Majors Creek Leek Orchid. However, accidental incursion may occur, and through the existing Statement of Commitments relating to the retention of the identified habitat through a Biodiversity Management Plan, this is considered an appropriate mitigation measure. No cumulative impact is considered of relevance given that the proposed modification would not remove any area of identified habitat.

With consideration of these factors, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Majors Creek Leek Orchid is not listed as an endangered population.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:



- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Majors Creek Leek Orchid is not listed as an endangered ecological community.

(d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
- (i) The proposed modification would result in direct impacts to 19.7 hectares, none of which is identified as potential habitat for Majors Creek Leek Orchid.
- (ii) Given the nature of the proposed modification, the continued grazing history of the Project Site, and the identification of a single patch of potential habitat within the Project Site, no area of habitat is likely to be become fragmented or isolated.
- (iii) The area of potential habitat would not be directly impacted. The small area should be identified by signage and fenced to ensure that exclusion is maintained. Given this, the proposed modification would not remove, modify, fragment or isolate habitat that is of 'potential' long-term importance to the species in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this species. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would be affected, indicate that the proposed modification would be consistent with such a plan should it exist, particularly in the context of exclusion from the area mapped by Gaia (2010) as potential habitat for Majors Creek Leek Orchid.



- (g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will not affect the single area of potential habitat for Majors Creek Leek Orchid as identified by Gaia (2010).

Conclusion

This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a '*significant effect*' on Majors Creek Leek Orchid or their habitat.

Tablelands Basalt Forest EEC

- (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Tablelands Basalt Forest EEC is not listed as a threatened species.

- (b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Tablelands Basalt Forest EEC is not listed as an endangered population.

- (c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,



- (i) No. The proposed modification would result in direct impacts to 19.7 hectares of vegetation types that in the context of the previous work described, are not considered a part of the EEC. Tablelands Basalt Forest EEC (with overstorey) occurs across at least 35 hectares of the Project Site and hundreds of hectares in the locality (Table 1), all of which would not be impacted by the proposed modification.
- (ii) No. As the proposed modification is occurring in vegetation communities that have been previously confirmed as not being part of any EEC.

(d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,
- (i) The proposed modification would result in direct impacts to 19.7 hectares of vegetation types (regenerating Acacia and native-dominated pasture) that in the context of the previous work described, are not considered a part of the EEC. Tablelands Basalt Forest EEC (with overstorey) occurs across at least 35 hectares of the Project Site and hundreds of hectares in the locality (Table 1), all of which would not be impacted by the proposed modification.
- (ii) Given the nature of the proposed modification, the extent of habitat in the surrounding area, no area of habitat is likely to be become fragmented or isolated.
- (iii) SCIVI data suggests that large areas of similar forest exist across the locality. Indeed, Tablelands Basalt Forest (with overstorey) occurs across at least 35 hectares of the Project Site and hundreds of hectares in the locality (Table 1). In the context of the previous work described, the vegetation communities affected by the proposed modification are not considered a part of the EEC. Given these factors, we consider both vegetation types of little (if any) importance to the long-term survival of the EEC in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared in Palarang LGA under TSC Act.



(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no recovery plan or threat abatement plan for this EEC. However, should one exist, the extent and nature of the proposed modification and the quality of habitat that would be affected (ie, areas that are not EEC), indicate that the proposed modification would be consistent with such a plan should it exist

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

While the proposed activity – mining – is not recognised as a key threatening process under schedule 3 of the TSC Act, the *Clearing of native vegetation* is.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposed modification will result in the removal of some vegetation, however in the context of the extent of vegetation across the project site and in the locality, and that retained areas of EEC are being managed through a Biodiversity Management Plan, this is considered negligible given the extent of the EEC across the Project Site and in the locality that would remain unaffected by the proposed modification.

Conclusion

This Assessment of Significance has determined that the proposed activity is 'unlikely' to have a '*significant effect*' on Tablelands Basalt Forest EEC.

Impact assessment (Migratory species - EPBC Act)

Protected under several international agreements to which Australia is a signatory, Migratory species are considered Matters of National Environmental Significance under the EPBC Act.

Two migratory species were found to have the potential to occur within the study area. These being Cattle Egret and Latham's Snipe.

Under the EPBC Act, an action is likely to have a significant impact on a migratory species if it substantially modifies, destroys or isolated an area of 'important habitat' for the species (DotE 2013). For these species, the study area is not considered to comprise 'important habitat' as it does not contain:



- Habitat used by a migratory species occasionally or periodically within a region that supports an ecological significant proportion of the population of the species.
- Habitat that is of critical importance to the species at particular life-cycle stages.
- Habitat used by a migratory species that is at the limit of the species' range.
- Habitat within an area where the species is declining.

Given this, the impacts of the proposed modification on Cattle Egret and Latham's Snipe, are not likely to be regarded as significant and are not considered further.

Impact assessment (Threatened species - EPBC Act)

The study area and immediate surrounds contains potential habitat for one species listed as threatened under the EPBC Act; Spotted-tailed Quoll (also assessed under the TSC Act). The following section provides significance assessments for this species.

Endangered Species (Spotted-tailed Quoll)

Will the action lead to a long-term decrease in the size of a population of a species?

No. The proposed action will result in the removal of approximately 0.2 hectares of potential foraging habitat (regenerating wattles). This is considered negligible given the extent of potential habitats and native vegetation in the locality (2,262 hectares) that would remain unaffected by the proposed modification and that the species occupies relatively home ranges (750-3,500 ha). Given this, it is unlikely that the proposed action would lead to a long-term decrease in the size of a population of this species. Further, no cumulative impact is of relevance to this species should the proposed modification be approved.

Will the action reduce the area of occupancy of the species?

No. There is no evidence to suggest that a population relies upon the resources of the area to be directly impacted by the proposed modification in its entirety. Nonetheless, the proposed action will remove 0.2 hectares of potential habitat within a landscape consisting of large areas of native vegetation. Given these factors, the action is unlikely reduce any area of occupancy to the detriment of this species.

Will the action fragment an existing population into two or more populations?

No population would be fragmented into two or more populations by the current design of the action.

Will the action adversely affect habitat critical to the survival of a species?



No. The potential habitat comprising regenerating Acacias is not considered critical for the survival of this species.

Will the action disrupt the breeding cycle of a population?

No. Potential denning sites are not located within the vicinity of the proposed modification suggesting that breeding does not occur there.

Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

No. The availability of habitat in the locality indicates that the proposed action is unlikely to impact potential habitat to the extent this species is likely to decline.

Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?

While the proposed action has the potential to increase the ability of noxious and environmental weeds to become established through site disturbance, the Project Site has numerous weed species and a Weed Management Plan is currently being prepared by the proponent as part of previous approvals.

Will the action introduce disease that may cause the species to decline?

No. General mitigation measures offered by RWC in the Environmental Assessment provide a framework to minimise potential risks.

Will the action interfere with the recovery of the species?

No. Given the relatively minor nature of the proposed action, the extent of similar or higher quality habitats in the locality, it is unlikely that the proposed action would have an impact on the recovery of this species.

Conclusion

With consideration of the assessments completed, the proposed modification is *unlikely* to have a significant effect on threatened or migratory species as listed by the EPBC Act.

Based on this, referral to the Commonwealth Minister is not warranted.



Mitigation measures

EnviroKey believe that the Statement of Commitments and Conditions of Consent from the Land and Environment Court provide the necessary mitigation measures for the proposed modification. No additional measures are required.

Offsetting

The location and extent of the Biodiversity Offset Area located within the Project Site was previously determined in consultation with OEH without an approved metric. As indicated in the expert report prepared by Greg Stone for the Land and Environment Court, the principal concern of OEH *"to biodiversity within and surrounding the Project Site was the loss of native grassland through ongoing agricultural land management practices. As a result, from the Department's perspective, the proposed Biodiversity Offset Strategy provided an opportunity to:*

- *re-establish a vegetation community, namely native grassland, that has been very extensively disturbed regionally;*
- *protect and enhance an area of remnant forest that was later reclassified as Tablelands Basalt EEC, without allowing that community to replace the grassland community;*
- *provide for an ongoing beneficial use of the Biodiversity Offset Area; and*
- *provide an example of appropriate agricultural land management for surrounding farmers".*

Since the Proponents have purchased the land contained within the Project Site, the implementation of an approved Biodiversity Management Plan has commenced.

EnviroKey believe that the existing Biodiversity Offset Area could be extended using the same rationale applied in the original consent. There is sufficient areas of native vegetation in the adjoining 'Slings' property and the southern section of the Project Site should the existing Biodiversity Offset Area need to be increased in area. Any alterations to the existing Biodiversity Offset Area could be determined should approval be given for the proposed modification.

Conclusion

This assessment has determined that the proposed modification is *unlikely* to have a 'significant effect' on any listed threatened species, communities, populations and their habitats in accordance with s5A of the NSW *Environmental Planning & Assessment Act*



1979. The proposed modification is also *unlikely* to have a '*significant effect*' on any EPBC Act listed biota and their habitats or other matters of National Environmental Significance. Therefore, a referral to the Commonwealth Environment Minister is not warranted.

A handwritten signature in black ink, appearing to read 'Steve Sass'.

Mr. Steve Sass

Director / Principal Ecologist, EnviroKey Pty. Ltd.

B.App.Sci (Env.Sci) (Hons)

Certified Environmental Practitioner, Environment Institute of Australia & New Zealand

Practicing Member, Ecological Consultants Association of NSW

Envirokey Pty. Ltd
PO Box 7231 Tathra NSW 2550 t 02 6494 5422
www.envirokey.com.au info@envirokey.com.au

ABN 35150812570



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