

Draft For Adequacy

APPENDIX C
Ecological Impact Assessment



2 December 2011

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ECOLOGICAL ASSESSMENT - DRAYTON MINE SECTION 75W MODIFICATION

Dear Belinda

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Anglo Coal (Drayton Management) Pty Limited (Drayton) was granted Project Approval (PA 06_0202) by the Minister for Planning on 1 February 2008 for the Drayton Mine Extension.

Drayton is currently preparing a Modification to their Project Approval (MOD 3) under Section 75W of the *Environmental Planning & Assessment Act 1979*, to extend their operations into four areas: an area to the north (Northern Modification Area), an area to the east (Eastern Modification Area), and two areas to the south (Southern Modification Areas) of the currently approved Mining Disturbance Footprint (the Modification).

The purpose of this letter is to present an assessment of the ecological impacts of the proposed Modification. The full report is contained within **Appendix A**.

1.1 Key Findings

The Modification will result in additional surface disturbance beyond the approved Mining Disturbance Footprint at Drayton totalling 36.5 hectares. The Modification will require removal of heavily modified vegetated areas, existing cleared land and the drainage of the Industrial Dam in the Eastern Modification Area.

The vegetation within the proposed Modification areas mainly comprise rehabilitated grassland sown with exotic grasses. To a lesser extent there is also some low diversity Derived Native Grassland and a narrow band of young

regrowth woodland (0.44 ha). In total, 19.3 hectares of vegetation are proposed to be cleared due to the Modification.

The young regrowth woodland area is located in the Eastern Modification area and is a small 0.44 ha strip of land that was previously identified as Three-awned Grass Open Grassland, a form of Derived Native Grassland, in earlier studies but has since regenerated to immature woodland corresponding to Hunter Lowland Redgum Forest (HLRF). Hunter Lowland Redgum Forest is listed as an Endangered Ecological Community (EEC) under the *Threatened Species Conservation Act 1995* (TSC Act).

1.1.1 Vegetation

The original vegetation within the Modification area was eucalypt forest and woodland. Consequently, the threatened species known from the locality are forest or woodland dependent.

The occurrence of the narrow strip of HLRF in the proposed Eastern Modification area is considered to have little ecological significance. It has minimal value as habitat for flora and fauna species due to its young age and lack of structural integrity. It has little to no understorey and contains no hollows for fauna. Therefore, the net impact to the EEC in the locality due to the proposed Modification is not considered significant.

The rehabilitated, exotic grassland and the low diversity grassland in the Modification areas are highly disturbed and are considered to have minimal conservation significance.

1.1.2 Flora and Fauna

During the site inspection, no threatened flora or fauna were recorded and given the highly modified nature of the Modification areas, none are likely to make significant use of the area. The grassland areas, like the regenerated woodland, have little habitat value for fauna and flora and are unlikely to support threatened species.

The mine water dam (known as the Industrial Dam) represents low value habitat for some fauna species and is unlikely to support a substantial diversity or abundance of animals. The Industrial Dam is artificial and was constructed to support the current mining operations. It receives run off from the mine and is likely to contain a high concentration of salts and pollutants. Regardless, the dam habitat could support turtles, eels and aquatic birds despite the limited fringing habitat. For this reason, measures will be implemented to manage the impacts upon such species as the dam is drained prior to mining.

1.2 Conclusion

No significant impacts are predicted on threatened flora, fauna or ecological communities listed by either the TSC Act or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The removal of 0.44 hectares of degraded regrowth HLRF is not likely to have a negative effect on the ecological values of the area or put the community at risk.

Threatened fauna species previously recorded within the approved Mining Disturbance Footprint are unlikely to utilise or rely on the Modification areas due to the degraded and fragmented nature of these areas, small size and proximity to active mining and infrastructure. Those threatened species that have been recorded are highly mobile species able to utilise large areas of habitat remaining in the locality including the Drayton Wildlife Refuge located to the north of the existing mine and mine rehabilitation. The removal of a small area of approximately 19.3 hectares of degraded vegetation is not likely to negatively affect these species or the ecological values of the area.

The Industrial Dam habitat could potentially support turtles, eels and aquatic birds however these animals are unlikely to occupy the dam in large numbers. Impacts due to the drainage of the dam for the proposed Modification are unlikely.

Notwithstanding this, the following mitigation measures are proposed:

- A drainage protocol for aquatic fauna should be prepared and implemented to protect aquatic fauna and water fowl that might be impacted by the drainage of the Industrial Dam and to relocate them safely offsite where necessary; and
- To address the minor impacts upon HLRF, future rehabilitation of the Modification areas should include woodland species rather than Rhodes Grass and other exotic herbaceous plants. In particular, the rehabilitation should include at least 1.3 hectares (3:1 ratio) of HLRF trees, shrubs, herbs and grasses.

If you would like to discuss any aspects of this letter report, please do not hesitate to contact either myself or Lauren Ooi on 9868 1933.

Yours sincerely



Dr David Robertson

Director

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Appendix A

Ecological Assessment - 75W Modification
for Drayton Mine

A.1 Background

Drayton Coal Mine commenced production in 1983 to provide predominantly steaming coal to export and domestic markets at a maximum of 8 Million tonnes per annum (Mtpa) of Run-of-Mine (ROM) coal.

Anglo Coal (Drayton Management) Pty Limited (Drayton) was granted Project Approval (PA) 06_0202 by the then Minister for Planning on 1 February 2008 for the Drayton Mine Extension, which was assessed under Part 3A of *Environmental Planning & Assessment Act 1979* (EP&A Act). A modification to PA 06_0202 under Section 75W of the EP&A Act was approved on 1 February 2009 to extend operations into an 8 hectares area to the north of the approved Mining Disturbance Footprint and the establishment of a new 12 hectares conservation area adjacent to the Drayton Wildlife Refuge to provide an appropriate offset for this additional disturbance.

In July 2011, Drayton submitted a second modification to PA 06_0202 under Section 75W of the EP&A Act to facilitate the emplacement of raw tailings within the East Pit Void and the construction and operation of an explosives storage facility.

Drayton is now seeking approval to extend their operations via a third modification to PA 06_0202 under Section 75W (the "Modification"). The Modification will facilitate an extension of mining operations into three key areas around the currently approved Mining Disturbance Footprint: the Northern Modification Area, the Eastern Modification Area and the Southern Modification Area.

The purpose of this report is to assess the ecological impacts of the proposed Modification, including threatened flora, fauna and endangered ecological communities (EEC). The report focuses on the impacts of the Modification on threatened flora and fauna listed by the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

A.2 Proposed Modification

The proposed Modification seeks approval for the disturbance of 36.52 hectares of highly disturbed land located within Drayton's existing Mining Lease (**Figure 1**). The Modification comprises three key areas which have been subjected to previous mine related disturbances:

- An area to the north totalling 8.84 hectares (Northern Modification Area);
- An area to the east totalling 20.30 hectares (Eastern Modification Area); and
- Two small areas to the south totalling 7.38 hectares (Southern Modification Areas).

The proposed mining method of the Modification will be consistent with that described in the Drayton Extension (Hansen Bailey 2007) and Modification Environmental Assessment reports (Cumberland Ecology 2009) and as approved in Project Approval 06_0202.

The Modification will not extend Drayton's currently approved mine life or result in an increase in coal production levels to that approved.

A.2.1 Northern Modification Area

The proposed Northern Modification area is located to the immediate west of the approved North Pit. It includes an extension of Drayton's approved Mining Disturbance Footprint by approximately 8.84 hectares. The North Pit Modification area will allow the 'laying back' of the highwall to improve safety whilst opportunistically extracting steep dip barrier coal that may exist. The existing erection pad (approximately 2.63 hectares of previously disturbed land) will also be removed as part of the North Pit Extension.

A.2.2 Eastern Modification Area

The proposed 'Eastern Modification area is located to the north of the approved East Pit, adjacent to the existing infrastructure. It includes an extension of Drayton's approved Mining Disturbance Footprint by approximately 20.30 hectares. The Industrial Dam (approximately 6.5 hectares) will also be removed as part of the Eastern Modification Area.

A.2.3 Southern Modification Areas

The proposed Southern Modification Areas comprise two small areas that will extend Drayton's approved Disturbance Footprint to the south by a total of 7.38 hectares.

A.3 Methods

A.3.1 Literature Review

The flora and fauna of the Modification areas are known via previous studies that took place for the Drayton EA. This includes a site inspection conducted in May 2009 by Cumberland Ecology as part of a previous modification application.

This ecological assessment utilised the following reports to gain an understanding of the potential flora, fauna and vegetation communities present within the Modification areas and for data relevant to the current assessment:

- Hansen Bailey (2011) Drayton South Coal Project Preliminary Environmental Assessment (PEA) prepared for Anglo American;
- Cumberland Ecology (2009) Ecological Assessment of Section 75W Modification for Drayton Mine;
- Hansen Bailey (2007) Drayton Mine Extension Flora and Fauna Impact Assessment;
- Cumberland Ecology (2007) Drayton Mine Fauna Surveys; and
- Saunders, T (2006) Bird Surveys of the Proposed Drayton Mine Extension.

A.3.2 Database Analysis

Other existing information on biodiversity values of the area were obtained from the OEH Atlas of NSW Wildlife database (OEH 2011), SEWPaC Protected Matters Search Tool (PMST) (SEWPaC 2011) and Royal Botanic Gardens PlantNet (Royal Botanic Gardens 2011) to assess the likelihood of threatened species occurring within the Modification areas and surrounds.

The Wildlife Atlas search was used to generate records of threatened flora and fauna species listed under the State *Threatened Species Conservation Act 1995* (TSC Act) known to occur within the Muswellbrook LGA. The PMST generated a list of flora, fauna and ecological communities listed under the EPBC Act predicted to occur within a 10 km radius of the Modification areas based on the availability of suitable habitat.

A.3.3 Site Inspection

A site inspection was conducted by Cumberland Ecology on 30 September 2011 for the current Modification. The inspection involved an assessment of:

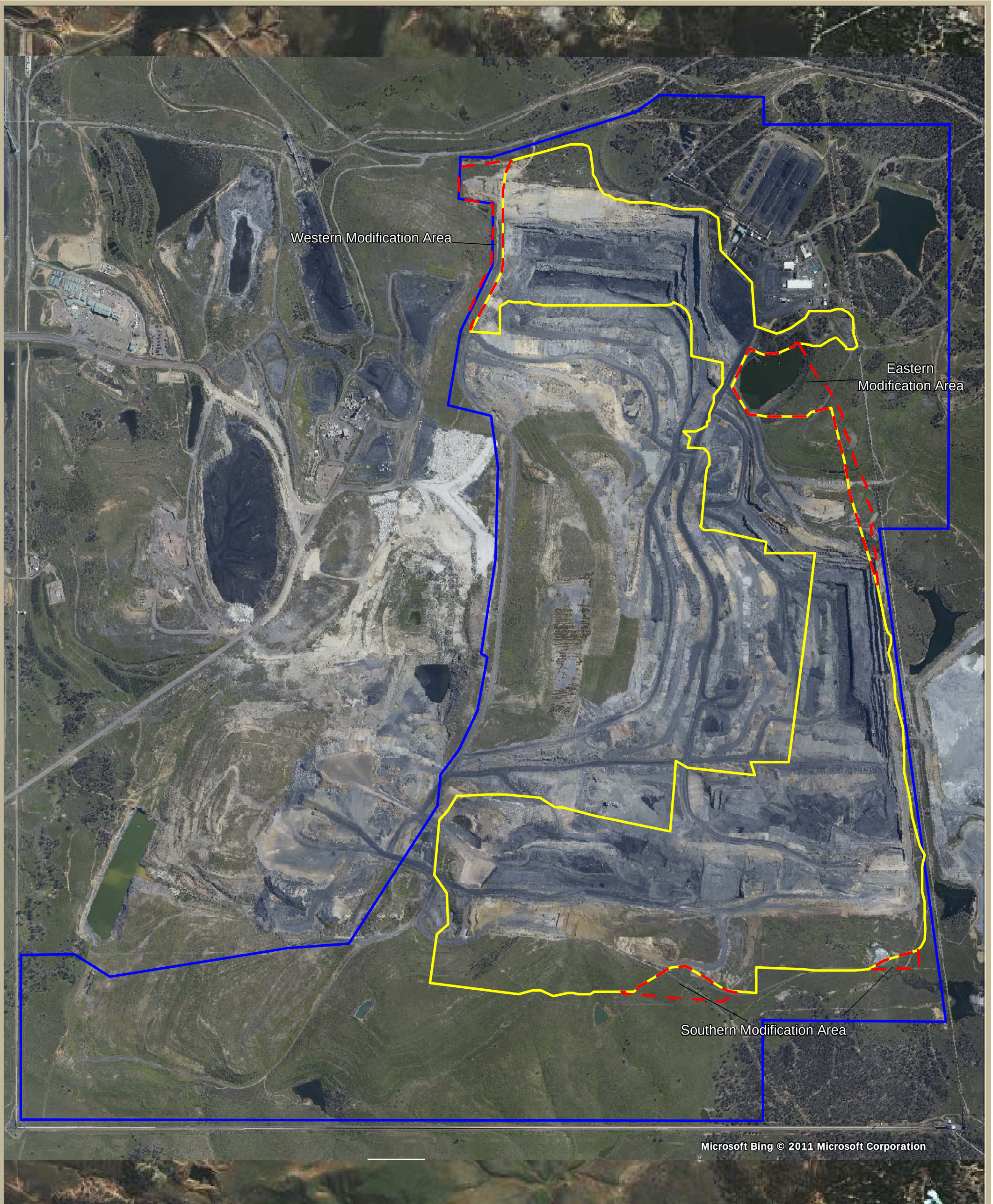
- Surrounding land use and extent of human disturbance;
- Type, condition and age structure of vegetation;
- The presence of threatened flora species;
- Availability of fauna habitat and microhabitat features; and
- Assessment of potential impacts of the Modification on biodiversity values.

Photographs were taken in order to provide an indication of the current condition of the habitat.

A.3.4 Limitations

Due to the small scale of the Modification, the highly disturbed nature of habitats within the Modification areas and the existence of good baseline information for flora and fauna within the Drayton lease, detailed surveys of the Modification areas were not deemed necessary.

Targeted threatened fauna surveys of the Modification area were not undertaken during the current site inspection as the environment on and around Drayton Mine has been extensively surveyed in recent years and the threatened fauna with potential to occur are well known, and can be predicted with confidence based on the results of previous surveys and fauna habitat assessments.

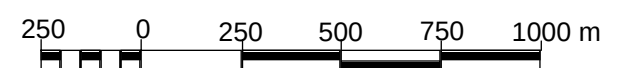


Legend

-  EA Boundary
-  Project Disturbance Boundary
-  Drayton Modification Area



Figure 1. Drayton Mine Section 75W Proposed Modification Areas



A.4 Results

A.4.1 Vegetation

Vegetation within the Modification areas is highly modified and the original forest and woodland communities have been almost entirely cleared. Some areas of “Derived Native Grassland” exist, which have been created by the clearance of the original forest and woodland. However, these have been invaded by exotic weeds and pasture species. Vegetation communities within the Modification areas and surrounds are shown in **Figure 2**.

i. Northern Modification Area

The majority of the Northern Modification area comprises exotic grassland; and an existing gravel-based erection pad and associated disturbances which are devoid of vegetation (**Figure 1**).

The remaining northern portion of the Northern Modification area has been rehabilitated in the past and has been mapped as Three-awned Grass Open Grassland, a form of Derived Native Grassland that is not listed under either State or Commonwealth threatened species legislation. This vegetation is of low quality that primarily consists of exotic groundcovers including improved pasture species and exotic grasses for soil stabilisation. A number of invasive weed species not sown as part of rehabilitation are also present, having colonised the open and frequently disturbed areas (**Photographs 1 – 3**).

This community is dominated by grasses and forbs, although a high proportion is exotic. The native component of the community consists of *Aristida ramosa* (Threeawn Wiregrass), *Austrostipa verticillata* (Slender Bamboo Grass), *Chloris ventricosa* (Windmill Grass), *Calotis lappulacea* (Yellow Burr-daisy), *Dichondra repens* (Kidney Weed), *Desmodium varians* (Variable Tick-trefoil) and *Einadia nutans* (Climbing Saltbush).

Rehabilitated areas were found to contain the following exotic species; *Galenia pubescens* (Galenia), *Melinis repens* (Red Natal Grass), *Pennisetum clandestinum* (Kikuyu), *Vicia* sp. (Vetch), *Cynodon dactylon* (Couch), *Bromus* spp., *Avena* spp. (Oats), *Medicago sativa* (Lucerne), *Sorghum* spp. (Sorghum), *Chloris gayana* (Rhodes Grass), *Phalaris* sp. (Canary Grass), *Trifolium repens* (Clover), *Anagallis arvensis* (Scarlet Pimpernel), *Senecio madagascariensis* (Fireweed), *Carthamnus lanatus* (Saffron Thistle), *Taraxacum officinale* (Dandelion), *Plantago lanceolata* (Lamb's Tongues), *Sida rhombifolia* (Paddy's Lucerne) and *Opuntia* sp. (Prickly Pear).

The nearest treed or woodland patch is a narrow strip of trees planted as a visual screen along Thomas Mitchell Drive to the north of the Modification. This does not contain value of any conservation significance.



Photograph 1 Open Grassland at the proposed Northern Modification Area, facing Thomas Mitchell Drive.



Photograph 2 Open Grassland in the proposed Northern Modification Area.



Photograph 3 The existing erection pad which will be removed as part of the Modification.

ii. *Eastern Modification Area*

Vegetation at the Eastern Modification area consists of two portions separated by the mine-related Industrial Dam (**Figure 2**). The majority of the vegetation has been mapped as Three-awned Grass Open Grassland and Acacia revegetation, although a narrow band of young regrowth woodland totalling 0.44 hectares that corresponds to Hunter Lowland Redgum Forest (HLRF) exists adjacent to the dam.

The 0.44 hectares of young regrowth HLRF conforms to an Endangered Ecological Community (EEC) listing under the TSC Act. The occurrence of the narrow strip of HLRF in the proposed Modification area is considered to have little ecological significance. It holds minimal value as habitat for flora and fauna species due to its young age and lack of structural integrity. It has little to no understorey and contains no hollows for fauna (**Photograph 4**). The community is bounded by a mine haul road and is adjacent to the existing ROM stockpile to the north and the Industrial Dam to the south. Therefore, the impact to EEC due to the proposed Modification is unlikely to be significant.

A narrow strip of young acacias, generally Cooba (*Acacia salicina*), Golden Wreath Wattle (*Acacia saligna*) and Western Silver Wattle (*Acacia decora*) (pers. comm P. Simpson), line the road edge that runs along the south-eastern side of the Industrial Dam (**Photograph 5**). Beyond these planted trees is degraded open grassland, with some scattered trees and shrubs, which was rehabilitated with a seed mix of exotic groundcovers including Kikuyu, Couch, Rhodes Grass, Vetch and pasture-improved herbs (**Photograph 6**).



Photograph 4 Narrow strip of regrowth Hunter Lowland Red Gum Forest (HLRF) in the proposed Eastern Modification area.



Photograph 5 Young Acacia regeneration planted along the road in the proposed Eastern Modification area.

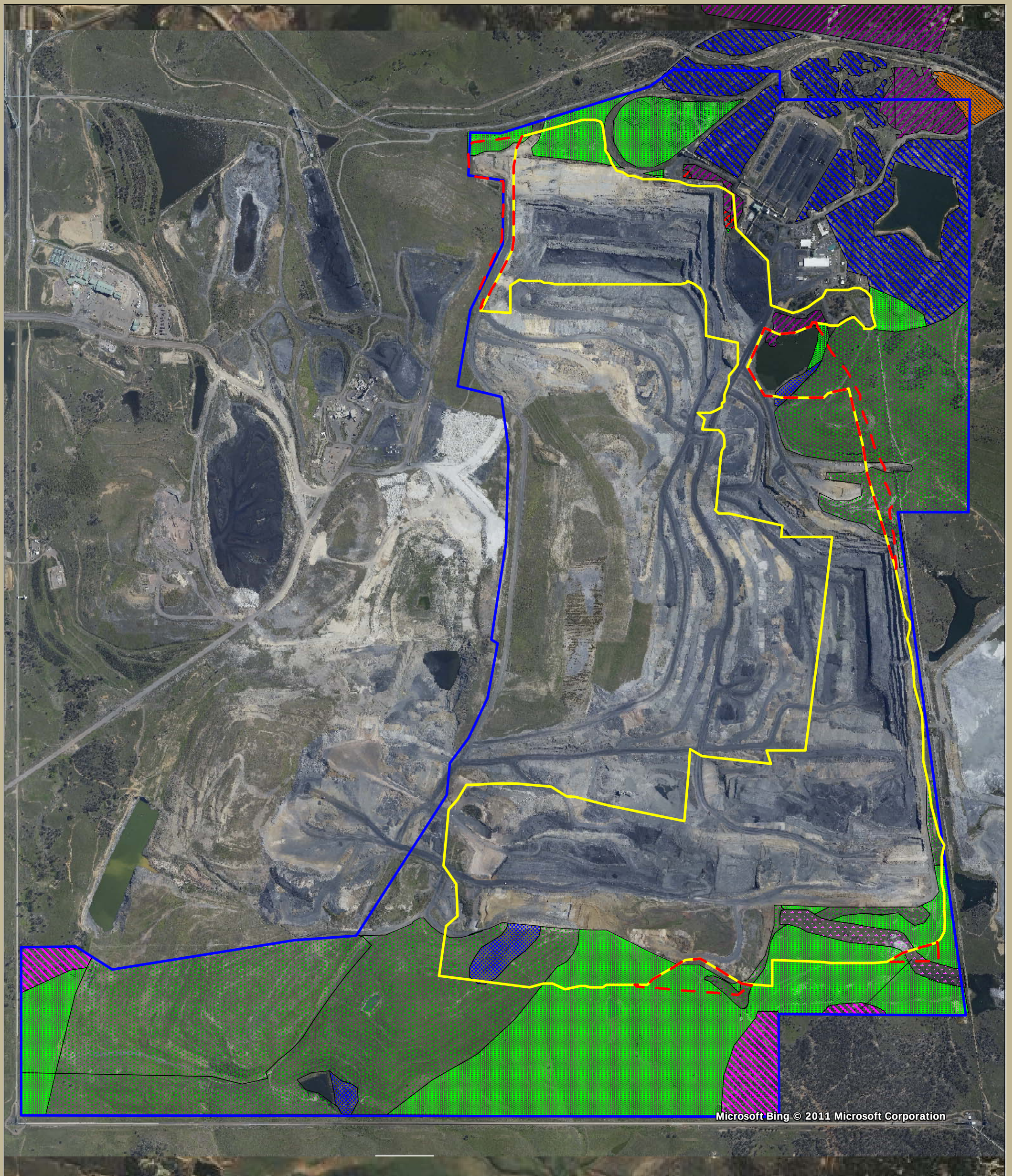


Photograph 6 Grassland rehabilitation area containing a high proportion of exotic ground cover species at the proposed Eastern Modification area.

iii. Southern Modification Areas

The Southern Modification Areas have been rehabilitated in the past and has been mapped as Three-awned Grass Open Grassland a form of Derived Native Grassland that is not listed under either State or Commonwealth threatened species legislation. The areas of Derived Native Grassland in these Modification Areas are of similar nature to that found in the Northern Modification Area and contain a number of weed species.

The low condition native grasslands are dissected by areas of exotic grassland rehabilitation. These areas of exotic grassland rehabilitation contain Kikuyu and Rhodes Grass, presumably for soil stabilisation and pasture improvement.



Legend

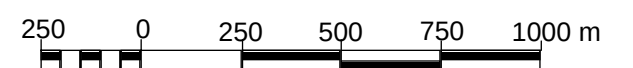
- EA Boundary
- Project Disturbance Boundary
- Drayton Modification Area

Vegetation Community

- Spotted Gum-Grey Box Open Forest
- Hunter Lowland Red Gum Forest EEC
- Central Hunter Box-Ironbark Woodland
- Spiky Rush-Kikuyu Grass
- Narrow-leaved Ironbark Woodland
- Grey Box Forest
- Acacia Revegetation Area
- Rhodes Grass Rehabilitation Area
- Derived native grassland



Figure 2. Mapped Vegetation Communities



A.4.2 Flora

Threatened flora surveys that included targeted searches in 2006 (as a component of the EA) and quadrats in 2009 (as a component of the previous modification application) did not identify any threatened flora species within the Drayton mining lease.

Similarly, no threatened flora species were found during the most recent site inspection of 2011. During the 2011 site inspection, searches were conducted for threatened flora species recorded in the vicinity of the existing mine that have potential to occur within the rehabilitated Modification areas. These included the threatened terrestrial orchids *Diuris tricolor* (Painted Diuris/ Pine Donkey Orchid) and *Prasophyllum sp. Wybong* which are highly detectable when in flower in late September and the grass *Bothriochloa biloba* (Lobed Blue Grass).

A.4.3 Fauna

During the 2011 site inspection, no mammals, amphibians or reptiles were observed in the Modification areas. The Australian Raven and Australian Magpie, common bird species that are well adapted to disturbed environments, were observed flying overhead. Given the predominance of grassland areas, it is expected that the fauna of the Modification areas would be typical of Hunter Valley farmland and consist of hardy native species, as described below for previous survey work on the Drayton lease.

i. Previously Conducted Fauna Surveys

a. Drayton Mine

Previous fauna surveys within the approved Mining Disturbance Footprint have recorded a very low diversity and abundance of native species. No threatened species have been recorded within the proposed Modification areas.

Commonly recorded mammals are the Eastern Grey Kangaroo (*Macropus giganteus*) across all grassland sites; Red-necked Wallaby (*Macropus rufogriseus*) in woodland; and the introduced pest species Rabbit (*Oryctolagus cuniculus*) widespread across all vegetation types, especially in open grassy areas.

During 2007 surveys for the Drayton Mine Extension EA, five Squirrel Gliders (*Petaurus norfolcensis*) were captured in arboreal traps in woodland dominated by Spotted Gum. Several threatened microchiropteran (microbat) bat species were also recorded during this survey period within woodland and forest areas including:

- Yellow-bellied sheath-tailed bat (*Saccolaimus flaviventris*);
- Eastern bent-winged bat (*Miniopterus schreibersii*);
- Greater broad-nosed bat (*Scoteanax rueppellii*); and
- Eastern cave bat (*Vespadelus troughtoni*).

Several bird species that are relatively common and well adapted to disturbed environments have been recorded at Drayton, including the: White-plumed Honeyeater, Superb Fairy-wren, Zebra Finch, Australian Raven, Yellow-faced Honeyeater, Red Wattlebird, Noisy Friarbird, Eastern Rosella, Australian Magpie, Buff-rumped Thornbill, and Brown Falcon.

Four bird species of conservation significance have been recorded from previous Drayton Mine surveys within larger blocks of relatively undisturbed woodland (Saunders 2006, Cumberland Ecology 2009), including:

- Diamond Firetail (*Stagonopleura guttata*) – listed as Vulnerable under the TSC Act;
- White-throated Needletail (*Hirundapus caudacutus*) – listed as a Migratory/Marine species under the EPBC Act;
- Rainbow Bee-eater (*Merops ornatus*) - listed as a Migratory/Marine species under the EPBC Act; and
- Speckled Warbler (*Pyrholaemus sagittatus*) – listed as Vulnerable under the TSC Act.

b. Drayton South Project Environmental Assessment

The Drayton South Project is located adjacent to the south of Drayton Mine and a number of fauna and flora surveys have recently been conducted at the site. A total of 21 threatened and/or migratory fauna species comprising highly mobile birds and bats were recorded at Drayton South (**Table A.1**). Due to the proximity of Drayton South to Drayton Mine, there is potential for these species and others known to occur in the locality to overfly the Modification areas. However, a lack of suitable habitat makes it highly unlikely that any of these species would utilise vegetation within the Modification areas.

Table A.1 Threatened fauna species recorded at Drayton South

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurrence at Drayton Modification areas
<i>Pyrholaemus sagittatus</i>	Speckled Warbler	V		No suitable habitat
<i>Circus assimilis</i>	Spotted Harrier	V*		No suitable habitat
<i>Hieraaetus morphinoides</i>	Little Eagle	V		No suitable habitat
<i>Hirundapus caudacutus</i>	White-throated Needletail		M	No suitable habitat
<i>Climacteris picumnus</i>	Brown Treecreeper	V		No suitable habitat
<i>Stagonopleura guttata</i>	Diamond Firetail	V		No suitable habitat
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V		No suitable habitat

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurrence at Drayton Modification areas
<i>Merops ornatus</i>	Rainbow Bee-eater		M	No suitable habitat
<i>Melanodryas cucullata</i>	Hooded Robin	V		No suitable habitat
<i>Petroica boodang</i>	Scarlet Robin	V		No suitable habitat
<i>Lathamus discolor</i>	Swift Parrot	E	E; M	No suitable habitat
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V		No suitable habitat
<i>Ninox connivens</i>	Barking Owl	V		No suitable habitat
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail- bat	V		No suitable habitat
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V		No suitable habitat
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	No suitable habitat
<i>Miniopterus orianae oceanensis</i>	Eastern Bentwing-bat	V		No suitable habitat
<i>Myotis adversus</i>	Large-footed Myotis	V		Potential – aquatic forage habitat present
<i>Nyctophilus timoriensis</i>	Greater Long-eared Bat	V	V	No suitable habitat
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V		No suitable habitat
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V		No suitable habitat

ii. Habitat Assessment

The Modification areas constitute poor habitat for native fauna. The patches of vegetation that occur are small, lack structural complexity, have limited connectivity to surrounding woodland offsets and there is an absence of important shelter features such as logs, hollows and bush rock. The Modification areas are characterised by disturbed open grassland and immature regrowth vegetation as a result of past rehabilitation efforts (see **Photographs 1 to 6**) and continue to be affected by surrounding land use including the Industrial Dam, erection pad and proximity to access roads.

No hollows were recorded in the Modification areas; most of the canopy trees have a low 'diameter at breast height' (DBH) and are not old enough to provide substantial hollows. Ground debris and fallen hollow logs are also absent and do not provide habitat for ground dwelling fauna.

The understorey is limited and dense shrubby vegetation is non-existent. This significantly limits the habitat amenity of the Modification areas for species such as woodland birds that depend on dense understorey for foraging resources and shelter. Foraging resources for microbats, birds and arboreal mammals is also limited due to the immaturity of trees as they

produce a lower quantity and consistency of flowers and fruit than large mature trees. While some woodland birds, including the threatened species Diamond Firetail and Speckled Warbler may periodically utilise habitat elsewhere in the approved Mining Disturbance Footprint, the Modification areas do not provide enough suitable habitat for these species.

A.4.4 Aquatic Environment

The Industrial Dam is unlikely to support much fauna such as amphibians, reptiles and waterbirds due to the lack of fringing vegetation and shelter and the quality of the water (**Photograph 7**). The quality of the water is generally very poor as it is located within an active mine site and receives dirty mine water. The dam is turbid, has experienced silt-laden runoff and is potentially slightly acidic as a result of dust and run off pollutants.

The dam habitat is artificial habitat and unlikely to support substantial fauna species; also, surrounding land use and infrastructure and the lack of permanent watercourses and ephemeral drainage lines would limit fauna movement through the surrounding grassland landscape. However, the dam could potentially support common turtles, eels and aquatic birds.

No threatened frogs have been found on the Drayton site during past surveys, which have included the Industrial Dam. It is unlikely that species such as the Green and Golden Bell Frog (*Litoria aurea*) occurs.



Photograph 7 Edge of the existing Industrial Dam showing a lack of fringing vegetation for aquatic fauna.

A.5 Impact Assessment

A.5.1 Vegetation Communities

The vegetation to be cleared by the Modification is summarised in **Table A.2** below. The majority of the Modification area is either totally cleared or comprised of open water within the Industrial Dam.

Table A.2 Areas of vegetation to be impacted by the Modification

Vegetation Community	Area of Site Vegetation (ha) (including offset areas and excluding areas in existing approvals)	Total Disturbance due to Modification (ha)
Acacia Revegetation Area	3.29	1.24
Central Hunter Box-Ironbark Woodland	4.73	
Derived native grassland	167.71	7.43
Grey Box Forest	0.15	
Hunter Lowland Red Gum Forest EEC	130.43	0.44
Narrow-leaved Ironbark Woodland	20.8	
Rhodes Grass Rehabilitation Area	248.05	9.68
Spiky Rush-Kikuyu Grass	2.94	0.49
Spotted Gum-Grey Box Open Forest	75.55	
TOTAL Vegetation	653.63	19.28
Industrial Dam	-	6.55
North Pit Erection Pad	-	2.63
Cleared Land	-	8.06
TOTAL Area	-	36.52

The Modification will result in the removal of 0.44 hectares of young regrowth HLRF; however the removal of such a small patch of modified regrowth is not considered likely to result in a significant impact to the local occurrence of the EEC. An Assessment of Significance for this community is provided in **Appendix B**.

Taking into consideration the small, fragmented size of the Modification areas, their degraded condition and close proximity to an active open cut mining operation; it is considered unlikely that the Modification will result in any significant impacts to other vegetation communities in the approved Mining Disturbance Footprint.

A.5.2 Flora

No threatened flora species have been recorded in the Modification areas despite multiple surveys. None are considered likely to occur within the vicinity of the Modification areas or be impacted by the Modification. Habitat within the Modification areas is unsuitable for the target threatened species due to the degraded nature of the grassland; a high level of disturbance caused by past clearing and surrounding mining activities; the impacts of grazing by native and exotic herbivores; and significant weed infestation which can smother natives or out-compete them for resources such as space and nutrients.

A.5.3 Fauna

The recent site inspection did not record any threatened species within the Modification areas or identify any evidence of recent use (e.g. nests, scats, burrows). Several threatened fauna species have previously been recorded within the approved Mining Disturbance Footprint and the following impacts section is based on these known species records.

The Modification will result in the removal of approximately 0.44 hectares of regrowth HLRF; 1.24 hectares of low quality Acacia revegetation; and 17.6 hectares of various low quality and highly modified open grassland communities. All of these communities are extensively disturbed and surrounded by active mine infrastructure and roads. Due to the small size and fragmented nature of vegetation in the Modification areas and lack of suitable habitat features such as flowering resources, ground debris, hollows and rocks that may provide forage resources, shelter or breeding habitat, no threatened species are likely to be dependent on the Modification areas to be removed for their ongoing survival.

As no significant impact is likely to occur to threatened species as a result of the Modification, no further assessments of significance have been prepared.

Drayton has previously offered large areas of onsite and offsite vegetation offsets including 131 hectares protected within and adjacent to the Drayton Wildlife Refuge and 88 hectares of woodland in the Northern Offset Area. These areas represent significantly higher quality habitat than that to be removed. Microchiropteran bats and birds, the type of threatened fauna previously recorded at Drayton, are highly mobile species that, if present, will be able to utilise these other habitat areas.

i. Microchiropteran Bats

Database records and previous fauna survey results indicate that several threatened microchiropteran bat species have been known to utilise habitat within the Drayton approved Mining Disturbance Footprint and the locality, including the Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Eastern Bentwing bat (*Miniopterus schreibersii oceanensis*), Greater broad-nosed bat (*Scoteanax rueppellii*), and Eastern cave bat (*Vespadelus troughtoni*) and Large-footed Myotis (*Myotis adversus*).

The Large-footed Myotis is a fishing bat that requires large dams or creeks to forage over for insects. It has not been recorded during surveys of the Drayton approved Mining

Disturbance Footprint but is known from the locality and was recently recorded as part of the Drayton South Project environmental assessment. As the large Industrial Dam will be drained and removed as part of the Modification, potential forage habitat for this species will be removed. However, as this is a highly mobile species that travels large distances to forage and roost, and as other water bodies will still remain within both the approved Mining Disturbance Footprint and locality, the Modification is unlikely to have a significant impact on the Large-footed Myotis. An Assessment of Significance for this species is provided in **Appendix B**.

The small Modification areas are not considered to provide suitable forage habitat, where they typically feed on insects above the tree canopy, or roosting habitat, as there are no hollows, decorticating bark or caves present, for the other threatened bat species. No significant impact is predicted to occur to these microbat species as a result of the Modification.

ii. Squirrel Glider

Squirrel Gliders were recorded within Spotted Gum Forest in the northern portion of the Drayton approved Mining Disturbance Footprint, adjacent to the administration buildings, during the 2007 EA surveys.

It is likely that this species would utilise other areas of habitat on Drayton at different times of the year, when different forage resources such as gum, sap, pollen and invertebrates become available. However, as the Modification areas are small and fragmented by surrounding roads and the existing mine; do not contain mixed species forest and woodland with a shrubby understorey; or large mature trees that have abundant tree hollows and forage resources, they do not support suitable habitat for Squirrel Gliders.

As such, no significant impact is predicted to occur to Squirrel Gliders as a result of the Modification.

iii. Birds

Several threatened species of birds have previously been recorded within the approved Mining Disturbance Footprint area and are species that are commonly found within the locality, including: Speckled Warbler (*Pyrrholaemus sagittatus*), Brown Treecreeper (*Climacteris picumnus*), Diamond Firetail (*Stagonopleura guttata*), and Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*).

The Modification areas offer very limited habitat for these species as they are small, fragmented, lacking structural complexity and highly degraded. Large areas of higher quality potential habitat for these species will remain in the locality, including the Drayton Wildlife Refuge.

The removal of a small area of native vegetation is not expected to have a significant effect on these species. Although not recorded from the Modification areas, the Speckled Warbler (*Pyrrholaemus sagittatus*) has been recorded within the offset area. This area will not be disturbed and will continue to provide habitat for this species.

Two species listed as Migratory/Marine under the EPBC Act have been recorded from Drayton; the White-throated Needletail (*Hirundapus caudacutus*) and Rainbow Bee-eater (*Merops ornatus*). These species would only periodically utilise foraging resources that are present at Drayton, and would not nest on the site. This habitat is unlikely to be important for these species, and the minor reduction in vegetation that is not considered to provide suitable foraging habitat would not have a deleterious effect on them. Large areas of vegetation remain in the locality as outlined above, and these would continue to provide habitat for these species.

As such, no significant impact is predicted to occur to threatened birds as a result of the Modification.

A.5.4 Aquatic Environment

The Industrial Dam is considered unlikely to support any fauna such as fish or amphibians due to the poor quality of the water. As it is a mine water dam the chemical composition, acidity, turbidity and oxygen levels of water in the dam are likely to be unsuitable for aquatic fauna. Also, the dam lacks fringing vegetation that could provide suitable shelter.

The nearest watercourse is Ramrod Creek, an ephemeral drainage line that occurs close to the north-eastern boundary of the North Pit. The headwaters of this creek begin near the southern extent of the rail loop and travel north-west under Thomas Mitchell Drive.

This creek is predominantly dry (pers. comm. P. Simpson), and does not offer suitable habitat for fish or amphibians. It does not have fringing vegetation such as reeds and rushes preferred by amphibians for shelter.

As such, no significant impacts are predicted to occur to threatened amphibians or aquatic environments as a result of the Modification

A.6 Conclusion & Recommendations

No significant impacts are predicted on threatened communities, flora and fauna listed by either the TSC Act or the EPBC Act as a result of the proposed Modification. The areas are very highly modified and apart from narrow strips on the edges of treed communities that fall just within the new Modification boundary, retain almost no woodland or open forest.

The proposed Modification will result in additional impacts of approximately 36.52 hectares to that already approved as part of the approved Mining Disturbance Footprint. Of this area, approximately 19.3 hectares of vegetation will be removed by the Modification, comprising approximately 0.44 hectares of regrowth HLRF; 1.24 hectares of low quality acacia revegetation; and 17.60 hectares of various low quality open grassland communities.

The removal of 0.44 hectares of regrowth HLRF EEC is considered to have little conservation significance due to its small size and degraded nature. Neither Modification area provides suitable habitat for native flora or fauna, including threatened species. This is due to the small size of the areas; being set within an active mine and close to infrastructure

and roads; the lack of woodland; fragmented nature of vegetation; and out competition from invasive weed species.

No threatened flora species have been recorded from the Modification area and none will be impacted by the Modification. No fauna were observed during the site inspection; however the majority of fauna species likely to occur in these areas of the approved Mining Disturbance Footprint are common and widespread species that are able to exist in highly disturbed environments. None of these species will be impacted by the Modification. Several threatened species have previously been recorded from Drayton; however based on the lack of suitable habitat, are also unlikely to be impacted by the Modification.

The removal of small, already modified areas of poor quality habitat will not impact on the ecological values of Drayton or remove critical habitat. Other areas of native woodland to be retained in the locality will continue to provide higher quality habitat than that to be removed. This includes the proximate Drayton Wildlife Refuge which is actively managed to maintain and increase its conservation value and provide habitat for flora and fauna.

There are two recommendations arising from this assessment:

- A drainage protocol for aquatic fauna should be prepared and implemented to protect aquatic fauna and water fowl that might be impacted by the drainage of the dam and to relocate them safely offsite where necessary; and
- To address the minor impacts upon HLRF, future rehabilitation of the Modification areas should include woodland species rather than Rhodes Grass and other exotic herbaceous plants. In particular, the rehabilitation should include at least 1.3 hectares (3:1 ratio) of HLRF trees, shrubs, herbs and grasses.

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Appendix B

Assessments of Significance

B.1.1 Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions

Approximately 0.44 ha of Hunter Lowland Redgum Forest (HLRF) occurs as a narrow band adjacent to the existing Industrial Dam in the proposed Eastern Modification area. It is proposed to be removed as part of the Modification.

During past surveys the area in question was previously identified as Derived Native Grassland. However, it has since regenerated to immature woodland corresponding to the Endangered Ecological Community (EEC) Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions under the NSW *Threatened Species Conservation Act 1995* (TSC Act). The band of Hunter Lowland Redgum Forest being assessed is a small, degraded remnant of this forest community and is characterised by relatively low species diversity. It is immature vegetation comprised mostly of regrowth that lacks structural complexity and contains a number of invasive plant species.

Hunter Lowland Redgum Forest occurs on gentle slopes arising from depressions and drainage flats on permian sediments of the Hunter Valley floor in the Sydney Basin and NSW North Coast Bioregions. The community is generally an open forest with most common canopy trees species being *Eucalyptus tereticornis* and *Eucalyptus punctata* although other frequently occurring canopy species are *Angophora costata*, *Corymbia maculata*, *Eucalyptus crebra* and *Eucalyptus moluccana*, with a number of other eucalypts being less frequently recorded. The mid stratum is characterised as open with sparse shrubs of *Breynia oblongifolia*, *Leucopogon juniperinus*, *Daviesia ulicifolia* and *Jacksonia scoparia*. There is consistently a ground layer of grasses and herbs, characterised by *Microlaena stipoides* var. *stipoides*, *Cymbopogon refractus*, *Echinopogon caespitosus* var. *caespitosus*, *Cheilanthes sieberi* subsp. *sieberi* and *Pratia purpurascens* (NSW Scientific Committee 2011).

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,*

Not applicable to threatened communities.

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,*

Not applicable to threatened communities.

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

Approximately 0.44 ha of regrowth Hunter Lowland Redgum Forest that occurs as a narrow band along a small portion of the Industrial Dam within the Eastern Modification area is proposed to be removed. This community conforms to an Endangered Ecological Community (EEC) listing under the TSC Act.

The occurrence of the narrow strip of HLRF in the proposed Modification area is considered to have little conservation significance. This woodland remnant is highly degraded due to its size, proximity to existing infrastructure and level of isolation from other patches of significant woodland and forest. It holds minimal value as habitat for flora and fauna species due to its young age, lack of habitat features and lack of structural integrity. It has little to no understorey and what is present in the ground stratum comprises many exotic flora species.

Approximately 130 ha of this woodland community will remain within the Drayton approved Mining Disturbance Footprint, Northern Offset Area and Drayton Wildlife Refuge to the north. These areas of Hunter Lowland Redgum Forest are of higher quality and are substantially larger than that to be removed as part of the Modification. They are to be conserved in the long-term which will ensure that the local occurrence of the community will not be placed at risk of extinction. Active management of these areas to maintain and increase conservation value will also provide important habitat for native flora and fauna, including threatened species.

(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.

The Modification will result in the removal of 0.44 ha of regrowth Hunter Lowland Redgum Forest. This community exists as an isolated, narrow band along the Industrial Dam, located within an active mine site.

Although much of the pre-1750 extent of this community has been cleared and approximately 27% (less than 500 ha) of the original distribution survives and is highly fragmented (NSW Scientific Committee 2011), the Modification is unlikely to impact on the long-term survival of the community. In its current state, the community requires active management to counter the effects of continued degradation.

This remnant is currently subject to fragmentation in the landscape and isolation which may impact on recruitment capabilities and genetic viability in the locality. The EEC is also subject to significant edge effects including weed and feral animal invasion and pollution and runoff from the mine and dam access road. The noxious weed Prickly Pear and a variety of exotic grasses and herbs were observed in the community.

The Hunter Lowland Redgum Forest is not considered likely to provide important habitat for fauna due to its small size, degraded form and as trees do not support hollows or important forage resources. The removal of immature trees will reduce poor quality vegetation that is not important habitat for native fauna. Large areas of higher quality habitat remain in the locality, particularly in the Drayton Wildlife Refuge.

The small area of Hunter Lowland Redgum Forest habitat to be removed is not considered to be important to the long term survival of the community in the locality or provide significant fauna habitat. The project will not affect the long-term viability of this community 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 for Hunter Lowland Redgum Forest has currently been identified by the Director-General of OEH.

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

No recovery plan for Hunter Lowland Redgum Forest has been prepared by the NSW National Parks and Wildlife Service to date.

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*

The following Key Threatening Processes are relevant to Hunter Lowland Redgum Forest:

- Clearing of native vegetation;
- Invasion of native plant communities by exotic perennial grasses as this impacts regeneration capabilities and results in loss of structural complexity and of key food plants and habitat;
- Competition and grazing by the feral European rabbit *Oryctolagus cuniculus* as they alter the structure and composition of vegetation, and degrade the land;
- Anthropogenic climate change as this can reduce the geographic range of species and alter the structure and composition of communities

Conclusion

Approximately 0.44 ha of degraded EEC Hunter Lowland Redgum Forest is proposed to be removed as part of the Modification. Due to the small size of the regrowth vegetation; location adjacent to an Industrial Dam and access track within an active mine; highly modified and structurally simplified structure; and invasion by exotic flora species, the removal of this community is not considered to be significant for the long-term survival of the community in the locality. In its current state and without active management, this remnant is expected to continue to be subject to edge effects and degradation that will impact on its viability.

B.1.2 Large-footed Myotis (Myotis adversus)

The Large-footed Myotis is listed as Vulnerable under the TSC Act. The Large-footed Myotis has not been recorded during surveys of Drayton Mine; however it is known from the locality and has previously been recorded at Drayton South. There are 7 records of the species within the Muswellbrook LGA (OEH, 2011). This species is being assessed due to the presence of the large Industrial Dam that is proposed to be drained, as it offers limited but potential aquatic forage habitat for the Large-footed Myotis.

The Large-footed Myotis is a water-foraging, cave-dependent. The species is primarily distributed along the east coast of Australia to the Kimberley, and along major rivers in south-eastern Australia. Colony size can range from less than 15 to hundreds, in caves, mine shafts, hollow-bearing trees, storm-water channels, buildings, under bridges and in dense foliage (Churchill, 2008). Day-roost sites are often close to water where the species can forage over streams and pools to catch insects, prawns and small fish (DEC (NSW), 2005).

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,

This species roosts in caves and hollow-bearing trees, none of which were recorded within the Modification areas. The large dam may on occasion provide forage resources for locally occurring Large-footed Myotis. However, as the Large-footed Myotis is highly mobile and regularly flies large distances to forage, the removal of degraded and generally open grassland and the polluted dam are not considered to be critical habitat for the species. The drainage of the dam and removal of vegetation for the Modification will not have an adverse effect on the life cycle of the species.

Larger areas of higher quality habitat that contain tree hollows, cave, streams and ponds will remain available elsewhere within the locality, including the large Drayton Wildlife Refuge. Any bats likely to utilise the Modification areas would also utilise these offset areas and therefore, a viable local population is unlikely to be placed at risk of extinction as a result of the proposed development.

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,

No endangered populations of the Large-footed Myotis are listed under the TSC Act.

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

Not applicable.

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.

Potential forage habitat in the form of the existing Industrial Dam is proposed to be removed as part of the Modification. This may reduce the availability of aquatic forage habitat for the species; however as the species has not been recorded despite multiple past surveys, the dam is not considered to provide important habitat for the species or be critical to a local population's survival.

The Modification areas do not contain suitable roosting habitat for this species. No caves or hollow-bearing trees occur within the Modification areas and as such, will not support a population of the Large-footed Myotis. As the species is highly mobile and is known from records elsewhere in the LGA, it will still be able to forage and roost in more suitable habitat that exists elsewhere in the locality.

The impacts of the project are not expected to have a deleterious impact upon habitat corridors or habitat connectivity for dispersal of the species. Drayton Wildlife Refuge will continue to provide flyway corridors for the Large-footed Myotis. The extent of clearing will not cause any further isolation of potential foraging habitat for this species. Thus, the local population of Large-footed Myotis will not be placed at risk because of the Modification.

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

No critical habitat for the Large-footed Myotis has currently been identified by the Director-General of OEH.

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

The Action Plan for Australian Bats recovery plan published in 1999 is applicable to the Large-footed Myotis and outlines actions to promote the recovery of these species and the abatement of key threatening processes affecting their occurrence.

- 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*

The proposed project will involve three Key Threatening Processes under the TSC Act:

- Clearing of native vegetation;
- The removal of dead trees, dead wood and logs; and
- Anthropogenic climate change as this can reduce the geographic range of species and alter the structure and composition of communities.

Conclusion

The Large-footed Myotis has not been recorded within the Drayton Mine, despite multiple surveys. However, as the species is known from the locality, including Drayton South, and the Eastern Modification area contains a large dam, it was considered possible that the species could potentially forage over the water body for insects.

While the species may utilise the dam on occasion, the location of the dam within an active mine site and the lack of site records indicate they are not reliant on it. As the species is highly mobile and travels large distances to forage and roost, dams and watercourses elsewhere in the locality will still provide aquatic forage habitat for the Large-footed Myotis. As such, the Project is not considered likely to have a significant impact on the local occurrence of the Large-footed Myotis.