Kanmantoo Copper Mines Native Vegetation Management Plan Addenda

“Giant” pit cut back

January 2016

Version No.	Prepared By	Reviewed By	Approved By	Date
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Contents

1. INTRODUCTION

1.1 Background

Hillgrove Resources Limited (Hillgrove or HGO) requested permission to lay back a section of the pit wall in the Schultze/Giant pit beyond the boundary of the approved pit crest in the current PEPR to maintain safe operations. A section of the eastern wall of the Schultze pit has become unstable and presents a significant risk to the safety of personnel if allowed to fail in an uncontrolled manner. The wall is subject to continuous monitoring and scanning equipment that is linked to an alarm system. The system has identified instability immediately above an access ramp into the Giant pit, which if not addressed is likely to result in a toppling mode failure posing an unacceptable risk to employees using the access ramp. To maintain safe operation the wall needs to be laid back to an angle such that the likelihood of a toppling failure is reduced to acceptable levels.

This moves the crest of the pit further east into an area where native vegetation valued at a 6:1 SEB ratio is located. The area of native vegetation to remove is 0.99 ha. This will equate for the need to provide a further 6ha of off-set vegetation of Acacia pycnantha, low woodland being established on Hillgrove controlled/owned property.

This document constitutes addenda to the original NVMP. It should be viewed as an extension of NVMP, addressing the additional area of native vegetation disturbance and the corresponding area of SEB-offset.

This offset will commence establishment in 2017 to align with major works associated with further enhancement of neighbouring SEB offset areas. Preliminary works such as de-stocking and resting the cropped area will occur this year.

For full site details, operating and rehabilitation plans associated with the initial phase of mining operations at Kanmantoo, please refer to the approved PEPR and associated resources via this link
…ftp://central.pir.sa.gov.au/Minerals/Kanmantoo_Appendix_Volume3_v7.pdf

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1.2 Regulatory Framework

1.2.1 *Mining Act 1971*

The principal legislation for the regulation of mining in South Australia is the *Mining Act 1971*, which is administered by the Department for Manufacturing, Innovation, Trade, Resources and Energy SA (DMITRE). Hillgrove Resources Ltd was granted mining lease (ML) 6345 under the provisions of this Act in order to proceed with mining on-site at Kanmantoo.

1.2.2 *Native Vegetation Act 1991*

All native vegetation in South Australia is protected under the provisions of the *Native Vegetation Act 1991*, where the South Australian Native Vegetation Council (NVC) must approve any clearance of vegetation not exempted under regulations.

DSD has been delegated the authority from the NVC to administer the SEB requirements (as they apply to mining operations) under the *Mining Act 1971*, on the basis that DSD will apply the policies of the NVC to clearance and revegetation as part of the requirements of a PEPR under Regulation 42 of that act (DWLBC, 2005).

1.3 NVMP Addenda

This NVMP addenda comprises

- – Background information.
- _ Site and vegetation description.
- – Management and mitigation measures.
- – SEB Offset calculation.
- – SEB Offset implementation and timing

2. SITE AND VEGETATION DESCRIPTION

ML 6345 contained approximately 113 ha of remnant vegetation; consisting of 7 differing vegetation communities distributed over approximately 440 ha prior to 2011 (see Table 1). Vegetation condition ranged from degraded and highly modified patches, given an SEB Condition Ratio of '2:1', to patches with high levels of diversity in very good to excellent condition, given an SEB Ratio of 8:1. A total of 20.5ha of native vegetation disturbance was approved in our initial PEPR, requiring the establishment of 125.5 ha of SEB-offset vegetation within the ML, in conjunction with measures to protect and enhancement all remnant vegetation within the ML.

Surveys of potential new disturbance areas associated with the LOM-extension proposal were conducted by EBS-Ecology in June 2013. Significant rainfall through the winters of 2011, 2012 and 2013 and associated vegetation recovery following previous drought affected seasons, enabled the survey team to accurately represent the endemic flora of each area for referral to DSEWPaC. ML vegetation condition was significantly improved at the time of the 2013 survey, when compared to that viewed by Ecological Associates during the dry spring of 2007.

Though the June 2013 EBS survey was not conducted at the seasonal peak, we consider that the surveyors were sufficiently experienced to accurately identify emergent flora within the survey areas and we are comfortable that their findings provide an accurate representation of patch composition and quality. Regardless of this, have applied an 8:1 offset-ratio to disturbance in vegetation patches listed as 6:1, and a 10:1 offset-ratio to disturbance in patches listed as 8:1 vegetation in the EBS 2013 survey. The distribution of vegetation communities described by EBS is illustrated by Figure 3 (below).

2.1 Land Use History

The Kanmantoo Copper Mines have a long history of mineral exploration and mining which began in 1846 and continued to 1874, with intermittent prospecting continuing in the area until the 1960s. In the early 1970s, Kanmantoo Mines Limited commenced open-cut mining over the northernmost workings of the earlier underground Kanmantoo mines. The first open-cut mine operated for six years. Mining infrastructure remaining on the site from these operations included an open pit (approximately 120 m deep), processing plant (now used as a site for fertiliser manufacture), a partially revegetated waste rock dump and a tailings dam. The site also has been disturbed by past works to establish hardstands, roadways and other historic infrastructure.

In late 2003, Hillgrove began an exploration program in the Kanmantoo area and in April 2004, the company acquired the historic Kanmantoo Copper Mines mining lease (ML 5776).

Grazing and cereal cropping has been occurring in the Kanmantoo/Callington region for over 100 years. The flora in and around the Kanmantoo Copper Mines has been substantially altered through a long history of clearing to support intensive grazing and dry-land cropping. Woody weeds now occur in many remnant stands of native vegetation and introduced grasses occupy large parts of the ML area, particularly over former cropping land and around fenced grazing paddocks. Hillgrove discontinued grazing and cropping within ML6345 prior to the commencement of on-ground works in 2011.

2.2 Vegetation Communities

The Kanmantoo Copper Mines are located in the region covered by the Biodiversity Plan for the South Australian Murray–Darling Basin and within the Eastern Mount Lofty Ranges Regional Ecological Area (REA). The ML is in a 425mm rainfall zone. It is on the cusp between two adjacent floristic regions of SA, driven by high and low rainfall respectively. Subsequently, the ML's flora is diverse, containing a broad range of species which are routinely seen in either rainfall zone.

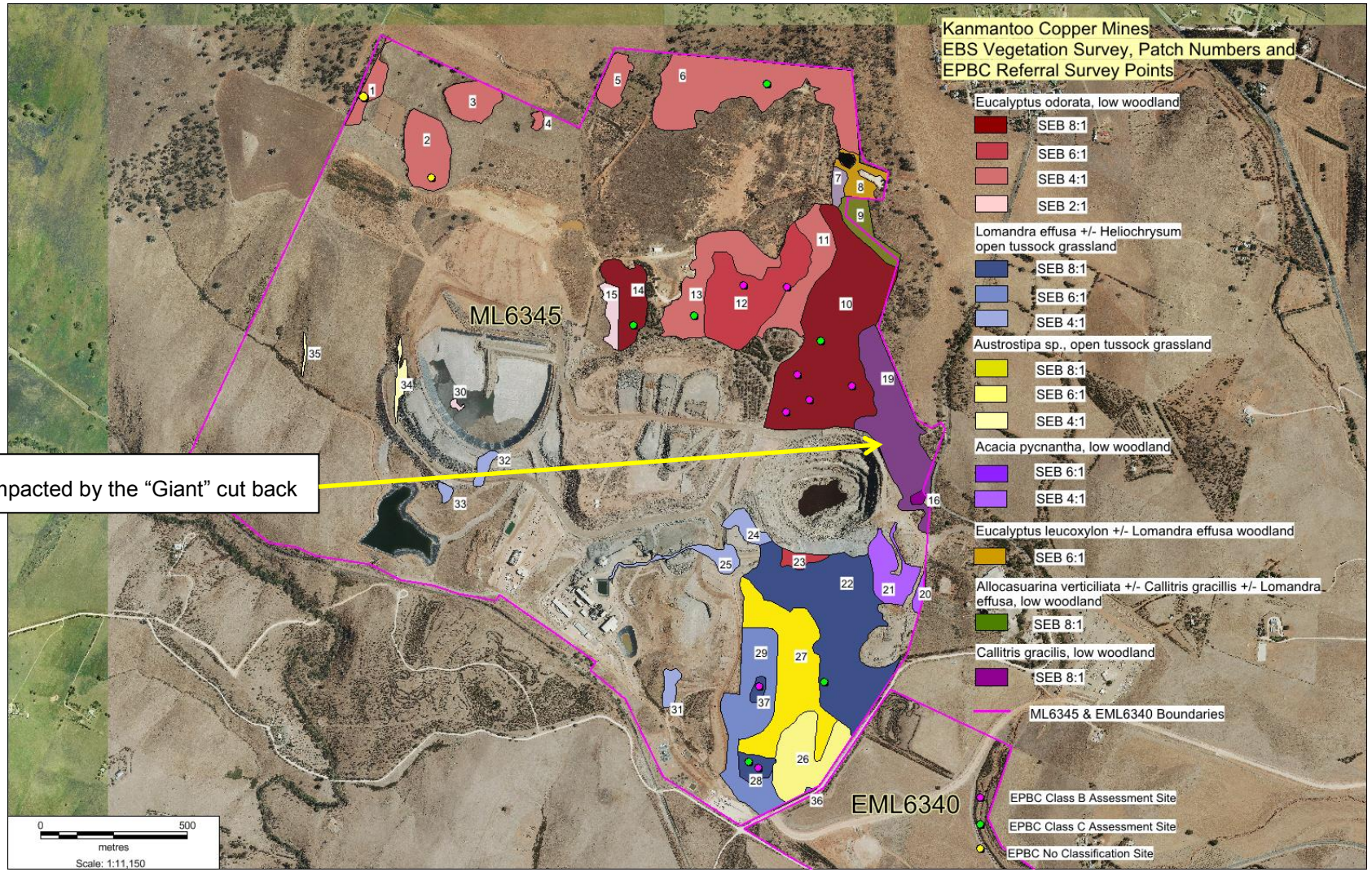
Table 1. Native Vegetation Communities within ML 6345

		PEPR/EA Survey			Revised EBS 2013 Survey	
Vegetation Community	**Conservation Significance**	**Condition (SEB Ratio)**	**Patch Numbers**	**Area (ha) Within ML**	**Patch Numbers**	**Area (ha) Within ML**
Eucalyptus odorata low woodland	National level, critically endangered. State level - Priority 3	8:1	10, 14	14.93	10, 14	20.28
		6:1	12, 17, 23	9.66	12, (17 inc in 10), 23	8.29
		4:1	1, 2, 3, 4, 5, 6, 11, 13	28.50	1, 2, 3, 4, 5, 6, 11, 13	28.50
		2:1	15, 30	1.05	15, 30	1.05
Lomandra effusa +/- Helichrysum leucopsideum open tussock grassland	National level, critically endangered. State level - Priority 1	8:1	22, 28, 37	17.77	22, 28, 37	15.86
		6:1	29, 36	2.06	29, 36	6.94
		4:1	24, 25, 31, 32, 33	3.46	24, 25, 31, 32, 33	3.46
Austrostipa sp. open tussock grassland	Regional level - threatened	8:1	27	11.61	27	8.66
		6:1	26	4.66	26	4.66
		4:1	34, 35	0.73	34, 35	0.73
Callitris gracilis low woodland	Regional level - threatened	8:1	16	0.19	16	0.19
Eucalyptus leucoxylon +/- Lomandra effusa woodland	Regional level - threatened	6:1	8	1.27	8	1.27
Eucalyptus gracilis +/- Eucalyptus oleosa open mallee	Not listed	8:1	18	4.00	(Inc in 10)	0.00
Acacia pycnantha low woodland	Not listed	6:1	19	7.74	19	7.74
		4:1	7, 20, 21	3.49	7, 20, 21	3.49
Allocasuarina verticillata +/- Callitris gracilis woodland	Not listed	8:1	9	1.84	9	1.84
Scattered Trees	Not listed	n/a	n/a	56 trees	n/a	56 trees
			Total	**112.96**	Total	**112.96**

2.3 *Acacia pycnantha* low woodland

Remnant patches of *Acacia pycnantha* low woodland occur to the immediate east and northeast of the existing pit and originally occupied 11.2 ha within the ML. Vegetation disturbance attributable to the "Giant" pit cutback equates to 0.99ha of 6:1 *A. pycnantha* woodland in patch 19 of figure 1.

Figure 1. Revised 2013 EBS Vegetation Survey, Listing Patch Numbers, and EPBC Survey Points



3. MANAGEMENT AND MITIGATION MEASURES

3.1 Vegetation Clearing

The management of the risks associated with additional areas of vegetation clearing will be based on the following hierarchy:

1. Avoiding areas with communities of conservation significance where possible and minimising approved vegetation clearance where this can be achieved
2. Avoiding disturbance in all other remnant native vegetation
3. Appropriately managing the approved clearance of native vegetation
4. Monitoring and reporting the clearance of all vegetation
5. Mitigating approved vegetation disturbance through the provision of corresponding SEB-offset areas

3.1.2 Avoiding Disturbance in all Other Remnant Native Vegetation

Measures to minimise disturbance in all other remnant vegetation types, both within and adjacent to the ML on Hillgrove-owned properties include:

- Employing a strictly enforced land clearance permit system for all disturbance activities. This permit system requires detailed mapping of proposed disturbance by the proponent, sign-off by each of the Mine's operational Departments, an on-ground vegetation survey by Environment Department staff and final HGO Environment Department approval before disturbance is authorised.

  The HGO Environment Department routinely place restrictions on disturbance areas or request redesign of proposals to avoid sensitive vegetation where this can be practically achieved. The HGO Environment Department also walks cleared areas following earthmoving activities to ensure that Permit conditions have been followed. Any breaches of Permit conditions are formally reported and are followed up with the responsible HGO Department Manager.

- Strictly limiting any form of disturbance in all areas of native and non-native vegetation
- Limiting disturbance by locating access tracks, bunds and other mine infrastructure outside of vegetation remnants wherever possible.
- Minimising the length and number of access tracks in remnant vegetation. This includes closing off redundant tracks where feasible.

3.1.3 Appropriately Managing the Approved Clearance of Native Vegetation

Measures to appropriately manage the clearing of vegetation, where the above steps cannot avoid this, include:

- Educating workers in the importance of protecting native vegetation by:

  - Including information on the importance of threatened plant species, vegetation clearance restrictions and conservation aims in the induction process.
  - Ensuring staff are aware that plant identification charts, conservation information and plant identification expertise are readily available through Environment Department Staff.
- Protecting areas of vegetation to be retained by:
  - Ensuring areas of vegetation to be retained are clearly marked on site plans.
  - Clearly marking 'no go' zones (e.g., with fencing, bunding, demarcation and/or instructions) to ensure areas to be protected are clearly defined, identified and avoided.
  - Avoiding introduction of soil pathogens to areas of remnant vegetation by identifying and clearly demarcating soil stockpile sites. This includes pre-entry inspections of all new vehicles and earthmoving equipment and issuing of Equipment Inspection Certificates to compliant plant before they can commence work within the ML
- Developing site-specific vegetation clearance protocols for all personnel to follow. These protocols include:
  - A step-by-step process to follow prior to commencing the clearing of any native vegetation. This includes an Excavation Permit, which requires a separate Land Clearance Certificate to be completed and approved by Environment Department staff in cases where vegetation clearance is required. This process ensures that:
  - Areas to be cleared are mapped, pegged and verified.
  - Areas to be retained are mapped, pegged and verified.
  - A continuous-checking system is employed to minimise the potential for inadvertent clearing of native vegetation.
  - Areas are only cleared immediately prior to their development.
  - Ground disturbance is only undertaken within designated and approved areas.
  - Clearance activities are coordinated to allow topsoil recovery and stockpiling
  - Plant rescue campaigns are scheduled for designated clearance areas within appropriate seasonal windows prior to the commencement of land clearance. Plant rescue campaigns are carried out by collaboration between local Landcare volunteers and HGO Environmental Staff, with assistance provided through qualified Contractors (e.g., EBS and COOE).

Disturbed areas are progressively rehabilitated and unnecessary future disturbance of these areas will be avoided.

3.1.4 Monitoring of all Vegetation Clearance

Total vegetation clearance within the ML will be regularly monitored through routine on-ground observations, aerial photography and GIS-based mapping. Monitoring results will be reported annually in the MARCR. Regular auditing will also be carried out to assess the compliance of all personnel with vegetation clearance protocols listed above.

3.1.5 Mitigation of Approved Vegetation Disturbance Through the Provision of Corresponding SEB-offset Areas

Where vegetation clearance must be carried out to progress mining operations and approval has been granted clearance, care will be taken to ensure that the provision of SEB-offsets will commence at the same time that vegetation clearance occurs. The following measures are undertaken to ensure that clearance is mitigated through the provision of corresponding SEB-offsets:

- Working with local interest groups and other stakeholders where possible to maximise the benefits of SEB-offset programs, both in terms of the results achieved and in terms of creating both interest by and benefit for local groups (for example, the Kanmantoo Callington Landcare Group (KCLG) and other similar parties).
- Revegetating, using appropriate local species and local provenance seed sources (wherever possible), to link isolated vegetation remnants within the ML and provide a degree of continuity to offset areas located on properties immediately adjacent to the ML (See Figs 7 & 8).
- Relocating any threatened flora species to be disturbed by approved mining activities.
- Ensuring in-house environmental capabilities have been established and are maintained to develop, apply and manage revegetation and SEB-offset programs associated with the LOM extension. To date this has included (but will not be limited to) the construction and operation of a 1.0ha irrigated, Seed Production Area (SPA) within the ML and the establishment of a 5ha Seed Multiplication Area (SMA) on land directly adjacent to the ML in 2013 (please see Plates1 & 2, below).

  The SPA has been populated using native seed collected within the ML and near ML region. The SMA was sown in July 2013 using a combination of SPA-grown and local provenance seed. It is expected that a blend of SPA, SMA and annual wild seed collection will provide sufficient stock for progressive rehabilitation through the LOM extension and for final closure operations following the conclusion of mining. SPA, SMA and wild-seed collection programs are currently conducted in association with staff from EBS-Restoration.
- Establishing methods to monitor and maintain progressively rehabilitated and revegetated areas, including:
  - Establishing 360º photo-monitoring points throughout the ML area and at adjacent ML vantage points.
  - Establishing a series of Landscape Function Analysis (LFA) transects through benchmark vegetation communities (after Tongway & Hindley 2004). Data has been collected in association with staff from EBS-Ecology since the commencement of mining operations and will be used to gauge the progress of SEB and Rehabilitation plantings through regular LFA transect monitoring in newly established patches (EBS, 2013).
  - Developing procedures for conducting post closure follow-up visits to the ML area on a regular basis (of a decreasing frequency with time) to monitor the success rate of seedling emergence and survival, weed invasion, browsing levels (i.e., insect and animal attack of regenerating vegetation) and erosion, using photo-monitoring points to track progress.
  - Ensuring that the monitoring program reflects agreed closure criteria established through consultation with stakeholders.

- Acting where monitoring has identified erosion, weed invasion, failure of revegetation (to a material degree) or excessive browser damage to regenerating vegetation. This may include:
  - Repairing eroded areas.
  - Controlling weeds (chemical, mechanical, and manual methods).
  - Controlling pests (baiting, fencing, ripping etc.).
  - Infill planting.
  - Spot sowing.
  - Reseeding.

4. SEB- OFFSET CALCULATION

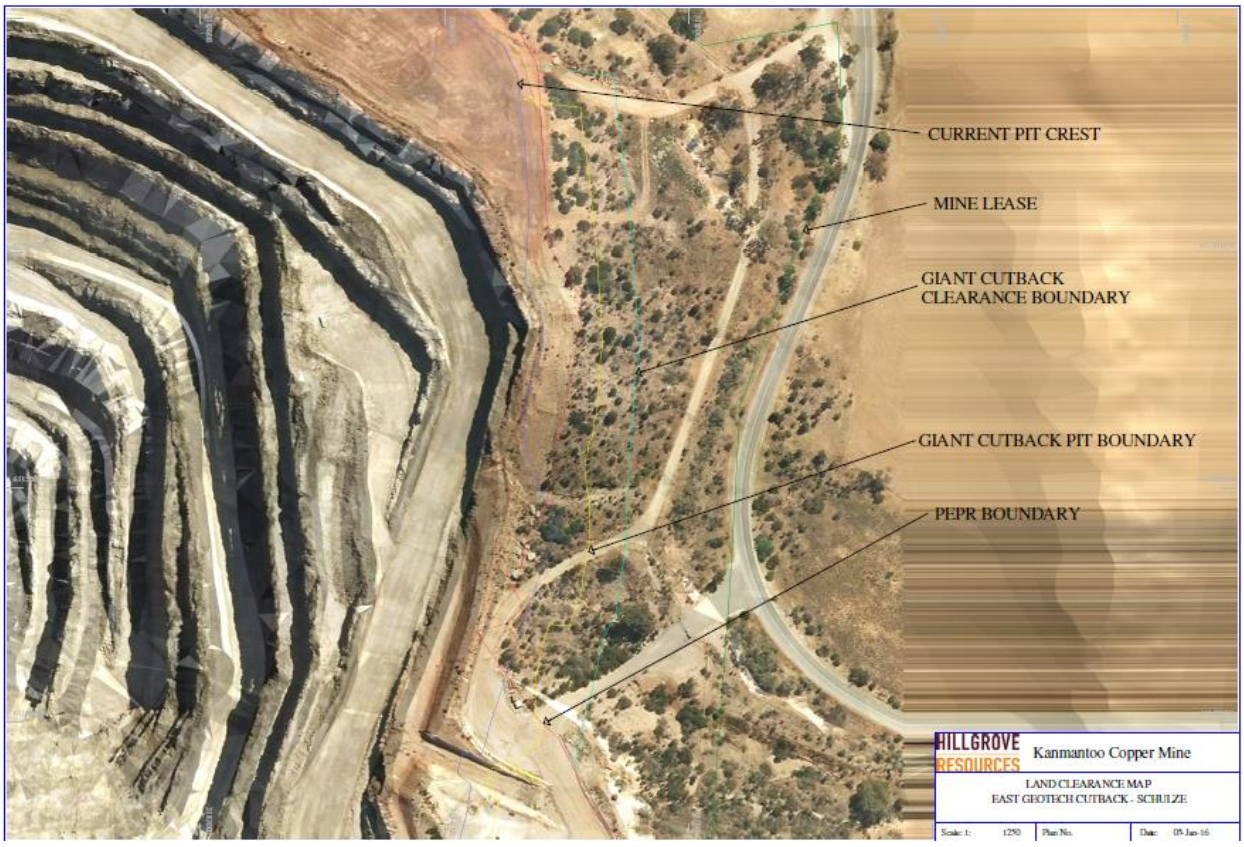
4.1 Extent of Vegetation Clearance

Native vegetation was cleared within the Kanmantoo ML between late 2010 and 2013 in PEPR-approved areas to accommodate mining infrastructure associated with the initial phase of mining operations.

A further 9.1ha of native vegetation disturbance occurred to extend the life of the mine. This involved additional native vegetation disturbance to the north-west and south-east of the open pit and to the south of Emily Star pit as follows

The “Giant” pit cut back will see a further 0.99ha of native Acacia pycnantha low woodland removed. Accordingly at a 6:1 ratio an area of offset in the order of 6ha will now be provided.

Figure 2. Proposed Native Vegetation Disturbance for “Giant” pit cut back



4.2 Impacts of Vegetation Clearance

The residual impacts of the proposed levels of disturbance to flora and fauna may include:

- Impacts to threatened vegetation communities.
- Impacts to threatened flora and fauna species.
- Reduced conditions favourable for plant growth due to dust.
- Reduced abundance of individual species (both flora and fauna).
- Increased abundance of introduced species (pest plant and animals).

4.3 Estimated Significant Environmental Benefit

4.3.1 Initial SEB Assessment

An SEB offset area of 125.25 ha was originally calculated to offset vegetation disturbance associated with the initial phase of mining operations.

A total of 9.1ha of native vegetation disturbance associated with the LOM extension, requiring the establishment of 67.6ha of mixed SEB-offset vegetation. As much of the ML has been previously allocated to SEB-offsets for PEPR-approved native vegetation disturbance, SEB-offsets associated with the LOM extension are proposed on Hillgrove-owned land, directly to the east of the ML.

The establishment of the 6ha to offset the “Giant” cut back will be located in the same parcels of land adjacent to the area of their removal currently under establishment of the LOM extension offsets.

5. PROVISION OF SEB

5.1 Rationale

The rationale for provision of an SEB Offset is based on the premise that the clearance of native vegetation will result in a loss of biological diversity values (which include flora and fauna habitat), with the degree of loss dependent on the quality and amount of vegetation to be cleared (PIRSA, 2004).

To compensate loss of biological diversity values, the SEB offsets should not only replace the environmental values lost through clearing, but also lead to a net gain that contributes to improving the condition of the environment, either on the site of the operations or within the same region of the state. Alternatively, an appropriate sum can be paid into the SEB Offset Fund administered by the SA Government for disbursement to other offset creating programs.

An SEB-offset is intended to commence at the time of vegetation clearance and should be located on land as near as possible to the site of clearance.

It is intended that the conversion of farming and grazing land adjacent to the ML will provide a significant benefit to the environment as outlined below. Table 3 provides a list of properties owned by Hillgrove immediately adjacent to the ML. It highlights which properties have been earmarked to host SEB offset areas for corresponding new areas of native vegetation disturbance within the ML.

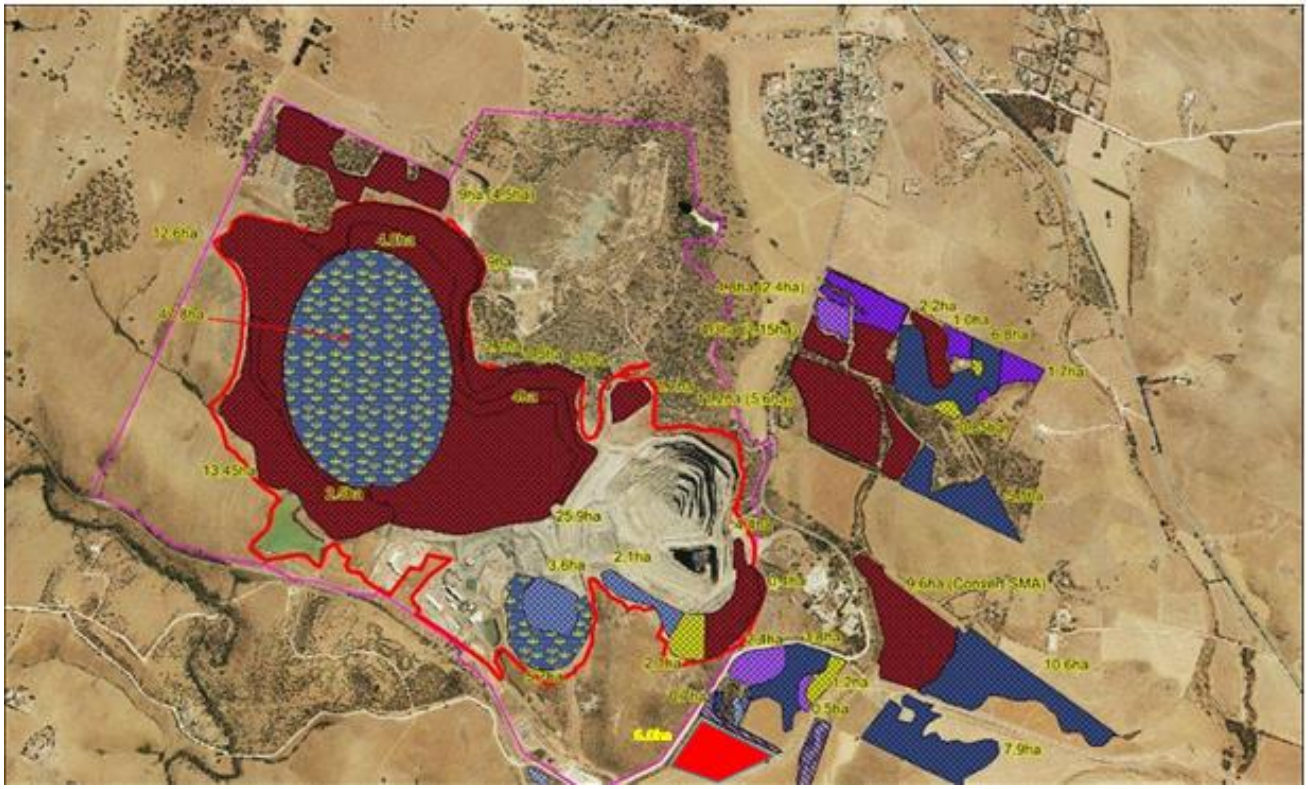
Table 2. Hillgrove-owned property adjacent to the ML and Assignment of SEB Offsets

Property Name	**CT Reference/ Owner**
141 Mine Rd	F160800 A61/ Hillgrove
Mullewa	F1636 A1/ Hillgrove
Ferguson's	D80644 A21/ Hillgrove
Lot 25	D60948 A25 (EML6340)/ Hillgrove
Back-Callington Rd/ Éclair Mine Rd	D47967 A4 and D30934 Q1/ Hillgrove

***The area in grey denotes the property on which the offset for the "Giant" pit cutback will be established.**

The following figure shows the location of SEB areas under current establishment as part of the approved Native Vegetation Management Plan. The area coloured red denotes the 6ha now reserved for the establishment of new offset for the “Giant“ cut back and subject of this addenda.

Figure 3. Location of new SEB in relation to approved and established SEB



The new area of offset will be established in 2017 to coincide with major works associated with neighbouring SEB areas and to allow for the building of the native seed reserves generated by the on-site seed production area (SPA).

it is intended that an SEB offset will be created on the assigned area through the following means;

- Removing agricultural activity from allocated areas
- Installing rabbit-proof fencing and controlling rabbits/hares/foxes within fenced areas
- Carrying out ongoing weed control programs to remove introduced plant species
- Carrying out erosion mitigation works within assigned areas where possible
- Planting local plant species derived from local provenance seed within designated vegetation areas to create areas of high-value vegetation
- Following up planting programs with infill plantings where required
- Progressively providing nesting boxes, perches and/or refuges for local fauna within revegetated patches as they become increasingly capable of supporting local fauna populations.
- Involving local community groups and local contractors in all work where possible (to create both regional interest and regional employment)
- Protecting SEB-offset patches through appropriate Heritage Agreements

These steps are described in detail by Section 5.2 and Table 4, below.

It is important to note that successful implementation of the intended SEB offset program on agricultural land currently owned by Hillgrove and the subsequent protection of planted areas through Heritage Agreements will remove these areas from future agricultural production in perpetuity. This requires considerable investment by Hillgrove as the assigned land parcels will lose their real-estate value as productive agricultural land and will have a limited future niche market value if they are sold at a later date. This will be particularly so if plans to build a new water supply pipeline to the ML are realized and the land could have been sold as productive areas with associated irrigation licences.

5.2 Implementation

Hillgrove proposes to meet this SEB requirement at the Kanmantoo Copper Mines by implementing the following SEB-Offset program.

Please note:

- SEB-offsets are provided on a 'like for like' basis with an area of vegetation disturbance being offset by the establishment of a corresponding area of offset vegetation
- The area of offset vegetation is proportionately larger than the area of vegetation to be disturbed. The size of the offset area is governed by the patch condition of the disturbed area and its assigned SEB offset ratio as highlighted by Table 2 (above)
- The floristic composition and plant density of the offset area will be the same as the disturbance area it offsets as illustrated by Fig. 8
- *Should the results of 'investigative studies' as discussed in point 5.2.7, below, prove that the provision of SEB Offsets on any particular allocated land parcel is impractical or financially unreasonable, Hillgrove reserves the right to directly fund the establishment of an equivalent SEB offset on private land in the near-mine region by third-party providers, following an appropriate Government approval process*

5.2.3 Surveying proposed revegetation plots within assigned SEB-offset land parcels

Objective

Conduct detailed surveys of designated SEB-offset patches to ensure that they meet initial requirements in terms of area, land class and aspect for their intended offset vegetation type. If any area is determined as unsuitable, survey and allocate equivalent land parcels within Hillgrove-owned land immediately adjacent to the ML.

Discussion

The areas assigned to specific SEB-offset patches, as illustrated in Fig 8, are well known but they haven't been surveyed in detail at the time of writing this NVMP. The selection of SEB-offset patches for each vegetation class and community is based on current knowledge the aspect, terrain and soil type being broadly suitable for its intended end-use.

Detailed ground-based survey of each patch may identify localised features which exclude portions of designated areas from their intended rehabilitation purpose, or conversely confirm their suitability. If so, detailed survey will allow unsuitable areas to be identified and mapped. Any variance to the area available for SEB-offset patch establishment will be compensated by the assignment of alternate areas of appropriate size within the same land parcel or on an adjacent Hillgrove-owned land parcel.

Activities

To meet this objective, Hillgrove proposes to:

- Conduct a detailed ground-based survey of designated SEB-offset patches
- Delineate patch boundaries
- Map areas within delineated patches which are unsuitable for their intended end use
- Identify alternative areas of a suitable size within the same land parcel or on Hillgrove-owned land adjacent to the ML
- Survey, map and delineate alternate patch boundaries
- Modify NVMP maps and program plans as appropriate

5.2.4 Install and maintain rabbit-proof fencing to protect land parcels or individual SEB-patches as appropriate

Objectives

Contain and control feral herbivores and other feral animals within designated land parcels or SEB-offset patches. Prevent reintroduction of feral pests into designated offset areas from surrounding properties. Protect new offset vegetation from grazing by feral and domestic animals. Allow native seed reserves to accumulate within offset patches, both in the short and long term.

Regularly inspect and maintain fences to ensure that pest reintroduction does not occur following control.

Discussion

Hares rabbits, goats and deer can devastate new plantings of native vegetation during the summer months when they are often the only source of palatable green feed. Similarly, unintended grazing by escaped livestock due to poor perimeter fences can significantly retard offset patch development. This is particularly so for direct-seeded areas, where tree guards can't be used cost-effectively.

Intensive, prolonged baiting programs with Pindone or 1080 are effective and can reduce rabbit and hare numbers in the short-term. However, such programs are expensive and poor perimeter fencing can lead to the ongoing reintroduction of feral pests from surrounding properties.

Numerous studies over the last 50-years have demonstrated the ability for native vegetation to re-establish within fenced exclosures, where the only driving forces for re-establishment are appropriate seasonal conditions and the removal of all grazing pressure. While areas of long-term cropping land are unlikely to contain significant quantities of remnant native seed, the exclusion and eradication of rabbits from newly planted rehabilitation areas can significantly aid seedling survival and establishment.

In the long-term, rabbit proof fencing allows feral animals to be controlled within fenced areas through baiting and other means. Once feral animals have been removed, appropriate fencing significantly reduces ongoing feral animal control costs by preventing the reintroduction of pests from surrounding properties. The absence of grazing pressure by rabbits in particular, will aid plant establishment, canopy development, seed accumulation, natural recruitment and ultimately, the establishment of self-sustaining vegetation communities.

Once fences have been established it will be necessary to carry out regular fence inspections and repairs throughout the life of the SEB offset program.

Activities

To meet this objective, Hillgrove proposes to:

- Survey land parcels to establish the most cost-effective means of installing rabbit proof fences to contain and protect designated SEB-offset patches
- Seek quotes for fence installation and reserve budgets for capital programs
- Engage contractors to complete fencing ahead of land preparation if necessary
- Regularly inspect and maintain fences throughout the life of the SEB Offset program

5.2.5 Purchase of specialist equipment and/or engagement of Contractors

Objectives

When SEB-offset plans for the LOM extension have been approved, ensure that planned SEB-offset programs are appropriately resourced through internal budget allocations and executed either through direct employment of staff and purchase of specialist equipment or through engagement of appropriately skilled and equipped contractors or other groups.

Discussion

The delivery of SEB-offset on former farming and grazing land requires specialist skill sets and equipment to be achieved successfully and cost effectively.

Activities

To meet this objective, Hillgrove proposes to:

- Discuss proposed SEB-offset patches and intended outcomes with our current contractor group and other specialist groups
- Seek quotes for the delivery of SEB-offsets on designated areas from our current contractors and other specialist groups (which could include the Kanmantoo/Callington Landcare Group, Goolwa to Wellington LAP, State Flora etc.)
- Review quotes and perform a cost-benefit analysis to determine if offset is best delivered in-house, or through external agents
- Engage staff and acquire equipment, or engage contractors or other specialist groups

5.2.6 Commence weed control and feral animal control programs within designated SEB-offset areas prior to planting and through the establishment phase

Objectives

Control feral animal populations within fenced SEB-offset areas prior to the commencement of planting operations. Maintain population control through ongoing feral animal control programs during the life of the SEB-offset program.

Control pest plants within designated SEB-offset areas. Begin weed population reduction prior to SEB-offset planting and continue weed control throughout the establishment phase.

Discussion

Significant populations of rabbits, hares cats and foxes currently occupy farming land around the Kanmantoo ML and within the Kanmantoo ML. Ongoing baiting programs within the ML have proven to be successful in reducing feral animal numbers for a short time, however the populations are resilient and we suspect that they are replenished by influx from surrounding areas when numbers are reduced within the ML.

Direct seeded rehabilitation areas within the ML have proven to be successful in terms of seedling germination and plant establishment; however they are prone to grazing by rabbits, particularly in drier months when seedlings offer a source of green feed at a time when introduced annual plants have senesced. This can slow the accumulation of biomass in rehabilitation areas and promote seed loss and slower recruitment as rehabilitation plants mature.

The commencement of feral animal control programs prior to planting within designated SEB-offset areas will act to significantly reduce damage to rehabilitation plantings during the establishment phase. When coupled with rabbit proof fencing, sustained feral animal control within protected areas will reduce grazing pressure to acceptable levels and will significantly assist the establishment and development of SEB-offset plantings.

Weed control within former cropping land is essential for the successful establishment of SEB-offset vegetation and will need to be carefully managed throughout the life of the offset program. A number of weed control strategies can be used and these will necessarily vary depending on the planting situation, the composition of the intended foundation seed mix and the ongoing program aims for each offset patch. Weed control programs will capitalize on herbicide selectivity for different species at differing developmental stages or physical treatments, such as pre cultivation burning or topsoil removal where this is warranted.

Typically, preparation of planting areas through the use of systemic herbicide sprays on fallowed areas as summer weed control can be followed by cultivation, pre-sowing herbicide application, post sowing-pre-emergent selective herbicide application and selective post emergent herbicide application. If a foundation seed mix containing perennial C3 and C4 native grasses is used to initially colonise farming land, contact desiccants can be used to control annual weeds and reduce vigour in perennial weeds. Once the foundation seed mix achieves canopy closure, selective herbicides and spot-spray programs can be used to further reduce weed numbers or create planting nodes for direct seeding and/or tube plantings

Activities

To meet this objective, Hillgrove proposes to:

- Commence feral animal control programs within designated SEB-offset areas as soon as possible and maintain feral animal control programs within SEB-offset patches throughout the life of the program
- Commence pre-sowing control of crop and pasture weeds and other pest plants as soon as possible. Maintain selective control programs post-planting and throughout the establishment phase

5.2.7 Investigative studies to quantify the parameters for successful revegetation on specific SEB-offset patches

Objectives

Conduct a range of detailed site-specific studies to define and understand the significance of parameters which may have a direct impact on the establishment and success of SEB-offset vegetation in particular offset patches.

Use Landscape Function Analysis and vegetation surveys on assigned offset patches prior to the commencement of on-ground works to define the benchmark state of each patch as a means of objectively assessing progress towards required offset outcomes.

Apply the outcomes of investigative studies to pre-sowing land preparation, foundation seed mix compositions, planting methodologies, post sowing management and follow-up maintenance programs for specific SEB-offset patches.

Discussion

Small-scale variations in soil characteristics, weed flora composition, site aspect, site terrain, land-use history and location can have a significant impact on the ultimate success of offset-patch establishment. Understanding the viability of available native seed lots can have a significant influence on the best seed mix composition and sowing rates for offset patch establishment.

Understanding the benchmark state of each offset patch prior to the commencement of ground works provides a basis for the objective assessment of progress towards the establishment of intended plant communities on each offset patch.

To define these parameters for each assigned offset area, a range of investigative studies will need to be completed for each patch and their allocated seed lots prior to land preparation (see below).

Activities

To meet this objective, Hillgrove proposes to carry out a range of site-specific investigative studies prior to land preparation and planting. These studies *may include, but will not be limited to* the following subject areas:

- Detailed site survey, mapping and planting niche identification for target plant communities
- Survey and mapping of weed populations and the location of any remnant native species
- Soil surveys and lab tests to define and map the physical characteristics, soil types profiles and nutrition status of soils in each offset patch
- Soil tests to establish freedom from critical soil pathogens which could cause offset patch failure, for example Phytophthora cinnamomi (or Dieback)
- Studies to determine the identity of weed seeds, their density and distribution through the soil profile

- Test patches to evaluate the efficacy of varying depths of topsoil removal to assist with weed seed bank depletion, detrimental nutrient removal (e.g., phosphate) and the establishment of direct-seeded patches
- Test patches to evaluate the direct seeding techniques best suited to assigned patches
- Specific studies through an alliance with the Adelaide Botanic Gardens Seed Conservation Centre (SCC), focussing in particular on the viability of foundation seed mix species and the relationship of this to optimal direct seeding rates for the establishment of representative offset vegetation communities
- Specific studies through the SCC to determine the best propagation, planting and establishment methods for recalcitrant species. For example continue investigating *Lomandra effusa* propagation, seed viability studies etc.
- Continue liaison with other mine sites to adapt successful niche-specific mine-site rehabilitation systems to Kanmantoo's SEB-offset and Rehabilitation program
- Surveying feral animal populations and rabbit warren distributions within each patch to tailor-make effective control programs
- Conducting Landscape Function Analysis (LFA) and vegetation surveys on each patch prior to the commencement of on-ground works. Survey temporary transect sites with a view to permanently establishing LFA transects following initial planting operations.
- Incorporating of site-specific knowledge into SEB Offset programs
- Conducting other studies as required, for example to determine optimal selective weed control, both pre and post planting for any previously unknown weed species located during site specific surveys
- *Where investigative studies identify a critical problem with an individual offset patch (for example, presence of Phytophthora cinnamomi), a suitable alternate offset patch will need to be located as near as practical to the ML. Appropriate investigative studies will need to be repeated on the alternate offset patch as required*

5.2.10 Build up seed reserves and order specific seed supplies or tube stock to meet planting schedules

Objectives

Ensure that adequate seed supplies and tube stock are available for scheduled offset patch planting and replanting programs at the various stages of patch establishment. Ensure that only species represented in ML floristic communities are included in planting programs. Ensure that local provenance seed and tube stock sources are used wherever possible. If supplies of local species are needed and can't be obtained from local sources, ensure they are acquired from sources as near as practical to the ML in the first instance or from other sources within the same climatic conditions as a last resort.

Discussion

It is expected that the majority of seed required for successful offset patch establishment will be available through annual wild seed collection campaigns conducted both within the ML and in the near-mine region. Past collection programs have yielded significant quantities of seed from a wide range of local species and over 390kg of seed is currently in store at the EBS seed storage facility. Further seed lines collected during 2013/14 are yet to be processed and weighed. It is understood that wild seed collection programs can be (and have been) very successful in good seasonal conditions, but they can fall short of requirements where winter rainfall is inadequate.

The ML's Seed Production Area is a 1 ha irrigated intensive seed production facility populated with local native species and planted with local provenance seed sources (see Plate 1). It has been established to provide a predictable quantity of key species efficiently and independently of seasonal conditions. Following an initial establishment period, the SPA is beginning to produce commercial quantities of seed. For example, our first harvest of seed *Austrodanthonia* yielded over 98kg.

Early seed yields form the SPA, together with wild-seed collections have been used to establish a large-scale seed multiplication area (SMA) on a plot of former cropping land directly adjacent to the ML (see Plate 2). The SMA was planted in mid-2013 and contains plots of Austrodanthonia, Austrostipa, Chloris, Themeda and Vittadinia. Plot sizes vary from 0.25ha to nearly 1.0ha each. It is anticipated that our first seed yields will be obtained in spring 2014, with seed being incorporated into SEB offset establishment programs shortly afterwards.

Where seed-derived establishment of particular native species within an offset plot is not possible by direct seeding, it will be necessary to propagate tube stock via reputable specialist nurseries (e.g., State Flora at Murray Bridge, or Provenance Indigenous Plants at Hendon SA etc.). Appropriate tube stock supplies will be sourced as required to meet ongoing planting and replanting schedules throughout the offset patch establishment program. Where possible, tube stock will be grown from seed derived through annual wild seed collection campaigns.

Activities

- Continue to conduct seasonal wild-seed collection programs on the ML, in the vicinity of the ML and near ML region, focussing on the quantities and range local native species required for SEB offset patch establishment programs
- Continue to propagate local provenance seed supplies through management of the ML's Seed Production Area (SPA – see Plate 1) and large-scale Seed Multiplication Area (SMA – see Plate 2).
- Purchase supplementary seed supplies from local suppliers if necessary.
- Order and purchase tube stock supplies

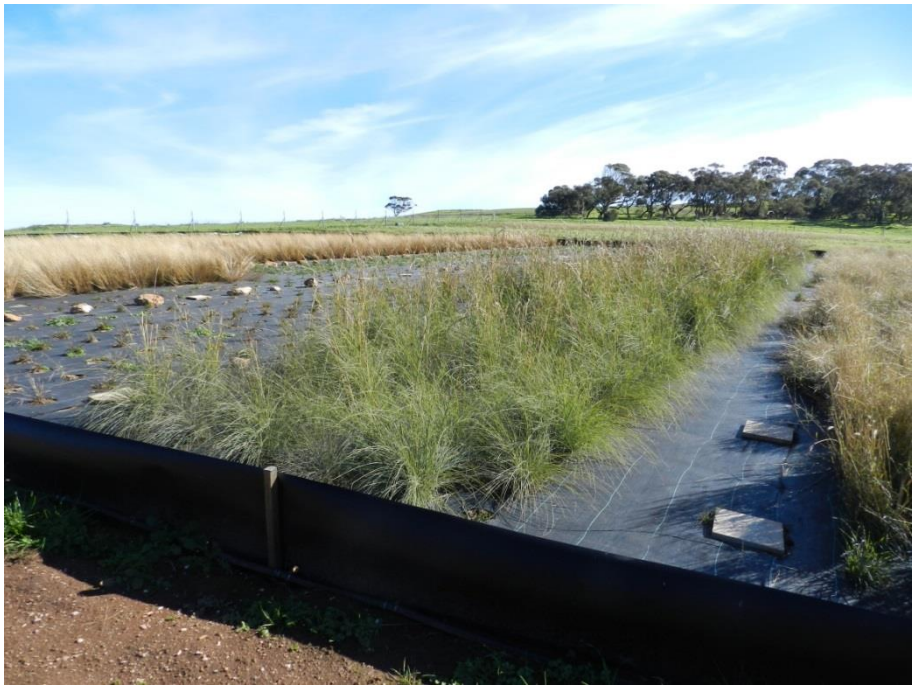


Plate 1. Seed Production Area highlighting diversity grass seed plots

Plate 2. Seed Multiplication Area established on former cropping land adjacent to the ML

5.2.11 Land Preparation

Objectives

Schedule and conduct land preparation activities to meet offset-patch establishment programs. Carry out pre-sowing and pre-planting weed reduction programs to reduce both the levels of weed competition in newly established plantings and subsequent weed contamination in mature offset vegetation patches. Carry out on-ground works necessary to prevent soil erosion during patch establishment or ameliorate current erosion features in patch areas where possible before planting. Cary out any cultivation or soil amelioration activities necessary for patch establishment prior to sowing.

Discussion

Inadequate land preparation will lead to offset patch failure, with weed competition being the greatest single risk to establishment success. Extensive soil seed banks have accumulated through decades of agricultural activity and a diverse range of weed species can be found on most land in the Kanmantoo area, including wild oats, brome grass, barley grass, wire weed, wild turnip, blackberry nightshade, horehound, Chenopodium, and salvation jane, to mention a few.

It is expected that the range of investigative studies discussed in point 5.2.7 (above) will provide the data necessary to define and program the necessary range of land preparation operations on a patch by patch basis. Pre-planting land preparation will be necessarily tailored to meet the specific needs of each offset patch and will vary dependant on previous site or cropping history, soil type, terrain and the intended end result for that patch.

For example, controlled burning, followed by a program of selective and non-selective herbicide applications will be necessary on higher rocky land with a history of grazing by sheep. Mechanical cultivation or direct seeding in these areas would is either impossible due to steep slopes and outcropping rock, or imprudent due to erosion risk. Where niche plantings are planned on rocky ground, small areas can be hand prepared, followed by a herbicide program prior to hand sowing or seed or planting tube stock. Ongoing weed control will be required to aid establishment.

Conversely, land preparation on former cropping land may involve the phased stripping of topsoil down to a carefully controlled depth with a wheel tractor-scraper, with the depth of topsoil removal determined by the seed bank studies cited in 5.2.7 (above). This practice acts to physically remove the soil weed-seed bank and accumulated phosphate fertilisers and some residual herbicides (e.g. metsulfuron-methyl), leaving prepared areas better able to support direct-seeding to a foundation seed mix (see 5.2.12, below). Topsoil removal was advocated during the 2012 Grassy Woodlands Establishment Forum, hosted by the City of Salisbury and has been subsequently used to successfully establish foundation seed mixes within the ML rehab area and on the former cropping land adjacent to the ML used to establish the SMA.

Topsoil removal is essentially the same process as that is used by conventional direct-seeders, where an offset disk scrapes away a layer of topsoil and seeds are sown onto exposed subsoil – only this is carried out on a much larger scale. Care will be taken to strip alternate bands of topsoil in scraper-width rows, leaving intermediate areas untouched to act as erosion protection and dust prevention. The intermediate areas will be managed with a program of mowing,

knockdown and selective herbicides before being stripped in a later season when initial direct sown areas have commenced establishment.

Land preparation may also involve the application of specific soil ameliorants as highlighted by the results of patch-specific investigative studies outlined above. For example, where the soil is shown to be sodic or dispersive, dressings of gypsum may be warranted to displace sodium, reduce soil dispersion and erosion and increase water infiltration. Other soil ameliorants will be applied as indicated by investigative studies.

Further soil pre-conditioning of former cropping land will be required following pre-stripping and immediately prior to planting. This may include ripping where warranted or cultivation as required. For example, seed bed preparation for direct seeding of pre-stripped land has been successfully carried out on the ML by EBS using a modified turf soil conditioner, which cultivates only the top 25mm of the soil surface immediately prior to direct seeding.

It is important to note that the examples provided above are not represent and exhaustive list of land preparation methodologies which can or will be used during the offset establishment program.

Activities

- Carry out land preparation operations tailored by investigative studies to establish specific offset patches on specific land areas
- Apply specific soil ameliorants to address issues identified in the investigative studies
- Prepare seed beds or planting sites ahead of planting programs as required

5.2.12 Planting Programs

Objectives

Schedule planting programs in accordance with seed and tube stock availability to meet land preparation, seasonal deadlines and SEB offset patch requirements. Tailor offset patch species lists and/or seed mixes to deliver the required floristic species range and planting densities necessary to successfully establish the required SEB offsets for the LOM extension. Use planting methods which are best suited to the terrain being sown and the vegetation type being established. Involve the local community, local groups and local contractors wherever possible to ensure benefit to our community and increase both interest in the SEB offset program and ownership by our communities.

Discussion

It cannot be overstressed that land preparation and forward planning are the keys to successful SEB offset area establishment. Pre-sowing land preparation for specific offset patches will be scheduled in accordance with seed and tube stock availability. Correspondingly, seed multiplication, collection and tube stock propagation programs will need to be planned to meet proposed planting schedules. The commencement of planting on specific offset patches will be governed by the time that successful land preparation is achieved and planting material is

available during ‘Year 1’ for each SEB offset patch as outlined by the program presented in Table 4 (above). Planting will generally be commenced after opening rains in late April to late May and should conclude by late June. However, planting too late in the season or during adverse seasonal conditions will lead to poor success and the waste of limited seed resources; as such planting times may also be determined and varied by seasonal factors.

The specific species lists used to establish particular plant communities and conditions in all SEB offset patches will be governed by;

1) The EPBC Condition Class of the vegetation patch disturbed by clearance associated with the LOM extension
2) The species range observed within the disturbed vegetation patch during the 2007 EA survey and the subsequent 2013 EBS survey
3) The species densities described by LFA surveys conducted within the ML since 2011

As a general principle, direct seeding of appropriately prepared sites with a suitable ‘Foundation Seed Mix’ containing a tailor-made range of understorey coloniser species will be preferred to other planting methods on former cropping land. Typically, this mix will include Austrodanthonia, Austrostipa, Themeda, Enneapogon, Chloris and a range of other herbaceous and shrub species representative of the floristic community being established. The aim of this phase is to provide competitive pressure for remnant weed species through colonisation with a dense stand of appropriate native species and to allow a degree of understorey development prior to planting appropriate mid and canopy-level species.

Establishment of the foundation seed mix may be followed by a combination of direct-seeded and tube-stock plantings to introduce mid-level and canopy species in *E. odorata* and *A. pycnantha* woodlands, while direct seeding and tube stock planting may be used to introduce diversity into *L. effusa* grasslands. In all cases, the most appropriate planting methods will be varied to meet the needs of individual patches and the end result to be achieved.

Where essential species are difficult to propagate or are known to establish poorly (for example *L. effusa*), the results gained through specific investigative studies (e.g. the Botanic Gardens Alliance) will be used to solve propagation issues and implement appropriate large-scale propagation programs. This may be carried out by specialized providers (e.g. State Flora – Murray Bridge) and will be geared to provide sufficient planting material to meet program needs.

For example, Alcoa’s Huntley operation in WA achieves near 100% species return to areas of rehabilitation in wet-sclerophyll forest through a combination of direct seeding and niche plantings of recalcitrant species propagated as a result of tissue-culture and other seed research conducted in liaison with Kings Park Botanic Gardens in WA. Tissue cultured plants are established through specialized planting and post-planting protection regimes for particular species (i.e. *Lomandra*). We expect that a similar alliance with the Adelaide Botanic Gardens SCC will greatly assist the overall quality and success of planting programs at the KCM.

Similarly, the reintroduction of rescued *Diuris behrii* following propagation by NOSSA will allow specific niche patches of *Diuris* to be reintroduced within *E. odorata* offset patches throughout the offset program. Of the 100 rescued *Diuris* plants, there are now more than 300 in the NOSSA nursery. This is expected to continue through successive daughter generations and will provide a continued stream of planting material of local provenance (see Plate 7, below).

There will be considerable scope for involvement of local community groups and service providers in offset patch planting programs throughout the life of the SEB offset program. This may take the form of planting days where school groups assist with tube stock plating into swards of established foundation species, funded planting campaigns assisted by volunteers from the local Kanmantoo Callington Landcare Group, through to funded planting programs by other providers (for example, possibly the Goolwa to Wellington LAP), where works are carried out either on designated offset patches or if the need arises, other Government approved near-mine areas.

Activities

- Integrate planting program timing with land preparation activities, seasonal windows of opportunity and the availability of appropriate seed reserves and tube stock
- Apply appropriate planting methodologies to individual offset patches in accordance with the vegetation community being established, past history of the patch and the land class available
- Engage in alliances to conduct research on the propagation and establishment of key recalcitrant species which prove to be unsuitable candidates for normal direct seeding or tube stock planting programs
- Engage appropriate expert assistance with large-scale propagation of recalcitrant species (for example State Flora – Murray Bridge & NOSSA)
- Engage the local community and community groups in offset patch planting programs
- Engage other specialist providers to provide planting program services where warranted
- *Directly fund Government approved offset patch establishment by 3rd party providers on other suitable near-mine areas, should offset patch establishment on allocated areas prove to be impractical or financially prohibitive*

5.2.13 Assess results and adjust methods

Objectives

Regularly objectively assess the establishment and development of offset patches against known patch analogues by recognised means. Continue with establishment methodologies where they are proven to be successful and adjust processes where they are proven to be inappropriate.

Discussion

The condition and functionality of native vegetation patches within the ML have been regularly assessed through a combination of both Landscape Function Analysis (LFA) transects in key vegetation patches and vegetation surveys conducted by EBS-Ecology over the past 3-years (Tongway and Hindley 2004), (EBS, 2013). We now have good volume of data to support the progressive improvement of remanent patch condition within the ML since 2011. This data also allows us to define the LFA characteristics of key vegetation communities and their respective SEB condition scores, with a view to providing analogue benchmarks for the structured assessment of SEB offset patch establishment on assigned areas.

The progress of SEB offset patch establishment will be objectively monitored against the characteristics exhibited by established analogue communities within the ML. This will be achieved by establishing and assessing a series of permanent LFA transects in each offset patch shortly after the first phase of planting is completed and regularly reassessing each patch during spring in subsequent years.

Where objective data proves the progression of offset patch condition and composition towards their intended outcome, management and planting programs will be continued. Where the data shows that poor progress is being made, supplementary actions will be scheduled to correct deficiencies (for example, improved weed control, different planting methods, additional planting programs or the application of supplementary soil ameliorants).

In extreme cases, patch failure may require reestablishment at an alternate approved site in the near-mine region. This would only be considered as a last resort if all other corrective measures have been exhausted, or a suitable alternate site offers a higher probability of success with fewer interventions.

Activities

- Continue LFA and vegetation surveys within key vegetation communities on the ML
- Establish permanent LFA transects in each offset patch over pre-planting transect sites
- Conduct regular LFA and vegetation surveys to objectively monitor development progress in each offset patch
- Continue and replicate patch establishment methodologies where LFA data shows promise
- Discontinue establishment methodologies where LFA data demonstrates poor progress
- Modify methods and address patch deficiencies where warranted
- In extreme cases, identify alternate offset patches near the ML, seek Government approval and re-establish offsets on alternate sites

5.2.14 Replanting and Amendment Programs

Objectives

Monitor and address poor offset patch establishment through appropriate replant programs. Identify and address plant losses caused by adverse seasonal events as required.

Discussion

Poor planting program success can be caused by inappropriate land preparation, poor timing of planting operations, poor seed viability, poor tube stock quality, inappropriate planting methods, inappropriate planting locations for specific species, inadequate follow-up maintenance or adverse seasonal events (to mention a few).

In order for intended SEB offset outcomes to be achieved, adverse establishment results identified through regular objective monitoring must be addressed through a schedule of

amendment works. These may range from the complete re-work and replanting of failed SEB plantings, through to replacement of individual tube-stock plants as required.

Activities

- Evaluate routine site monitoring data to identify and schedule appropriate improvements
- Organise the propagation or collection of appropriate replacement planting material
- Carry out site preparation works as required
- Schedule planting, replanting or site replacement programs as required

5.2.15 Establishment of Heritage Agreements

Objectives

Protect successful SEB offset areas from future disturbance through the establishment of recognised Heritage Agreements defined as follows:

> "A Heritage Agreement is a private conservation area, established in perpetuity through an agreement (contract) between the landholder and the Minister for Sustainability, Environment and Conservation"

Discussion

Considerable investment will be required by Hillgrove Resources over many years to establish appropriately functioning SEB Offset vegetation communities on land currently owned by Hillgrove and assigned for this process. Once SEB Offsets have been demonstrated to be functioning as intended in a floristic and ecological sense, the land areas will need to be protected from future disturbance. It is conceivable that areas planted to SEB offsets could be sold at some point in the future and land use under a new owner cannot be guaranteed.

Heritage Agreements will prevent this by providing perpetual protection for SEB offset patches. The Heritage Agreement contract specifies that the indigenous plants and animals in the Agreement area are to be protected from the time the agreement is made. Heritage Agreements are binding on future landholders and are ongoing, i.e. perpetual.

It is understood by Hillgrove that entering into Heritage Agreement contracts for specific offset patches will have the potential to significantly alter the value of assigned allotments in the event of a future sale and may considerably restrict both future land use and the sale price which can be realized.

Activities

- Use the results of objective monitoring to determine when an SEB offset area is approaching its intended floristic composition and ecological function
- Enter into Heritage Agreements for assigned offset patches to prevent future disturbance and degradation

Attachment
Minor Change Notification

Schultze/Giant pit cut back

Kanmantoo Copper Mines
Native Vegetation Management Plan Addenda

“Giant”pit cut back

January 2016

7 January 2016

Alistair Walsh
Principal Regulator Mining
Department of State Development
GPO Box 320
Adelaide SA 5001

Dear Alistair

RE: Minor Change Notification: *to lay back the wall of a section of the Schultze pit beyond the boundary of the approved pit crest in the current PEPR to maintain safe operations*

Description of Change

We request permission to lay back a section of the pit wall in the Schulte pit beyond the boundary of the approved pit crest in the current PEPR to maintain safe operations.

A section of the eastern wall of the Schultze pit has become unstable and presents a significant risk to the safety of personnel if allowed to fail in an uncontrolled manner. The wall is subject to continuous monitoring and scanning equipment that is linked to an alarm system. The system has identified instability immediately above an access ramp into the Giant pit, which if not addressed is likely to result in a toppling mode failure posing an unacceptable risk to employees using the access ramp. To maintain safe operation the wall needs to be laid back to an angle such that the likelihood of a toppling failure is reduced to acceptable levels.

This moves the crest of the pit further east into an area where native vegetation valued at a 6:1 SEB ratio is located. The area of native vegetation to remove is 0.99 ha. This will equate for the need to provide a further 6ha of off-set vegetation of Acacia pycnantha, low woodland being established on Hillgrove controlled/owned property. It is important to note that this is not EPBC listed vegetation (see map on next page)

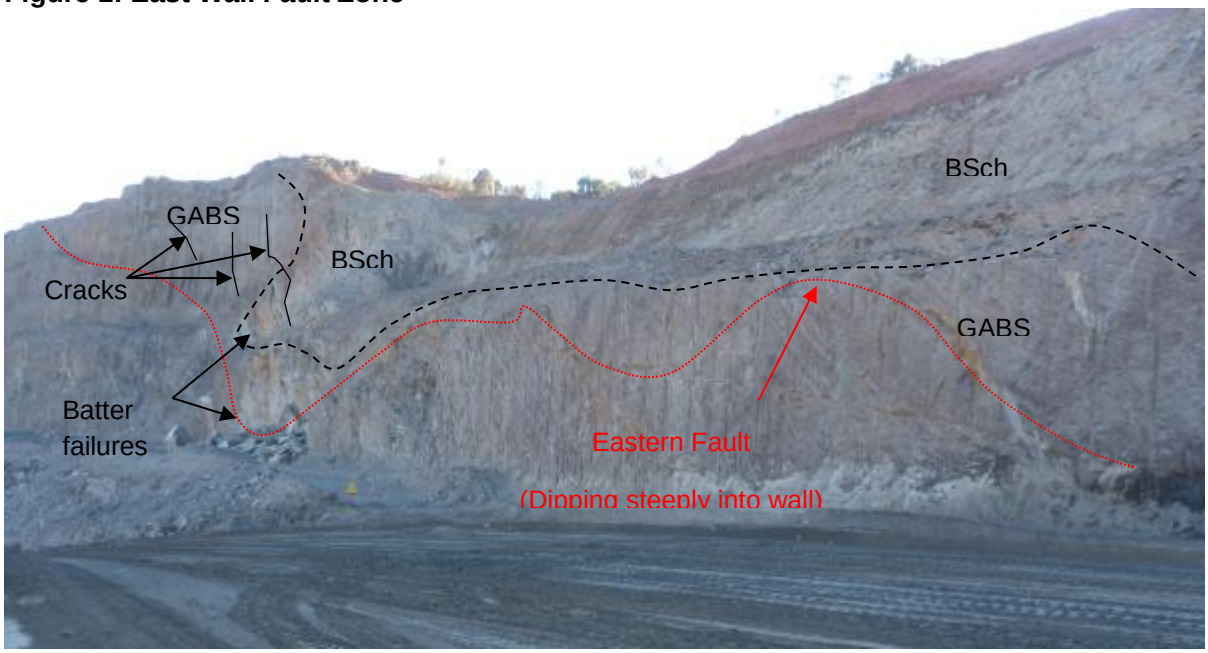
The proposed Giant cutback pit boundary (yellow line) and clearance boundary (blue line) maintain the 10 meter buffer requirement in schedule 2 lease condition 10 Land Use where no workings may occur within that zone.

Figure 1Photo – lease boundary, existing and proposed pit crest

Giant East Wall Cutback

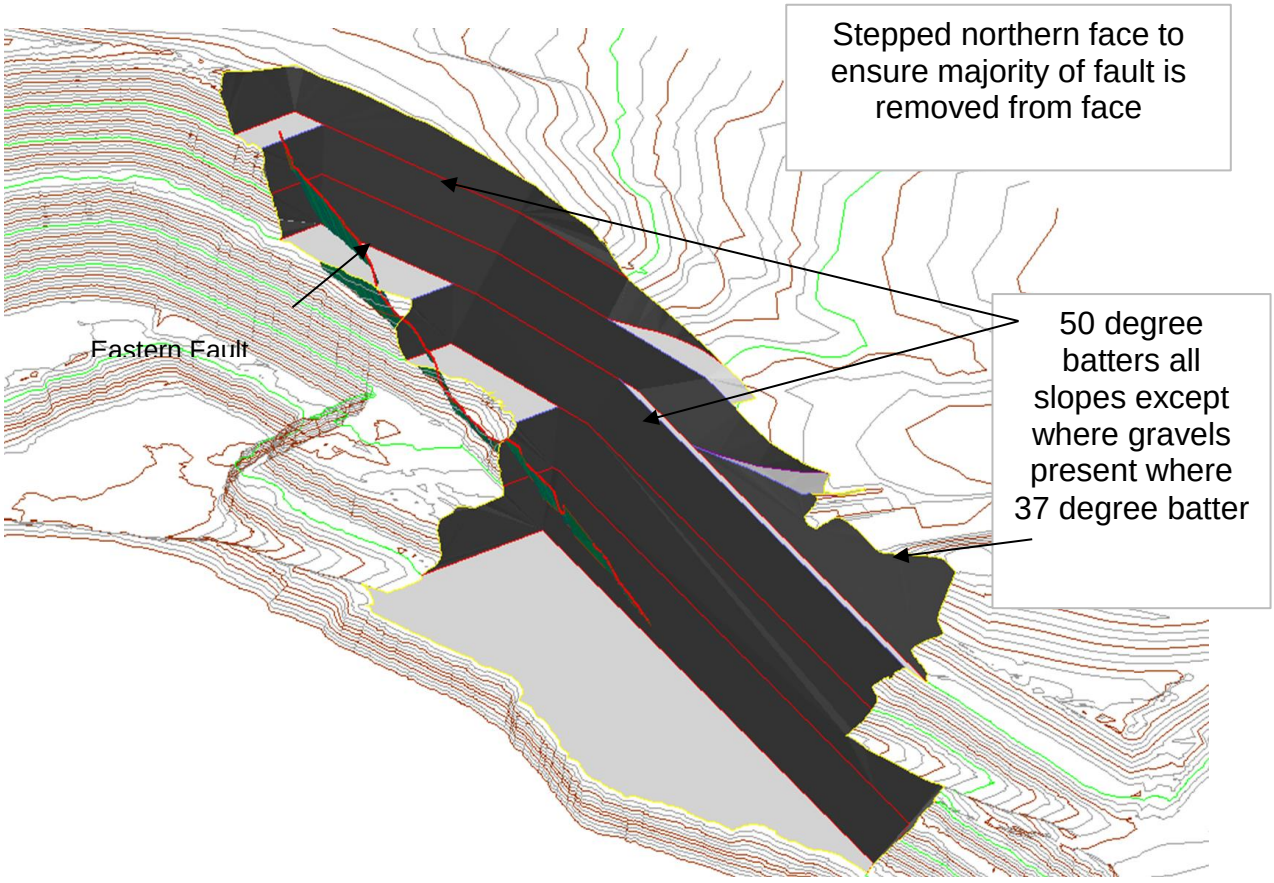
Excavations on the east wall of Giant Pit have encountered a steeply dipping fault running close to the Garnet Andalusite Biotite Schist (GABS) and Biotite Schist (BSch) contact, refer to Figure 1. This has altered the competency of the GABS rock mass. In Nugent Pit the contact area was very competent and vertical slopes were excavated in the GABS directly adjacent to the contact. In Giant the fault has affected a 20+m wide zone around the fault and contact; which has led to several batter height failures and extensive cracking further up the wall. If excavations continue along current design lines a major wall failure is expected.

Figure 1: East Wall Fault Zone



To provide long term stability a cutback is required to lay the slope back to a flatter angle, refer to Figure 2. This requires the new crest to be behind the current PEPR boundary

Figure 2: East Wall Cutback – Schematic View



Plan View:

Relevant licence conditions and outcomes that apply to the proposed change

The following conditions of the second schedule of the Mining Licence for ML6345 were relevant for assessment against this proposed minor change.

Land Use

10. The Lessee must in constructing and operating the Lease, ensure that there are no adverse impacts to adjacent public roads, railway, and adjacent land use.
    - The Lessee must maintain a buffer zone of 10 meters from the Lease boundary with no workings within that zone;
    - The Lessee must ensure that the current disturbed areas are stabilized to prevent sediment from leaving the Lease area.

Aboriginal and European Heritage

12. The Lessee must in constructing and operating the Lease, ensure that there is no disturbance to Aboriginal or European artefacts or sites of significance unless prior approval under the relevant legislation is obtained.

Fauna

13. The Lessee must in constructing and operating the Lease ensure that there are no net adverse impacts from the site operations on native fauna abundance or diversity in the Lease area and in adjacent areas.

Flora

14. The Lessee must, in constructing and operating the Lease, ensure that all clearance of native vegetation is authorised under appropriate legislation and ensure no permanent loss of abundance or diversity on or off the Lease.

Topsoil

16. The Lessee must in constructing and operating the Lease ensure that the existing soil quality and quantity is maintained.

Flooding/Runoff

21. The Lessee must, in constructing and operating the Lease ensure no water runoff from the Lease results in flooding of adjacent areas, to an extent greater than that that could reasonably be expected to occur prior to mining operations being established on the Lease.

Environmental Risk and Mitigation

The following potential environmental risks are associated with the requested change.

Risk	Proposed Mitigation/Method of Control

That a permanent loss of abundance or diversity of flora or fauna could occur.	■ That an SEB offset be provided on Hillgrove owned /controlled land at a ratio of 6:1 ■ That the newly created offset area be integrated via an "addenda" to the existing Native Vegetation Management Plan. That can later be incorporated into further iterations or reviews of the PEPR. ■ That the establishment of the 6ha off-set area be linked with other offset areas being established to enhance the existing plan.
Aboriginal or European Heritage areas will be threatened.	■ Heritage surveys have been conducted in the area and no surveys have found any sites of significance.
Damage to adjacent infrastructure of land	■ Stabilisation of the pit wall by "laying back" the angles of the walls to the crest will prevent any damage off the lease. A photo monitoring point exists nearby to monitor for any change.
Loss of topsoil	■ Topsoil and woody material will be collected and stored in the designated and approved storage areas for re-use in rehabilitation of the site
Flooding /runoff	■ The proposed crest is located at the top of the inclined slope and thereby will not increase existing natural runoff or increase the risk of flood or sediment leaving the site. A photo monitoring point exists nearby to monitor for any change.

As no significant increase in risk will occur with the mitigation strategies proposed and implemented.
The request for change is of a ***"level 4 significance"*** rating for assessing operational change according to your "*Guideline for Assessment to Change for Existing Operations MG3/V3"*

There are no requirements to change the Mining Licence conditions to capture additional risk as the overall risk profile remains unchanged by the proposal. As such it is reasonable to expect that all rehabilitation outcomes for the site remain achievable.

Measurement criterion that apply to the proposed change

The measurement criteria and methods for monitoring compliance and potential impacts currently designed and approved will continue to be sufficient for the early detection and subsequent mitigation of any environmental or social impacts.

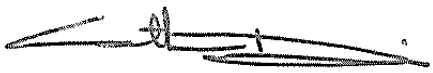
Beneficial Outcomes that apply to the proposed change

Maintaining the safety of our employees is the number one benefit of undertaking this work, removal of this risk from our workforce is our priority for this request.

A secondary benefit would be the replacement of 6 times more native vegetation in the local area than would be removed by allowing the request.

I look forward to having this favourably reviewed such that we can commence remediation works and alleviate the risk. Please advise if you have any queries or require any further information

Regards



CATHERINE DAVIS
ENVIRONMENT MANAGER
KANMANTOO COPPER MINE