

- Community 4 – White Cypress Forest.  
This simplified community consists almost entirely of White Cypress Pine, *Callitris glaucophylla*, with no shrub layer and a sparse, grazed ground layer.
- Community 5 – River Red Gum Riparian Open Forest / Woodland.  
This community was identified on the banks of the Namoi River and has been partially cleared. While modified it remains a relatively intact open forest to woodland dominated by river red gum and species adapted to wetter areas or permanently available water. Shrub and ground layers are variable in density.
- Community 6 – Weeping Myall Woodland.  
Identified as remnant patches of woodland on an existing farm track along the southern edge of the Pit Top Area and within the road reserve of Old Narrabri Road of the water pipeline route. Modified by clearing, the remnant patches of this community contain weeping myalls (*Acacia pendula*) but lack a native understorey.

A seventh artificial (cleared/semi-cleared or cultivated) community makes up the balance of the surface facilities, namely:

- Community 7 – Cleared Open Grassland / Cropland / Weedy areas / Cultivated Gardens.  
This community occupies the majority of the eastern two-thirds of the Mine Site. It is composed predominantly of cleared open pasture without trees, or isolated paddock trees with groundcover generally to a height of less than 50cm. Cropped fields and artificially planted gardens around homesteads are also included in this artificial community. The community is regularly grazed and/or ploughed and cultivated. The community has no flora conservation significance.

As illustrated on **Figure 4B.26**, Community 1 generally occupies the western third of the Mine Site, whilst Communities 2, 3 and 4 are spread over small areas of the eastern two thirds of the Mine Site. Community 5 occurs along the Namoi River at the proposed discharge point of the water pipeline. One small patch of Community 6 was identified along a farm track on the Mine Site (on the southern boundary of the Pit Top Area) with additional patches identified within the road reserve of the water pipeline route. Community 7 is the largest single community in area, and make up the balance of the eastern two thirds of the Mine Site.

The flora species diversity across the entire Mine Site was observed to be high with 209 flora species from 60 families identified. A total of 22 species of introduced flora were identified, representing approximately 11% of the total species identified.

No threatened flora species listed under either the TSC Act or EPBC Act or rare species on the ROTAP database were detected on the Mine Site during the flora survey.

The condition of the vegetation varied significantly across the Mine Site. The natural vegetation of Community 1 over the western portion of the Mine Site was reported by Ecotone (2009) to be often close to pristine, with few or no exotic species (although some evidence of past logging and/or clearing was evident). Overall, the condition of the vegetation was considered good by Ecotone (2009), even in the grazed pasture areas with patches of remnant tree cover where there was moderate to high native species diversity and a low diversity and cover of weeds.



#### 4B.4.3.2.2 Water Pipeline Route

Figure 4B.27 displays the presence of patches of four of the vegetation communities identified on the mine site, namely:

- Community 2: Inland Grey Box / Bimble Box / Blakely's Red Gum Woodland.
- Community 5: River Red Gum Riparian Open Forest / Woodland.
- Community 6: Weeping Myall Woodland.
- Community 7: Cleared Open Grassland / Cropland / Weedy areas / Cultivated Gardens.

Each of these communities within the water pipeline route contain similar tree, shrub and grass species to those on the Mine Site.

#### 4B.4.3.3 Noxious Weeds

Weeds were recorded almost exclusively in the cleared areas of Communities 2 to 5 over the eastern two thirds of the Mine Site. Six of these species are declared Noxious Weeds in the Narrabri Shire Council control area, pursuant to the *Noxious Weeds Act 1993*, namely:

- Bathurst burr (*Xanthium spinosum*) – Class 4<sup>4</sup>;
- Creeping oxalis (*Oxalis corniculata*) – Class 5<sup>5</sup>;
- Mother of millions (*Bryophyllum delagoense*) – Class 4;
- Noogoora burr (*Xanthium occidentale*) – Class 4;
- Prickly pear (*Opuntia stricta*) – Class 4; and
- Spiny burrgrass (*Cenchrus longispinus*) – Class 4

#### 4B.4.3.4 Flora of Conservation Significance

##### Endangered Ecological Communities

Of the vegetation communities identified on the Mine Site, Community 2, qualifies as the TSC Act listed Endangered Ecological Community (EEC) *Inland Grey Box Woodland in the Riverina, NSW Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions*.

Ecotone (2009) reports that a second EEC listed by the TSC Act, *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions*, occurs in marginal form only in scattered parts of Community 1 over the western slopes of the Mine Site. A third EEC listed by the TSC Act, *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions*

<sup>4</sup> Class 4: Locally Controlled Weeds: The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.

<sup>5</sup> Class 5: Restricted Plants: The requirements in the *Noxious Weeds Act 1993* for a notifiable weed must be complied with.



was also identified by Ecotone (2009), both as a narrow patch of weeping myalls (*Acacia pendula*) along both sides of a dirt road on a more elevated part of the central plains area on the Mine Site and at isolated locations within the road reserve of the water pipeline route (see **Figure 4B.27**). On the basis of these occurrences, other remnant occurrence of the species could occur elsewhere on the Mine Site.

### Threatened Species

As noted in Section 4B.4.3.2, no threatened or rare flora species were detected on the Mine Site during the flora survey. Based on the identified habitat of the vegetation communities of the Mine Site, Ecotone (2009) assessed the likelihood of those species previously identified within the locality, or predicted to occur within the locality by BIOCLIM or the Protected Matters Report of the EPBC Act.

Only one species, *Bertya opposens*, was assessed as having a high likelihood of occurring. One species, *Cadellia pentastylis*, is assessed as having a moderate likelihood of occurring and a further species, *Lepidium aschersonii*, a low to moderate likelihood of occurring. All remaining species are assessed as having a low or minimal likelihood of occurring.

### General Significance of the Flora of the Mine Site

The flora of the Mine Site is significant in terms of threatened species legislation, as one threatened flora species (*Bertya opposens*) has been identified within the Mine Site, the presence of one EEC has been confirmed with two further EECs identified in marginal or very small remnant form.

More generally, the Sandstone Slopes Woodland (Community 1) is contiguous with the large area of natural vegetation in Jacks Creek State Forest beyond the western boundary of the Mine Site. This community is of a high quality and represents a large remnant of practically undisturbed, weed free natural vegetation. It has high species diversity, and is a sharply contrasting vegetation type to the community on the low-lying flats and floodplains. The natural vegetation on the low-lying flats and floodplains of Communities 2, 3 and 4 is much more disturbed by past and current clearing and grazing, however, retains a high native species diversity, particularly in the ground layer. These communities are disturbed remnants of the once extensive floodplain communities that would have occurred widely on the flat areas that are now largely cleared for grazing and agriculture.

All the remnant natural vegetation within the site has ecological value in that it facilitates movement of fauna and exchange of genetic material between native flora species locally, from one part of the Mine Site to another via remnant connections and riparian corridors (including scattered trees in some areas). Although loss or modification of this vegetation may not isolate any populations of flora or fauna, it could have local impacts on natural populations and compromise movements.

## 4B.4.4 Fauna

### 4B.4.4.1 Regional Threatened Fauna

A total of 27 threatened terrestrial fauna species have previously been recorded within the locality, comprising 19 bird, seven mammal and one reptile species (see **Table 4B.26**).



**Table 4B.26**  
**Threatened Fauna Previously Recorded Within the Study Locality**

Scientific Name	Common Name	Status		Records (Locality)	Records (within 10km)
		TSC Act	EPBC Act		
<i>Alectura lathamii</i>	Australian Brush-turkey	E2	~	8	2
<i>Anseranas semipalmata</i>	Maggie Goose	V	~	1	0
<i>Ephippiorhynchus asiaticus</i>	Black-necked stork	E1		2	2
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V	~	2	1
<i>Rostratula benghalensis australis</i>	Painted Snipe (Australian subspecies)	E1	V, Mi	1	1
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	V	~	7	6
<i>Neophema pulchella</i>	Turquoise Parrot	V	~	10	1
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	1	1
<i>Tyto novaehollandiae</i>	Masked Owl	V	~	1	1
<i>Ninox connivens</i>	Barking Owl	V	~	7	5
<i>Climacteris picumnus</i>	Brown Treecreeper	V	~	19	12
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	~	1	0
<i>Pyrrholaemus sagittatus</i>	Speckled Warbler	V	~	10	9
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	~	1	0
<i>Xanthomyza phrygia</i>	Regent Honeyeater	E1	E, Mi	1	1
<i>Melanodryas cucullata</i>	Hooded Robin	V	~	3	2
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	~	5	5
<i>Stagonopleura guttata</i>	Diamond Firetail	V	~	4	0
<i>Phascolarctos cinereus</i>	Koala	V	~	17	6
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	~	2	1
<i>Macropus dorsalis</i>	Black-striped Wallaby	E1	~	1	0
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E1	V	8	0
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	~	5	3
<i>Nyctophilus timoriensis</i>	Eastern Long-eared Bat	V	V	3	2
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	2	1
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V	~	1	0
<b>Status (TSC):</b> refers to the NSW <i>Threatened Species Conservation Act 1995</i> (TSC) E1 Schedule 1, Part 1: Endangered species CE Schedule 1A, Part 1: Critically endangered species V Schedule 2: Vulnerable species  <b>Status (EPBC):</b> refers to the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC) E Endangered Species V Vulnerable Species Mi Migratory Species					

At the date of submission, the following preliminary determinations for listing under the TSC Act exist on the following species known to occur in the locality (recorded during surveys for this project or recorded on the Atlas of NSW Wildlife):

- Little lorikeet (*Glossopsitta pusilla*): proposed vulnerable species listing;
- Little eagle (*Hieraaetus morphnoides*): proposed vulnerable species listing; and
- Varied sittella (*Daphoenositta chrysoptera*): proposed vulnerable species listing.





An Australian Brush-turkey population in the Nandewar and Brigalow Belt South Bioregions is located within the locality.

#### 4B.4.4.2 Mine Site Fauna

A habitat assessment of the various components of the Mine Site was undertaken by Ecotone (2009). The habitat assessment identified four primary fauna habitat types, all of which occurred on the Mine Site (see **Figure 4B.28**) and three of which occur along the water pipeline route.

- Woodland areas<sup>6</sup>.
- Open areas comprised of pasture and/or cropping paddocks<sup>6</sup>.
- Drainage lines<sup>6</sup>.
- Farm dams.

A total of 156 fauna species were recorded within the study area during the field surveys, comprising 93 birds, 37 mammals, 16 reptiles and ten frogs. Nine introduced species (two birds and seven mammals) were recorded.

Notably, the drainage lines of the Mine Site (Kurrajong and Pine Creeks and their tributaries) were inspected by Ecotone (2009) who reported that these drainage features comprise little more than dry drainage lines lacking pools of semi-permanent or permanent water. No aquatic vegetation was recorded and no fish habitat was identified or considered likely to occur.

#### 4B.4.4.3 Fauna of Conservation Significance

Fourteen Threatened fauna species listed on the TSC Act were recorded during field surveys across the Mine Site (see **Figure 4B.28**).

- |                          |                                   |
|--------------------------|-----------------------------------|
| • Pale-headed snake.     | • Diamond firetail.               |
| • Glossy-black cockatoo. | • Koala.                          |
| • Turquoise parrot.      | • Delicate mouse.                 |
| • Superb parrot.         | • Black-striped wallaby.          |
| • Speckled warbler.      | • Eastern long-eared bat.         |
| • Grey-crowned babbler.  | • Little pied bat.                |
| • Eastern pygmy possum.  | • Yellow-bellied sheath-tail-bat. |

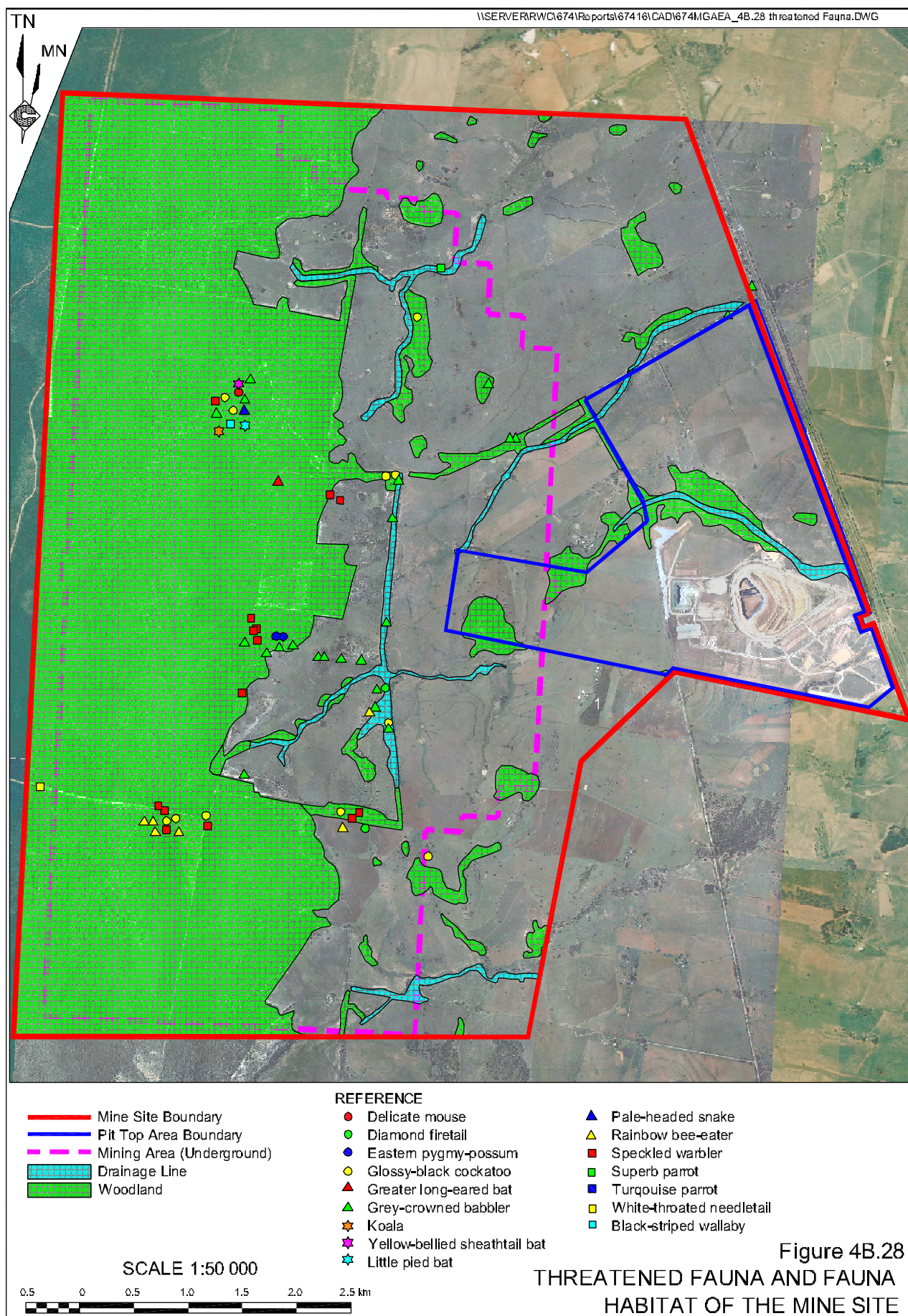
Of the fourteen threatened fauna species, the Delicate mouse and Black striped wallaby are the only endangered species (TSC Act) with the 12 remaining species listed as vulnerable on the TSC Act.

The Varied sittella, for which a preliminary determination under the TSC Act for vulnerable status has been completed, was also identified on the Mine Site. An additional two threatened species, the squirrel glider and spotted-tailed quoll, are likely to occur but were not recorded during field surveys.

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<sup>6</sup> Occurs along the water pipeline route.





Six threatened or migratory species listed within the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) were recorded during field surveys, namely:

- superb parrot<sup>7</sup>;
- delicate mouse<sup>7</sup>;
- white-throated needletail;
- eastern long-eared bat<sup>7</sup>;
- rainbow bee-eater; and
- yellow-bellied sheath-tail-bat<sup>7</sup>.

Potentially suitable habitat exists across the Mine Site for a further 20 threatened or migratory species that were not identified during field surveys (Ecotone, 2009).

#### **4B.4.5 Potential Impacts of the Longwall Project**

##### **4B.4.5.1 Vegetation Clearing and Habitat Loss**

Section 2.4.9 provides a detailed summary of the surface disturbing activities associated with the proposed Longwall Project. It has been estimated that up to 705ha of the Mine Site would be disturbed by activities such as the construction of mine ventilation shafts, gas drainage, extension of the Pit Top Area, development of the Reject Emplacement Area, Brine Storage Area and construction of access tracks and power line corridor across the Mine Site.

Over the eastern two thirds of the Mine Site, where Community 7 is the dominant vegetation type, the majority of this disturbance would be able to be restricted to the cleared lands of Community 7. However, the Mining Area of LW7 to LW20 includes significant areas of remnant vegetation (predominantly Community 1) where it would not be possible to avoid the disturbance to native vegetation. While the exact location of surface disturbing activities such as ventilation shaft construction and gas drainage cannot be exactly plotted, as underground and mining conditions at the time would dictate the exact location of these activities, **Figure 4B.29** presents the estimated location of all surface disturbance over the life of the mine. **Table 4B.27** provides a summary of the areas of disturbance of each vegetation community based on this estimate.

Based on the results of the desktop and field surveys of the Mine Site, there are only three Threatened flora species that are considered as potentially occurring on the Mine Site which could be disturbed as a result of the proposed surface disturbing activities. Habitat for up to 37 fauna species, 15 of which were identified on the Mine Site, would be disturbed. Section 4B.4.6 describes the management measures to minimise the impact of the proposed clearing and habitat loss and Section 4B.4.7 evaluates the residual impact on the 40 threatened species potentially affected (in accordance with Step 3 of Part 3A Guidelines).

**Table 4B.27**  
**Estimated Disturbance to Native Vegetation Associated with the Longwall Project**

Surface Disturbing Activity	Area of Disturbance (ha) of Communities					Total
	1	2	3	4	6	
Ventilation Fan Sites	13.0	1.0	0	0	0	17.0
Pre-drainage Sites	88.6	11.2	0.6	1.0	0	101.4
Goaf Gas Drainage Sites	62.0	8.0	3.0	1.0	0	74.0
Internal Access Roads, Power Lines and Service Corridors	15.3	2.7	0.5	0.2	0	18.7
Pit Top Area	0	1.9	0	0.5	0	2.4
<b>Total</b>	<b>178.9</b>	<b>24.8</b>	<b>4.1</b>	<b>2.7</b>	<b>0</b>	<b>210.5</b>

<sup>7</sup> Also listed under the TSC Act.





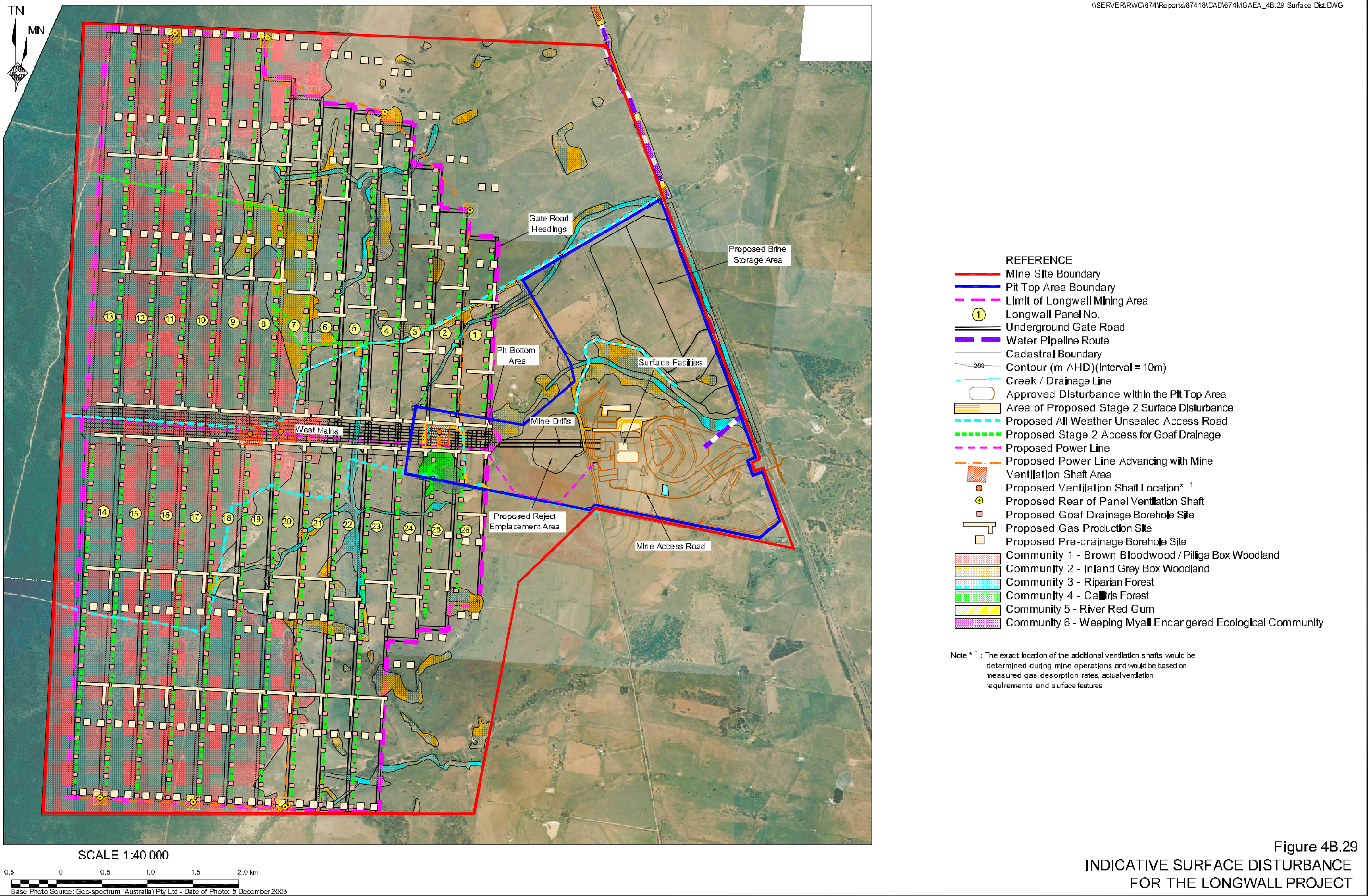


Figure 4B.29  
INDICATIVE SURFACE DISTURBANCE  
FOR THE LONGWALL PROJECT



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#### **4B.4.5.2 Habitat Fragmentation**

Disturbance associated with the construction of access roads between ventilation and gas drainage sites would result in some fragmentation of the native vegetation, in particular that of Community 1 over the western third of the Mine Site. The width of the corridors is likely to be no greater than 10m (see **Table 2.9**), and it is therefore unlikely that they would create significant barriers to the movement for many species. However, the creation of these corridors would increase the area of edge habitat within the Mine Site. Edge effects such as increased levels of light, solar radiation and wind penetration may alter the suitability of the environment for many species. Edges are also more likely to be colonized by weed species which may then spread further into woodland areas.

Section 4B.4.6 describes the management measures to minimise the impact of edge effects and Section 4B.4.7 evaluates the residual impact on the 37 threatened fauna species potentially affected (in accordance with Step 3 of Part 3A Guidelines).

#### **4B.4.5.3 Habitat Isolation**

The 30m wide power line corridor which would be aligned along the northern edge of the Mining Area may result in the isolation the northern portion of Community 1 from the southern portion and may prevent the movement of some species between these portions. As noted in Section 4B.4.5.2, the narrow width of access tracks running between the goaf boreholes (<10m) would not create a barrier for native species resulting in habitat isolation.

Section 4B.4.6 describes the management measures to minimise the impact of habitat isolation and Section 4B.4.7 evaluates the residual impact on the 37 threatened fauna species potentially affected (in accordance with Step 3 of Part 3A Guidelines).

#### **4B.4.5.4 Corridor Function**

Much of the vegetation within Communities 2 and 3 is located along fence lines (Community 2) and drainage features (Community 3) and provide a linkage between the western woodland area of Community 1 and the riparian habitat along the Namoi River, approximately 5km to the east of the Mine Site. The creation of access road and power line corridors may have some impact on the function of these corridors.

The large woodland remnant of Community 1 in the western third of the Mine Site also provides a corridor function, ie. it provides a north to south and east to west linkage for species within the remnant, and an east-west linkage for species moving from or to the remnant from the creek line and fence line corridors to the east. The northern power line corridor may reduce the corridor function for some species, eg. small terrestrial species and some arboreal species. The reduction in corridor function caused by the access tracks for ventilation and gas drainage activities is unlikely to significantly affect the corridor function of the remnant although they would increase the potential for edge effects on the habitat.

Where the proposed pipeline corridor requires the removal of trees along road easements, particularly along the dirt road running north-south along the eastern perimeter of the Mine Site, the likely removal of all woodland trees within such areas would result in a loss of corridor areas within the local landscape.

