EPBC-ACT CONTROLLED ACTION

EPBC 2013/6965

NATIVE VEGETATION MANAGEMENT PLAN COMPLIANCE REPORT FOR THE KANMANTOO COPPER MINE EXPANSION

2016/ 2017

Hillgrove Resources – 9th December 2017

0.Cover Picture – Mine Rd SEB-Offset Area: (141 Mine Rd); topsoil pre-stripped and subsoil direct seeded with local provenance native grasses and broadleaved species. Note the difference between the relatively weed-free, *Austrostipa*/ *Rytidosperma*-dominated, direct seeded bay in the foreground and the mown weedy pasture strip directly behind it. Note also that the direct seeded strips extend to the back of this paddock. The remaining weedy pasture strips will be pre-stripped and direct seeded in April 2018. This will create a continuous sward of native species as the basis of new *Eucalyptus odorata* and *Acacia pycnantha* grassy open-woodland associations on an area of land where commercial cropping and grazing has been conducted for more than 100 years.

Table of Contents **Page Number**

1.0 Definitions

Abbreviation	Definition
141 Mine Rd	Hillgrove-owned property & designated SEB-Offset area, 141 Mine Rd Kanmantoo SA 5252
Acacia pycnantha (A. pycnantha)	Open woodland community dominated by *Acacia pycnantha*
ADE	Australian Department of the Environment
Botanic Gardens	South Australian Seed Conservation Centre, Botanic Gardens of Adelaide
BushRAT	Bushland Rapid Assessment Technique/ DEWNR SA
CD	Compact Disk
CEO	Hillgrove's Chief Executive Officer, Mr Steven McClare
DEWNR	Department of Environment, Water and Natural Resources, SA
DSD	Department of State Development, South Australia
DPC	Department of Premier and Cabinet, South Australia
EBS Ecology	Fauna and Flora Consultancy division of the EBS Group, Adelaide SA
EBS Restoration	Ecological restoration division of the EBS Group, Adelaide SA
EM	Hillgrove's Environment Manager (Ms Catherine Davis)
EPBC 2013/6965	Approval granted to disturb vegetation under provisions of the EPBC Act
EPBC Act	Ecosystem and Biodiversity Conservation Act (1999)
Eucalyptus odorata (E. odorata)	Critically endangered grassy woodland community dominated by *Eucalyptus odorata*
Hillgrove	Hillgrove Resources Ltd/ Hillgrove Copper Pty Ltd
KCM	Kanmantoo Copper Mine
LFA	Landscape Function Analysis/ Ludwig & Tongway (1997)
Lomandra effusa (L. effusa)	Critically endangered open grassland vegetation community dominated by *Lomandra effusa*
LOM-Extension	Life of Mine Extension
ML	Mining Lease 6345
Mulawa	Hillgrove-owned property & designated SEB-Offset area, Mine Rd Kanmantoo SA 5252
NRM Act	Natural Resources Management Act 2004 (SA)
NVMP	Native Vegetation Management Plan
PEPR	Program for Environmental Protection and Rehabilitation
SA	South Australia
SEB x:1	A native vegetation condition rating for SEB-Offset purposes
SEB-Offset	Significant Environmental Benefit - Offset. New vegetation areas established to offset clearance.
SMA	Seed Multiplication Area/ 5ha seed multiplication plot
SPA	Seed Production Area/ 1ha intensive seed farm

1.1 Executive Summary

This compliance report describes our progress against the approval conditions listed in EPBC 2013/6965 during the 2016-2017 reporting period. Please refer to our 2014/2015 and 2015/2016 EPBC compliance reports for details relating to approval conditions discharged in previous reporting periods. Previous compliance reports can be accessed via the following link;

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

2014/2015 EPBC Compliance Report… Navigate down the page to 'Extension Documentation', then Navigate to '***2015 EPBC Act Compliance Report***' and click to download…

2015/2016 EPBC Compliance Report… Navigate down the page to 'Extension Documentation', then Navigate to '***2016 EPBC Act Compliance Report***' and click to download...

Hillgrove Resources have actively worked towards complying with both the spirit and intent of the approval granted by EPBC 2013/6965. Vegetation disturbance associated with EPBC 2013/6965 was commenced on 11Sep14 and continued to the approved limit of disturbance during the first reporting period (11Sep14 to 10Sep15). Vegetation disturbance has not extended beyond the limit described by EPBC 2013/6965 or the approved Native Vegetation Management Plan (NVMP).

Hillgrove have addressed all of the elements outlined by our NVMP. Progress has been made towards establishment of SEB-Offset areas, with approximately 10ha of plantings commenced in the 2014/ 2015 reporting period. Progress during the 2016/2017 reporting period concentrated on maintaining and consolidating the 2014/ 2015 plantings though weed control, brushcutting and slashing inter-row swards. The Mine Rd plantings were supplementing with 6,260 canopy and mid-story tube stock plants during this reporting period in winter 2017. Further topsoil pre-strip of the remaining Mine Rd areas and other LOM Extension SEB-offset plantings planned for the 2015/ 2016 reporting period have been deferred to autumn 2018 due to difficult business conditions for the Kanmantoo Copper Mine and corresponding operating constraints.

A range of investigative studies have been completed within the allocated SEB-Offset areas and reports associated with these studies have been posted on Hillgrove's web page. The final report for the Botanic Gardens Alliance was submitted in February 2016 and has also been posted on Hillgrove's web page (please see 2015/2016 EPBC Compliance Report).

Seed production programs and wild-seed seed collection programs are continuing. Initial results indicate that adequate seed supplies will be available for deferred direct-seeding programs in 2018, without the need to purchase additional seed from external sources. Additional grass seed has become available from the Mine Rd SEB-Offset areas as direct seeded strips become mature (note photos in Fig 17 & 18, below). A total of 940kg of seed was in-store by the end of this reporting period. Approximately 500kg of additional mixed Austrostipa/ Rytidosperma grass seed had been harvested during the early stages of the 2017 seed harvest (at the time of writing this report).

The 'Landscape-scale topsoil pre-strip' technique continues to be ideally suited for the conversion of farming land to high-quality native vegetation. Residual weed competition was managed intensively during the 2016/2017 reporting period through mowing, hand weeding, spot spraying and use of selective herbicides. Very dense seed shedding was observed coating the soil surface of direct-seeded areas in January 2017 and November 2017. Significant native grass recruitment was observed in autumn 2017 and this is expected to further increase plant density following germination of seed in future seasons.

1.2 Background

The Kanmantoo Copper Mine (ML6345) is located approximately 45km SE of Adelaide, near the townships of Kanmantoo and Callington. The 440 ha mining lease (ML) is on the eastern side of the Mt Lofty ranges, within a 425mm rainfall zone. The Kanmantoo Copper Mine (KCM) is operated by Hillgrove Copper Pty Ltd. The current mining operation is the third cycle of mining on-site since the 1850's.

The ML contains a range of remnant native vegetation, including stands of *Eucalyptus odorata* open woodland and *Lomandra effusa* open grassland, both of which are listed as critically endangered under the EPBC Act (1999). The ML's vegetation has been significantly altered by more than 150-years of agriculture and mining; however, remnant stands of native vegetation can be found within the ML, varying in condition from SEB-Offset classes of 2:1 to 8:1 in some areas. Clearance of 1.8ha of *E. odorata* woodland and 3.4ha of *L. effusa* grassland was required to allow extension of mining activities until 2019 under the *Life of Mine Extension proposal*, ('the LOM Extension').

The LOM Extension was approved under a revised Program for Environmental Protection and Rehabilitation (PEPR), regulated by the South Australian Department of State Development (DSD… now known as 'Department of Premier & Cabinet SA' or DPC). Both clearances were deemed 'controlled actions' under the EPBC Act, requiring approval by the Australian Department of the Environment (ADE) before the LOM Extension PEPR could be approved by DSD (DPC).

A NVMP was written to encompass the controlled actions associated with the LOM Extension. The NVMP was subsequently approved by the ADE and permission to proceed with both controlled actions was granted by the ADE under the conditions outlined in the approval document for this action Ref: EPBC 2013/6965 dated 6th May 2014. Both controlled actions subsequently commenced on 11Sep14, with due notice given to the ADE and DSD (DPC).

This document is an annual compliance report demonstrating that the controlled actions have been carried out within the 13 conditions attached to EPBC 2013/6965 (see section 2.0, below) and that progress has been made against the delivery of SEB-offsets required by EPBC 2013/6965. This report has been published within '*3-months of every 12-month anniversary of the commencement of the action*' as required by the approval granted on 06May14.

2.0 Table of conditions associated with Controlled Action EPBC 2013/6965

The following table lists the conditions applied to Controlled Action EPBC 2013/6965 and Hillgrove's compliance with each condition. Details associated with Hillgrove's actions relating to each condition during the period from 11Sep16 to 10Sep17 are presented in section 3 (below).

Condition No.	Conditions applied to the approval of EPBC 2013/6965	Compliance with condition (✓ or X)
1	The person undertaking the action must not clear more than 1.8ha of the ecological community *Peppermint Box (Eucalyptus odorata) Grassy Woodland* of South Australia within ML 6345	✓
2	The person undertaking the action must not clear more than 3.4 ha of the ecological community *Iron grass Natural Temperate Grassland of South Australia* within ML 6345	✓ (See 3.2, below)
3	The person taking the action must prepare and submit a Kanmantoo Copper Mine Native Vegetation Management Plan (NVMP) for the Minister's written approval prior to commencing the action. The NVMP must include the following;	✓

Condition No.	Conditions applied to the approval of EPBC 2013/6965	Compliance with condition (✓ or X)
3a	Management actions to improve the ecological quality of Peppermint Box and Iron Grass communities within ML6345 and offset lands and protect (them) from degradation for the duration of the action	✓
3b	Regeneration and revegetation strategies for Peppermint Box and Iron Grass communities within the proposed SEB-Offset areas to improve the ecological quality of these areas	✓
3c	An ecological monitoring program to monitor success of management actions within the NVMP and define measurable targets of management actions, performance indicators and adaptive management framework for the duration of the action's impact	✓
4	To compensate for the loss of 1.8ha of *Peppermint Box* and 3.4ha of *Iron grass* communities, the person taking the action must secure the lands identified as the SEB-Offset Areas… as a conservation offset	✓
5	The person taking the action must provide written evidence to the Department of their compliance with Condition 4… to clearly define the location and boundaries of the offset sites prior to the commencement of the action	✓
6	Within 30-days after the commencement of the action, the person taking the action must advise the Department in writing of the actual date of commencement	✓
7	The person taking the action must maintain accurate records substantiating all activities associated with or relevant to these conditions of approval… and make them available upon request to the Department	Agreed/ Ongoing record keeping is undertaken
8	Within 3-months of every 12-month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval	Report published by 09Dec17
9	Upon direction of the Minister, the person taking the action must ensure that an independent audit of compliance is conducted and a report submitted to the Minister	Agreed. No audit yet requested
10	If the person undertaking the action wishes to carry out any activity otherwise than in accordance with the NVMP as specified in the conditions, the person taking the action must submit to the Department for the Minister's written approval a revised version of the NVMP	Agreed. No unapproved activities undertaken as of 11Sep17
11	If the Minister believes that it is necessary or convenient for the better protection of listed threatened species and ecological communities to do so, the Minister may request that the person taking the action make specified revisions to the NVMP and submit the revised NVMP for the Minister's written approval	Agreed. No request received as of 11Sep17
12	If at any time after 5-years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the Minister	Agreed. The action was commenced on 11Sep14
13	Unless otherwise agreed to in writing by the Minister, the person taking the action must publish the NVMP referred to in these conditions of approval on their website. The NVMP must be published on the website within 1-month of being approved. The NVMP must remain on their website for the life of the action.	✓ published on Hillgrove's web page

3.0 Details of compliance with EPBC 2013/6965 conditions

Details of Hillgrove's compliance with each condition associated with EPBC 2013/6965 can be summarised as follows: (Figure 1, below, illustrates extent of clearance as of 01Jan15)

3.1 *Eucalyptus odorata* clearance areas

In accordance with the approved NVMP, no more than 1.8ha of *Peppermint Box (Eucalyptus odorata) Grassy Woodland* of South Australia has been cleared within ML 6345 between the commencement date of 11Sep14 and the 1st anniversary of commencement on 11Sep15. Precise areas of *Peppermint Box (Eucalyptus odorata) Grassy Woodland* of South Australia cleared during the reporting period within ML 6345 are highlighted by Figure 2, below.

3.2 *Lomandra effusa* clearance areas

In accordance with the approved NVMP, no more than 3.4ha of 8:1 *Iron grass Natural Temperate Grassland* of South Australia and 1.01ha of 6:1 and 4:1 *Iron grass Natural Temperate Grassland* of South Australia has been cleared within ML 6345 between the commencement date of 11Sep14 and the 1st anniversary of commencement on 11Sep15. Precise areas of *Iron grass Natural Temperate Grassland* of South Australia cleared within ML 6345 after 11Sep14' are highlighted by Figure 2, below (*Note: The Approval notice for Controlled Action EPBC 2013/6965 omitted reference to an additional 1.01ha of 6:1 and 4:1 Iron grass Natural Temperate Grassland of South Australia that was approved for clearance in the NVMP).*

Figure 1: PEPR-Approved clearance limit and extent of clearance after 11Sep14

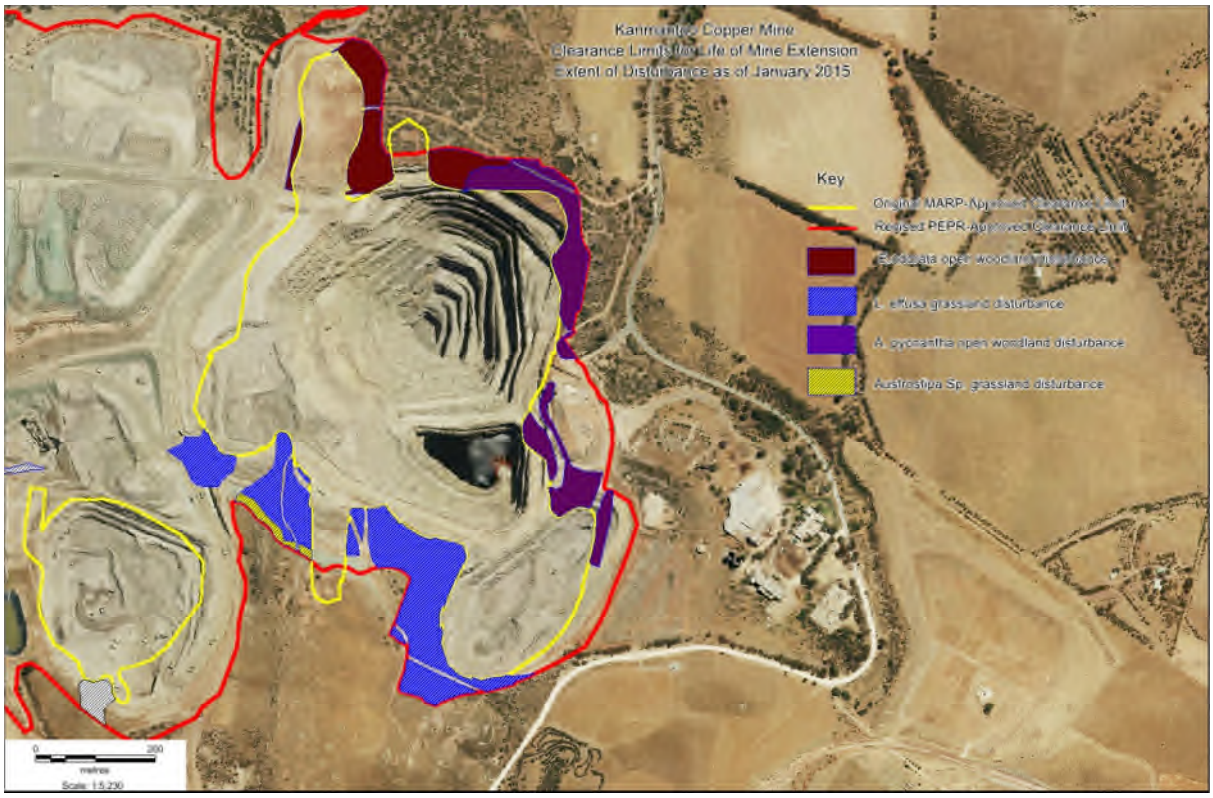

Figure 2: Disturbance of vegetation communities as of January 2015

3.3 Native Vegetation Management Plan Submission

A Native Vegetation Management Plan (NVMP) was written to address the disturbance of vegetation communities and provision of SEB-Offsets associated with the controlled actions approved by EPBC 2013/6965. Hillgrove's NVMP for controlled action EPBC 2013/6965 was approved on the 6th of May 2013. It specifically addresses the following approval conditions:

> 3a. Management actions designed to improve the ecological quality of Eucalyptus odorata (*E. odorata)* grassy woodland and Iron Grass (*L. effusa*) natural temperate grassland and offset lands for the duration of the action
>
> 3b. Regeneration and revegetation strategies for *E. odorata* grassy woodland and Iron Grass/ *Lomandra effusa* (*L. effusa*) natural temperate grassland within the proposed 'SEB-Offset areas' to improve the ecological quality of these areas
>
> 3c. An ecological monitoring program to monitor the success of the management actions in the NVMP and define measurable targets of management actions, performance indicators and an adaptive management framework for the duration of the action's impact on *E. odorata* grassy woodland and Iron Grass (*L. effusa*) natural temperate grassland

The NVMP was approved and has been posted on the internet at the following internet address:

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation'

Navigate to 'PEPR Appendices Vol 3' and click to download…

Open the downloaded document…

The NVMP is located under ‘Appendix 9b Native Vegetation Management Plan 2014’ and extends from page 147 to 213.

The approved NVMP will continue to be available via the Hillgrove web page for the life of the Action.

3.4 Security of SEB-Offset areas

The areas of Peppermint Box (*E. odorata)* grassy woodland and Iron Grass (*L. effusa*) natural temperate grassland disturbance approved under EPBC 2013/6965 are illustrated in Figure 2, above. SEB-offsets for this action are illustrated in Figure 3, below.

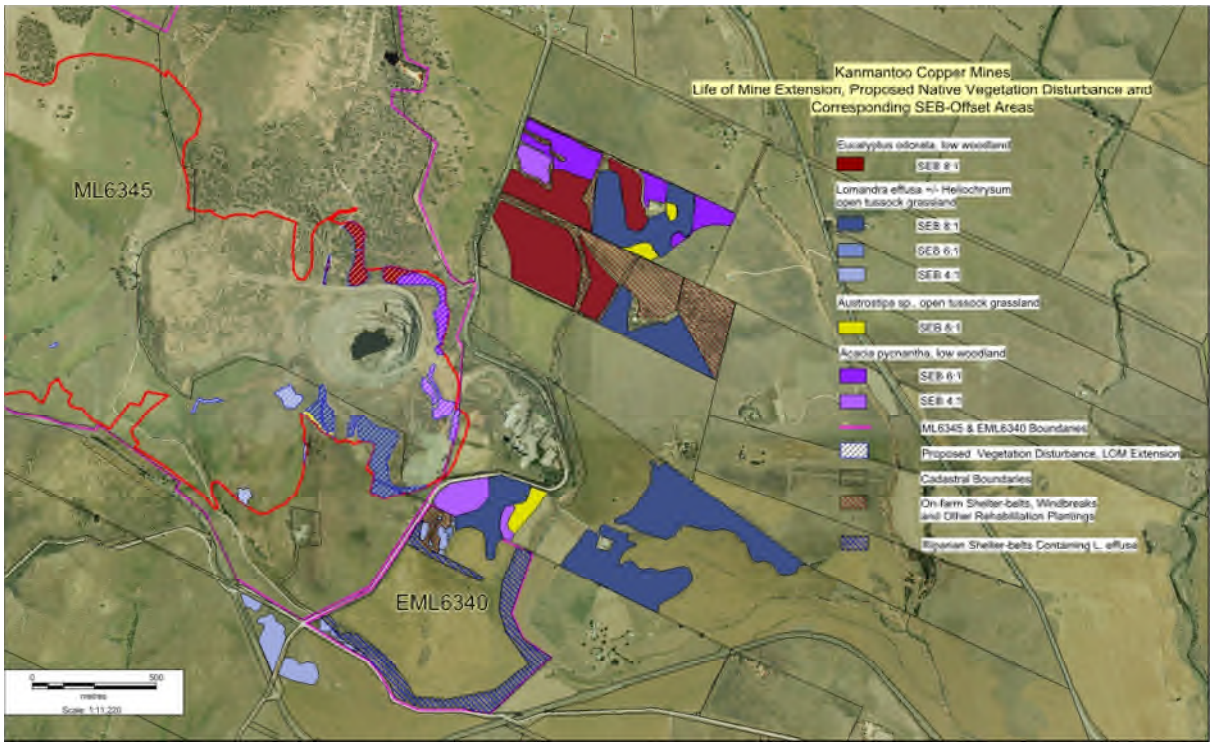

Figure 3: Approved disturbance areas and approved SEB-Offsets associated with action EPBC 2013/6965

All SEB-Offsets are located directly adjacent to the Kanmantoo Copper Mine on Hillgrove-owned properties. Hillgrove’s CEO, Mr Steven McClare, has quarantined the SEB-Offset areas from future development and has designated them as ‘SEB-Offset blocks’ to the exclusion of all other activities. Details of the land titles associated with each land parcel and the SEB-Offsets assigned to each patch are described below and in the NVMP on p30, ‘Table 3’, and in Figure 4, below.

Property Name	Parcel ID : Title ID & (Owner)	Allocated Offset Patches (ref NVMP)	Offset Types
141 Mine Rd	F160800 A61 : CT5548/435 (Hillgrove)	38, 39, 40, 41, 42, 43, 44, 45, 46, 47	E. odorata (8:1), L. effusa (8:1), Austrostipa (8:1), A. pycnantha (6:1 & 4:1)
Mulawa	F1636 A1 : CT5516/79 (Hillgrove)	48, 49, 50	E. odorata (8:1), L. effusa (8:1)

Property Name	Parcel ID : Title ID & (Owner)	Allocated Offset Patches (ref NVMP)	Offset Types
Ferguson	D80644 A21 : CT5863/768 (Hillgrove)	51, 55	L. effusa (8:1)
Lot 25	D60948 A25 : CT5892/419 (Hillgrove)	52, 53, 54, 56, 57, 58, 62	L. effusa (8:1, 6:1 & 4:1), Austrostipa (8:1)
Back-Callington Rd/ Éclair Mine Rd (Carmen's East)	D4767 A4 : CT5552/582 (Hillgrove) and D30934 Q1 : CT5366/650 (Hillgrove)	59, 60, 61	L. effusa (4:1)

Figure 4: Hillgrove-owned properties and their assigned SEB-Offsets

Hillgrove intends to establish the designated SEB-Offset areas as conservation areas protected under Heritage Agreements (or similar), as stated in the NVMP on p31.

Preliminary negotiations are underway to establish heritage agreements or similar instruments for the SEB-Offset areas detailed in NVMP's 'Table 3' and illustrated in Figure 4 (above). The NVMP specifies that Heritage Agreements (or similar) will be established for offsets by Year 4 (2018) and we are on-track to achieve this.

As of the 11th of September 2014 onwards, conventional farming operations have been modified or progressively withdrawn from the SEB-Offset areas highlighted above. Note the Google Earth image (below), dated 01Jul16, illustrating that SEB-Offset work has commenced on '141 Mine Rd' and 'Mulawa'.

3.5 Written evidence of compliance: SEB-Offset area establishment

2016/ 2017 Reporting Period

The Google Earth image in Figure 5, below, illustrates commencement of the Mine Rd SEB-Offset areas as described in this report. Note the strips within the yellow highlighted blocks, which are approximately 6m-wide topsoil pre-strip rows surveyed along contours in each block. Similar width weedy pasture strips remain between the pre-stripped rows.

The highlighted areas total 20.3ha with approximately half prepared and planted via direct seeding during the 2014/ 2015 reporting period. Further supplementation of the initial plantings occurred during winter 2017. Both Mine Rd areas have been extensively maintained during the 2016/ 2017 reporting period, with mowing, selective brushcutting, selective weed spraying, hand weeding and tube stock planting being among the activities undertaken.

Completion of topsoil pre-stripping and direct seeding on both 141-Mine Rd and Mulawa is budgeted for commencement in autumn 2018, in addition to the commencement of several other scheduled SEB-offsets. The total area scheduled for pre-strip and direct seeding in autumn 2018 is 16.5ha.

Figure 5: Google Earth Image, 01Jul16, highlighting SEB-Offset commencement, 141 Mine Rd and Mulawa

Documentary evidence of compliance with EPBC 2013/6965 Condition 4,'Securing the lands identified as SEB-Offset areas' was provided in the 2014/2015 and 2015/2016 compliance reports.

3.6 Notification of commencement

As reported previously, notification of commencement of the action covered by EPBC 2013/6965 on 11th September 2014 was forwarded to Justin Williams by Catherine Davis on the 9th of October 2014 as per the following email… Please see previous compliance reports for details…

3.7 Record keeping: Implementation of the Offset and NVMP

Hillgrove began preparing for the implementation of the NVMP before commencement of the action approved by EPBC 2013/6965. A range of preparatory activities and studies have been undertaken by Hillgrove as previously reported in the 2014/2015 and 2015/2016 EPBC compliance reports. Please see these reports for details…

Details of these activities, together with records of progress under the NVMP are documented in the reports posted on Hillgrove's Web Page. Each report is cited in our responses listed below.

Documentary evidence of progress on actions specified by the NVMP for Year 1 to year 3 (11Sep14 to 11Sep17) is as follows:

3.7.1 Item 1; 'Removal of grazing/cropping pressure – summer 2014 to Spring 2017'

A map highlighting land management limitations for the 2015/ 2016 reporting period was provided to our share farmer in autumn 2016. This map is illustrated by Fig 6, (below). Our instructions to our share farmer were identical during the 2016/2017 reporting period, but they will be revised in 2018 when new SEB-offset areas are commenced.

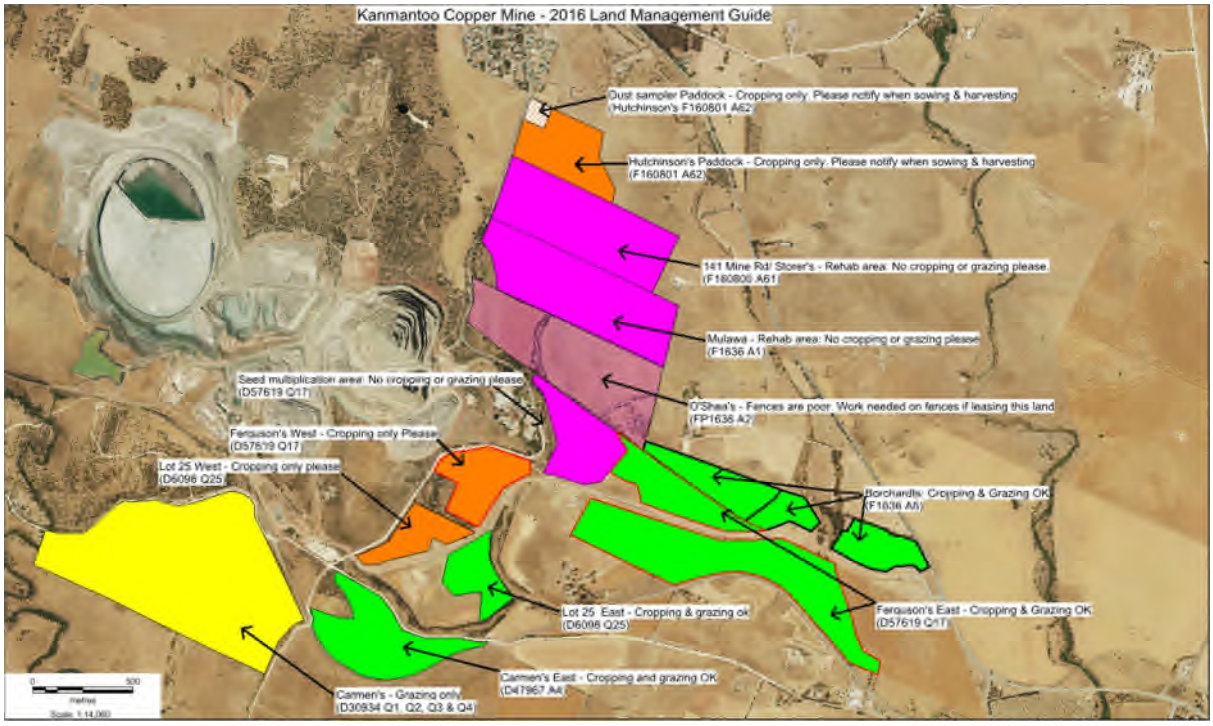

Figure 6: Hillgrove's Land management instructions to our sharefarmer, autumn 2016 and autumn 2017.

Figure 7: 141 Mine Rd following crop residue removal by grazing and prior to preparation for direct seeding, April'15

Figure 7A: 141 Mine Rd following topsoil removal in alternating strips and direct seeding – November 2015

Figure 7B: 141 Mine Rd Mine, highlighting development of direct-seeded strips and lush growth following high winter rainfall, October 2016

Figure 7C: 141 Mine Rd, November 2017

Figure 8: 'Mulawa' following removal of cropping residues by grazing and prior to preparation for direct seeding April 2015

Figure 8A: Mulawa following topsoil removal in alternating strips and direct seeding – November 2015

Figure 8B: Mulawa, main paddock: Growth of direct seeded strips, looking SE, October 2016

Please note that the photo observation point at Mulawa in Figure 9 (below) will supersede the Mulawa photo point illustrated in Figures 8, 8A and 8B (above). The revised photo point provides an improved perspective of progress towards SEB-Offset establishment at Mulawa and will be used in reporting from October 2016 onwards…

Figure 9: Mulawa, main paddock: Growth of direct seeded strips looking NE, October 2016

Figure 9A: Mulawa, main paddock: growth of direct seeded strips and introduction of canopy tube stock, September 2017

Figure 9B: Mulawa, main paddock November 2017

Figure 10: Topsoil pre-strip/ sown areas Mulawa (left) November 2015

Figure 11: 141 Mine Rd native grass establishment, November 2015

Figure 10A: Topsoil pre-strip/ sown areas Mulawa, October 2016

Figure 11A: 141 Mine Rd, October 2016

Figure 10B: Topsoil pre-strip/ sown areas, Mulawa. September 2017
(Note establishment/ and introduction of canopy tube stock)

Figure 11B: 141 Mine Rd September 2017

Figure 10C: Topsoil pre-strip/ sown areas, Mulawa. November 2017
(Note establishment, direct-seeding tree and shrub emergence and introduction of canopy tube stock).

Figure 11C: 141 Mine Rd November 2017

Pease note the accumulation of Rytidosperma seed visible beneath the canopy of direct seeded strips (white specks in Figure 12, below). This is expected to result in significant recruitment when this seed germinates in autumn 2018. Seed harvest from the Mine Rd strips yielded approximately 500kg of mixed Austrostipa/ Rytidosperma seed in November 2017…

Figure 12: Mulawa; Accumulation of Rytidosperma seed on the ground between mature Rytidosperma plants - Mine Rd SEB areas, November 2017

Figure 13: *Austrostipa*, *Rytidosperma* and *Atriplex* establishment – topsoil pre-strip/ direct seeding at Mulawa, November 2015

Figure 13A: *Austrostipa*, *Rytidosperma* and *Atriplex* establishment – topsoil pre-strip/ direct seeding at Mulawa, October 2016

Figure 13B: *Austrostipa*, *Rytidosperma* and *Atriplex* establishment – topsoil pre-strip/ direct seeding at Mulawa, September 2017

3.7.2 Item 2: Schedule offset programs

A program of progressive SEB-Offset commencements associated with EPBC 2013/6965 has been drafted to coincide with land preparation schedules and seed availability.

SEB-Offsets for EPBC 2013/6965 constitute roughly half of the total SEB-Offsets approved collectively by our initial Mining Lease approval and the subsequent approvals for the life of mine extension (LOM Extension).

Our SEB-Offset program is driven by seed stocks grown in our SPA and the SMA, together with stocks obtained through annual wild-seed collection programs from within the ML and near-mine region. We would only purchase seed or other planting material from external sources in poor seasons where natural seed production is low or where supplies of specific species can't be obtained locally. This would be a last-resort, with local-provenance sources always preferred.

The overall availability of seed and progressively building capacity to accrue seed stores from local sources, will collectively drive the maximum area of SEB-Offset establishment that can be commenced in any given calendar year. The actual delivery of this program will be regulated by seasonal factors, which will govern the total seed production in any given year and moderate the likelihood of successful direct-seeding establishment.

It is important to note that commercial considerations may also influence the timing of SEB delivery year to year. *If SEB-offset commencements begin to deviate from the plan beyond our ability to recover from in the following year, the ADE and DPC will be notified and a revised NVMP will be submitted for approval.*

2016/ 2017 Reporting Period

Difficult commercial conditions continued for the Kanmantoo Copper Mine during the 2016/2017 reporting period. A major cut-back of the Main Pit was carried out and lower copper prices adversely impacted cash flow. The cut-back was substantially completed towards the end of the reporting period, with reduced strip-ratios beginning to relieve very tight cash-flow conditions. Improving copper prices and significantly improved access to the Kanmantoo ore body are expected to be features of Hillgrove's operating environment at Kanmantoo in the next reporting period (2017/2018). This will allow us to begin to catch up on SEB-offset commencements from autumn 2018 onwards.

Progress on SEB-offset provision during the 2016/2017 reporting period was highlighted by an intensive maintenance program on the 141 Mine Rd and Mulawa plantings. This acted to reduce weed competition and weed-seed set through a coordinated program of spot-brushcutting, spot-spraying and hand weeding. The unsown inter-row swards were also tractor-slashed and sprayed several times during the reporting period to reduce overall weed seed-set and prevent weed-seed incursion from the inter-row strips into the direct seeded offset strips.

A tube stock planting program was completed on the Mine Rd strips during winter 2017, where a total of 6,240 canopy/ mid story and 100 *Diuris behrii* orchid pots were planted into the western-most rows of 141 Mine Rd and Mulawa. This augmented the tree and shrub seedlings arising from direct-seeding germination and provides a cohort of plants which will further increases the species diversity in our young SEB-offset areas.

Progress towards insuring seed reserve capacity for future SEB-offset establishment programs continued during this reporting period. Spring/summer 2016 marked the first time that significant quantities of mixed Rytidosperma and Austrostipa seed were harvested from maturing native grass swards at Mine Rd.

Hand-propelled 'Grass Grabbers' allowed seed to be collected efficiently, with minimal impact to the sward (see photos in Figures 14 & 15, below…). The grass grabbers are minimally intrusive, don't adversely impact ground-story plants, don't remove 100% of the available grass seed and allow significant quantities of seed to fall and become available for recruitment.

Figure 14: Hand-propelled 'Grass Grabber' **Figure 15**: Grass Grabber, cover off, seed tray full

Note photo in Figure 16 below, where the light-brown layer between plants is a 25-30mm thick mat of *Austrostipa* seed, which was common throughout the Mine Rd patches during the 2016/2017 reporting period. This translated to a new cohort of native grass seedlings emerging between established plants during winter of this reporting period.

Figure 16: Austrostipa post-harvest. Note significant mat of native grass seed between plants

The small hand-propelled Grass Grabbers proved to be very successful, but harvest speed was still not sufficient to allow all of the available seed to be harvested from the Seed Multiplication Area and Mine Rd plantings within the available seed maturity window.

To close this gap, a large All-Terrain Vehicle (ATV)-mounted Grass Graber was acquired and commissioned by EBS towards the end of this reporting period (see photos in Figures 17 & 18, below). The ATV Grass Grabber has more than doubled seed harvesting speed from the Mine Rd patches and is returning a very clean, high-quality seed sample.

Operation of the ATV-mounted grass grabber is safer and less tiring for operators, who no-longer need to walk behind the self-propelled units. The ATV Grass Grabber will significantly improve seed reserves for future SEB-offset establishment by allowing us to access more seed within the seasonal harvest window each season.

Figure 17: ATV-Mounted Grass Grabber

Figure 18: Example of seed harvested

Though the establishment of new SEB-offset patches were deferred during this reporting period, consolidation of the Mine Rd plantings during 2016/2017 has proven that the topsoil pre-strip method of cropping-land conversion is very successful and will be our preferred method of offset establishment in future years.

A presentation summarising Hillgrove's SEB-offset and rehabilitation program was provided for the Kanmantoo-Callington Landcare Group (K-CLG) at their AGM during this reporting period. The Mine Rd plantings have generated considerable local interest with the group, particularly the potential for the topsoil pre-strip method to enable landscape-scale conversion of cropping land to high-quality SEB-offsets. The K-CLG will closely watch development of the Mine Rd (and other) SEB-offsets over the coming years.

The following table illustrates work conducted within all aspects of our SEB-offset program by EBS-Restoration and Hillgrove staff during the 2016/2017 reporting period.

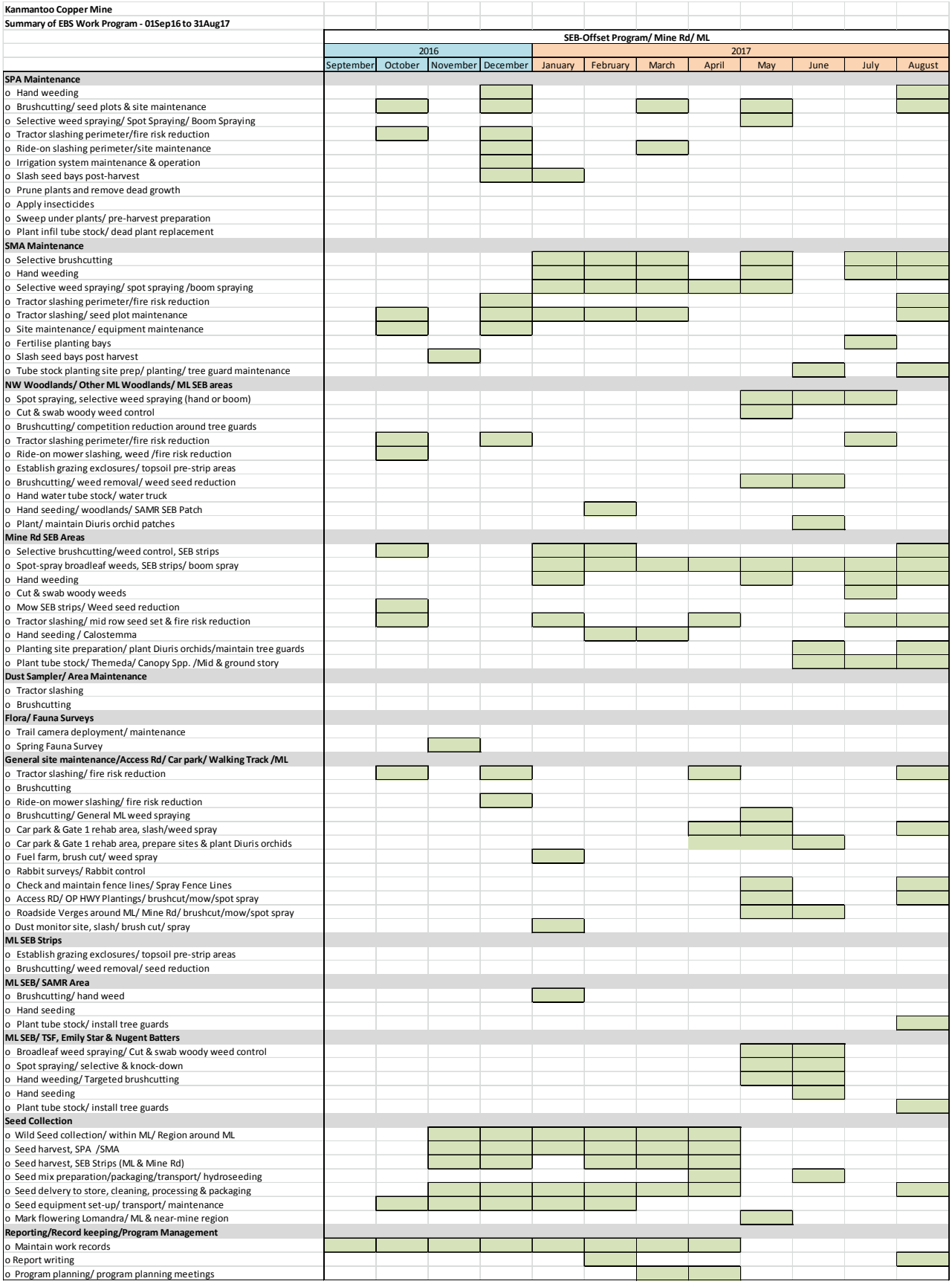

Figure 19: Gantt Chart summarising the 2016/2017 SEB-offset work program by EBS and others

Detail of progress by EBS during this reporting period is summarised by the EBS annual Report. This report can be accessed from the Hillgrove web page via the following link;

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to the following document; '2016_2017 EBS Annual Report.pdf'

The following maps (Figures 20 -25) illustrate the approved schedule of SEB-Offset commencements collectively associated with EPBC 2013/6965 and our initial ML approval.

Figure 20: Mine rehabilitation and SEB-Offset program areas; Autumn-Winter 2015

Figure 21: Mine rehabilitation and SEB-Offset program. Summary of rehabilitation and SEB-offsets commenced during Autumn-Winter 2016 (note red circle).

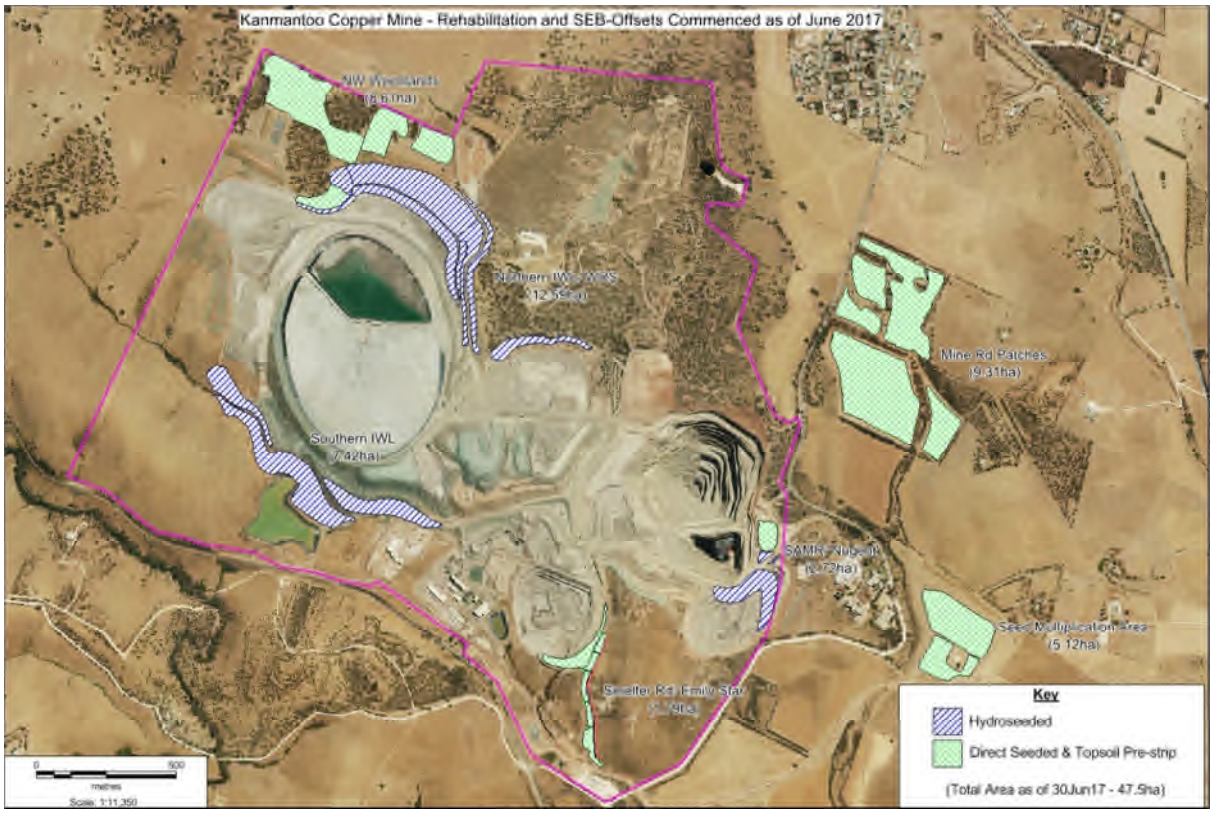

Figure 22: Mine rehabilitation and SEB-Offset program. Summary of Areas Commenced by Autumn-Winter 2017

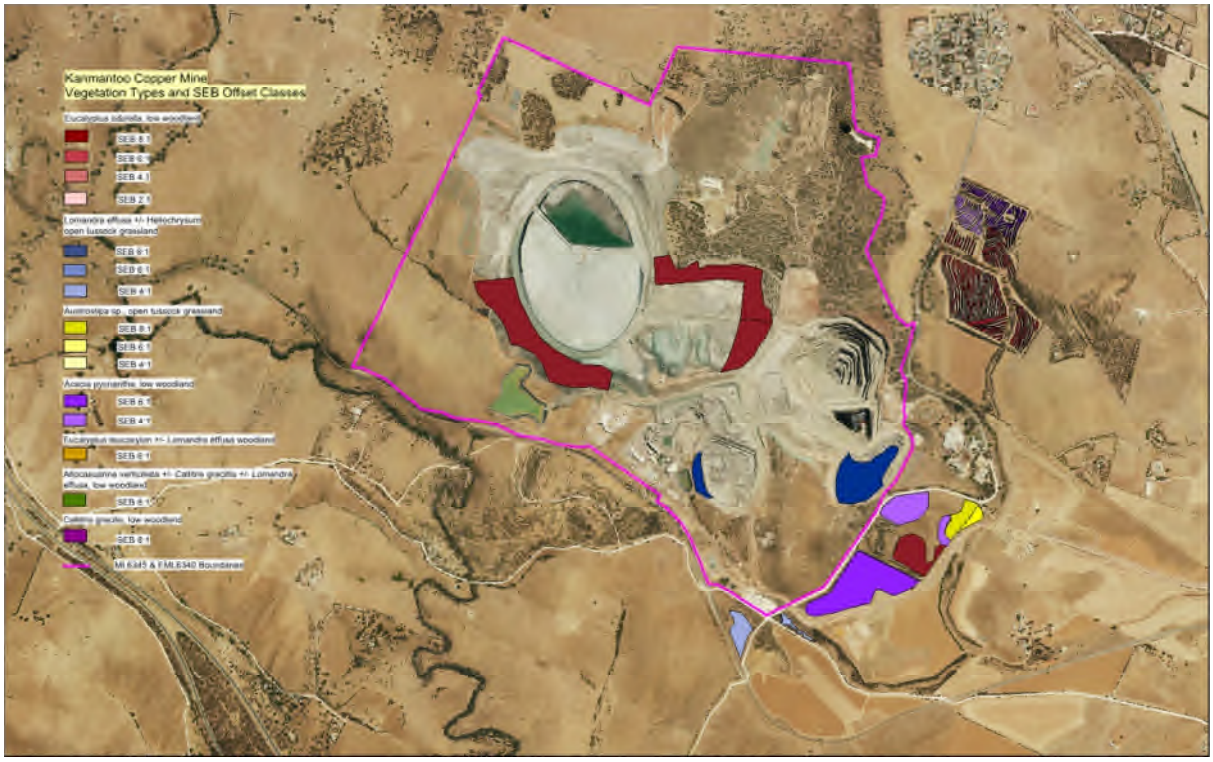

Figure 23: Proposed Mine rehabilitation and SEB-Offset program, Autumn-Winter 2018

Please note: If the planned SEB-offset commencements deliverable by 2018 prove to be unachievable by mid-2018, Regulators will be notified and a revised NVMP will be summited for approval to the ADE and SA DPC during the 2017-2018 reporting period.

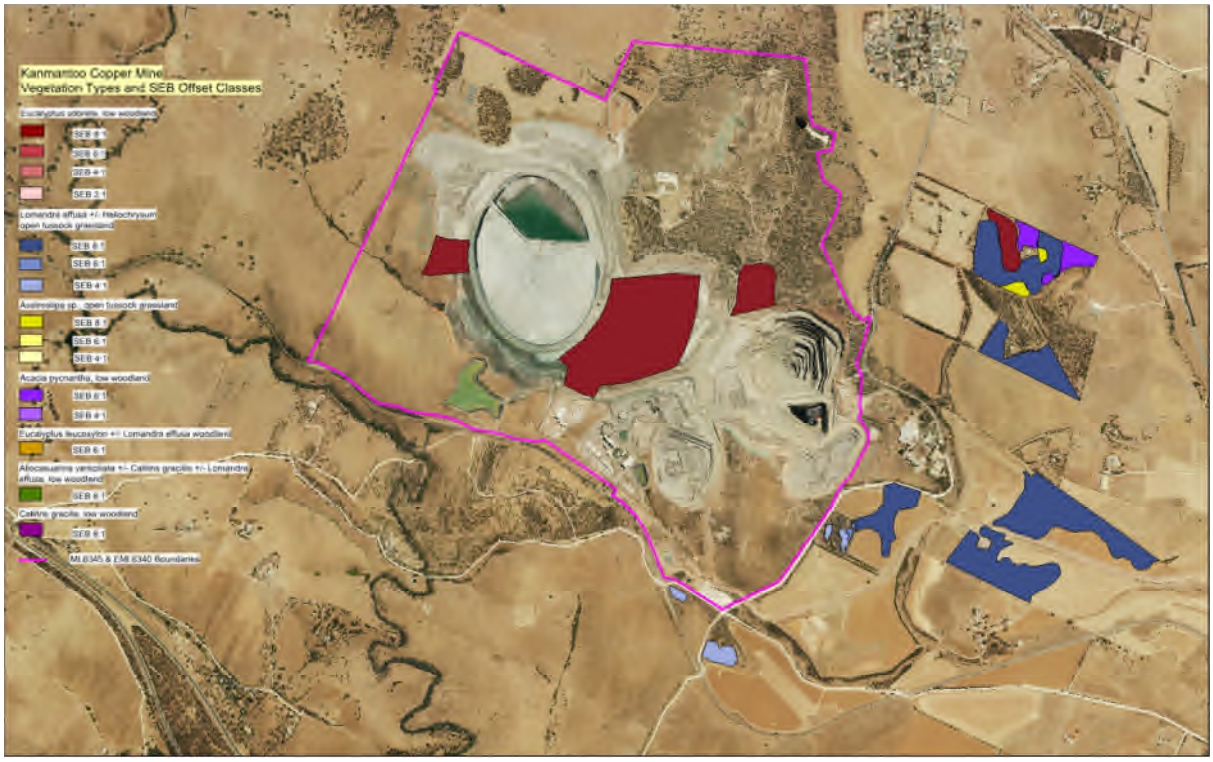

Figure 24: Mine rehabilitation and SEB-Offset program, Autumn-Winter 2019

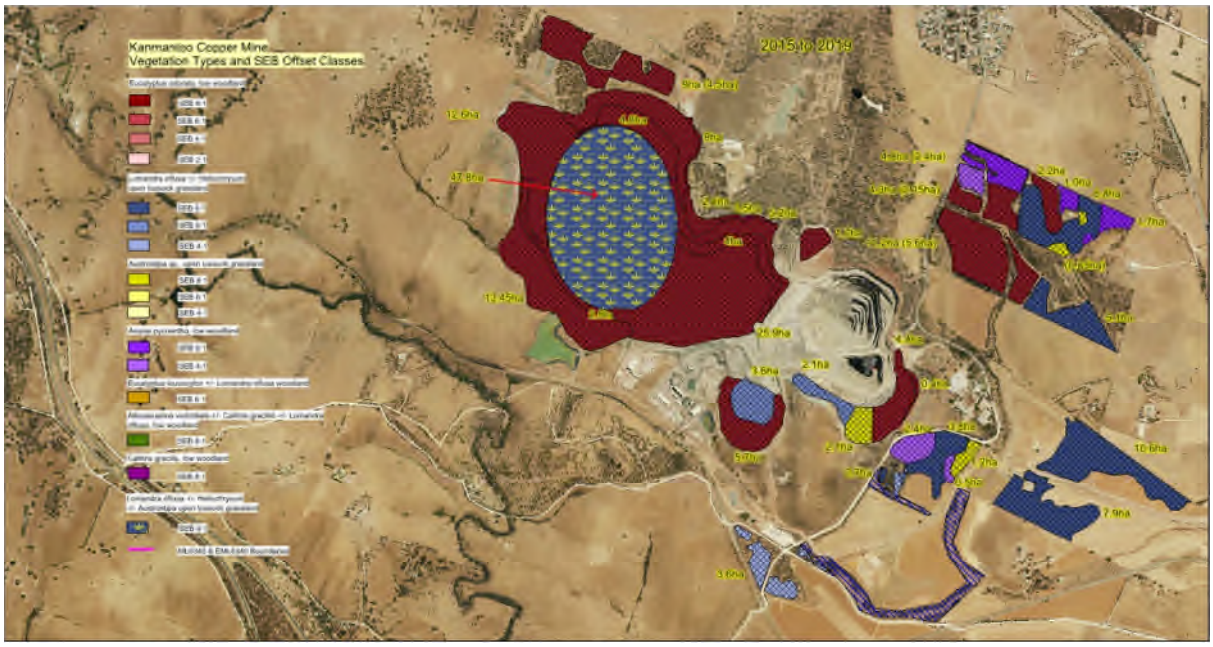

Figure 25: Cumulative Mine rehabilitation and SEB-Offset program, Autumn-Winter 2015 to 2019

Figures 20 to 25 illustrate areas where rehabilitation plantings and SEB-Offset plantings will be commenced, or initial works completed* between 2015 and 2019. (Note*: Where the topsoil pre-strip method begins the conversion of cropping land to native vegetation swards, only half of the area is pre-stripped in the first year, with the remainder pre-stripped in the subsequent year (see example in Figure 33 & 34 (below)).

Actual delivery of this program year to year may vary according to seasonal factors and seed availability. Appropriate notification of any changes to this program will be provided if necessary.

3.7.3 Item 3; Survey of revegetation plots

Vegetation surveys and fauna surveys were conducted on the SEB-Offset patches after commencement of the action covered by EPBC 2013/6965, during the period from the 23rd of October 2014 to 6th of November 2014. Surveys were designed to identify, map and rate any remnant native vegetation patches, introduced plant species, recognised weed species, native animal species and feral animal populations within the designated SEB-Offset areas. The results of these surveys have been detailed in the following report:

EBS Ecology (2014) *Kanmantoo Copper Mine Flora and Fauna Survey – New SEB Areas*. Report to Hillgrove Resources, A. Derry, EBS Ecology, Adelaide

This report can be downloaded by visiting the following link…
http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to '*EBSE00307 Flora and Fauna Survey New SEB Area Report*' and click to download. Open the downloaded document.

The results of the initial surveys were discussed in the 2015/2016 EPBC compliance report. Please refer to the 2015/ 2016 report for details…

2016/2017 Reporting Period

EBS conducted a fauna survey of the ML and Mine Rd SEB-offset areas during the 2016/2017 reporting period. It reported a slight numerical decrease in observations, but attributed that to food abundance in the wider region, resulting dispersal of fauna populations outside of the ML following good winter rainfall in 2016. This report can be downloaded by visiting the following link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to the following document;

2016_E50101_Kanmantoo Mine_Fauna Survey_Final.pdf'

Results of the 2016 fauna survey can be summarised by the following extract from the report's Executive Summary…

"A total of 530 separate observations of 42 native bird species (and one introduced bird species) were recorded at repeated patches throughout the ML and SEB project areas. The most abundant bird species present were Adelaide Rosella (Platycercus elegans adelaidae) (58 individuals), Australian Magpie (Gymnorhina tibicen) (48 individuals) and Yellow-rumped Thornbill (Acanthiza chrysorrhoa) (43 individuals).

Four bird and one mammal species of conservation significance were recorded within the project area during the spring 2016 survey, all of which were observed within the ML and one of which in the SEB area. For comparison, six birds and one mammal species of conservation significance were observed during the spring 2015 survey.

The species of conservation significance recorded in 2016 were:

• State rare White-winged Chough (Corcorax melanorhamphos) (36 individuals);

• State rare Elegant Parrot (Neophema elegans) (55 individuals)

• State rare Peregrine Falcon (Falco peregrinus) (one individual);

• Nationally listed marine Rainbow Bee-eater (Merops ornatus) (one individual); and

• State rare Brushtail Possum (14 individuals).

One native reptile, Sleepy Lizard (Tiliqua rugosa) was also recorded on the ML. This species does not have a conservation rating and is not considered further in this report.

The results of the 2016 survey showed a slight decline in abundance and in species diversity since 2015; this may however be contributed to other factors, such as the spread of abundant food/water across the region (not just confined to a small area), and is not considered to be a result of activities associated with Kanmantoo mine. Hence, the conditions of the PEPR continue to be met.

To date, Hillgrove Resources has made a positive contribution toward woodland enhancement and the planned rehabilitation of the site at the time of the mines closure. Rehabilitation operations continue to see areas of native woodland and grassland expand within the Mining Lease area and SEB areas."

3.7.4 Item 4: Install rabbit-proof fencing

A fence inspection has been conducted on all areas designated for SEB-Offset establishment. Fence condition ranged from 'good' to 'barely passable' in most cases. Fence condition on 141 Mine Rd and Mulawa is generally so poor that complete replacement will be required, but in the interim, it can be rendered serviceable by frequent inspection and repairs on an 'as-needed' basis. Quotes have been sought for fencing works on the SEB areas, with the intention of including fence replacement for the SEB-Offset areas as capital works projects in future Hillgrove budget cycles.

Work between September 2014 and September 2016 concentrated on repairing existing fences to keep livestock from adjoining properties from entering rehabilitation plantings on 141 Mine Rd and Mulawa. Rabbit control programs will be carried out in lieu of fencing until the fences can be replaced. This work has been described in previous EPBC compliance reports…

No fencing replacements have commenced since the 2014/2015 reporting period.

2016/2017 Reporting Period

Fencing maintenance during the 2016/2017 reporting period involved minor repairs identified during fence inspections. The removal of livestock from 141 Mine Rd/ Mulawa and surrounding

Hillgrove-owned properties throughout this reporting period has significantly reduced fence damage by livestock. Fence damage this season was predominantly due to Kangaroos moving to and from the Mine Rd SEB-offset areas.

3.7.5 Item 5: Source equipment and engage contractors

EBS Restoration has been engaged as the principal contractor responsible for SEB-Offset establishment, weed control and feral animal control on designated SEB areas as outlined in the program highlighted by Figures 20 to 25 (above).

EBS-Ecology has also been engaged as the principal contractor responsible for fauna surveying, flora surveying and surveying the progress of rehabilitation establishment efforts using Landscape Function Analysis (LFA) and BushRAT methods.

Hunter Brothers Earthmovers have been engaged as the contractors responsible for 'topsoil pre-stripping' and land preparation process prior to direct seeding on cropping land (see detail in 3.7.11 (below).

All contractors have proven track-records, both within the Mining Lease and on a range of projects within SA generally. We know they have the equipment and expertise necessary to effectively deliver SEB-Offset outcomes associated with Hillgrove's offset program. All have demonstrated admirable skills associated with the commencement of SEB-Offset establishment during the 2014-15 reporting period. Please see previous compliance reports for details…

2016/ 2017 Reporting Period

EBS-Restoration continued to be our principal contractor for the maintenance of SEB-Offset plantings during the 2016/ 2017 reporting period. They acquired an ATV-mounted 'Grass Grabber' during this reporting period, which has proven to significantly increase the volume of native grass seed which can be harvested within the available harvest window. The ATV has also been fitted with a spray tank, pump and hose lines, which will improve the efficiency of spot-spraying and boom spraying operations within SEB-offsets and the Mine's combined land assets generally. All other weed control was carried with knapsack sprayers (spot spraying) or through hand-weeding where it was practical to do so. EBS Ecology continued to provide services for the annual fauna survey and the spring LFA survey. Hunter Brothers have indicated their willingness to complete the Mine Rd topsoil pre-strip areas and commence topsoil pre-strip in new areas during autumn 2018.

3.7.6 Item 6; Weed and feral animal control

Weed and feral animal population information identified during the EBS survey of SEB Offset areas EBS Ecology (2014), have been used to direct control efforts as an extension of existing programs operating within the mining lease.

The EBS Group were engaged to conduct preliminary studies within the project area including rabbit population density and distribution, baiting methodology and population dynamics using 'trail cameras'. Initial baiting results were promising during the reporting period, with valuable lessons learned in relation to the prevention of off-target impacts to native fauna through trail camera observations. Results are summarized by the report:

EBS Group (2015), *Rabbit Control Program Kanmantoo Copper Mine Autumn 2015. Report to Hillgrove Resources.* EBS Group, Adelaide.

This report can be viewed on the Hillgrove Web Page via the link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to '*EBS Kanmantoo Rabbit Control 2015*' and click to download… Open the downloaded document.

Details of weed and feral animal control programs during 2014/2015 and 2015/2016 reporting periods can be found in the 2015/2016 EPBC compliance report…

2016/ 2017 Reporting Period

Considerable weed control work was completed in the SEB-offsets during this reporting period. Activities are summarised in Figure 19 (above) and included brushcutting, mowing, spot-spraying and selective boom-spraying.

Though feral animal control was not carried out during this reporting period, ample winter rainfall in 2016 and adequate rainfall in 2017 provided considerable feed in our region. This diluted any impact that feral animals may have had on SEB-offsets and the nett effect of feral animals on our SEB-offsets was negligible.

Contrastingly, Kangaroo numbers have increased significantly over the past two years, both within the ML and in surrounding SEB-offsets. Kangaroos have been observed breaking down 1.8m tall tree seedlings to reach tender shoots (particularly in the case of Allocasuarina and Acacia trees). They also selectively browse a range of mid-story and ground-story species, causing significant damage and inhibiting the development of SEB-offsets. A culling permit was granted by our DEWNR regional officer following a site-visit in 2016; however it has not been used and will only be used as a last-resort if after all other avenues to deter kangaroos fail.

An integrated feral animal control program will resume on-site during the 2017/2018 reporting period.

3.7.7 Item 7: Investigative Studies

Several investigative studies were conducted in preparation for the establishment of SEB-Offset plantings on the designated offset patches during 2014-15. These studies can be summarized as follows:

1. Soil seed bank studies to investigate the effective depth of topsoil pre-stripping prior to direct seeding of SEB-Offset patches, See:

South Australian Seed Conservation Centre (2015), *Germination Research on Selected Taxa for the Kanmantoo Restoration Technology Project, Progress Report August 2015.* Report to Hillgrove Resources, Botanic Gardens of Adelaide, South Australia, p9 & pp20-22. This report can be viewed on the Hillgrove Web Page via the link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to '*Botanic Gardens Progress Report August 2015*' and click to download… Open the downloaded document.

2. Germination research on selected taxa – particularly research into seed treatments to break dormancy in Lomandra effusa as a precursor to direct seeding. This work was lab based in 2013-2014 and was extended to small-scale field trials on SEB-Offset patches during 2015.

See: South Australian Seed Conservation Centre (2015), "*Germination Research on Selected Taxa"* Note pages 4-9 & 13-19.

3. Seed viability studies for direct-seeding species as a guide to direct seeding seed mix composition…

See: South Australian Seed Conservation Centre (2015), "*Germination Research on Selected Taxa"* Note pages 11-12 and pages 24 to 38.

Work conducted by the EBS Group, including:

4. Flora and Fauna surveys as listed in section 3.7.3 of this report (see above)

5. Baseline Landscape Function Analysis studies for selected SEB-Offset patches to determine the starting point for SEB-Offset establishment. Results are detailed in the following report:

EBS Ecology (2015), *Kanmantoo Mine LFA Monitoring – Autumn 2015.* Report to Hillgrove Resources. EBS Ecology, Adelaide.

Note map of transect locations and transect identifiers on p9 and associated data tables throughout the report.

This report can be viewed on the Hillgrove Web Page via the link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to '*LFA Monitoring Results Autumn 2015*' and click to download… Open the downloaded document.

6. Preliminary studies into the efficacy of topsoil pre-stripping prior to direct seeding as a means of converting cropping land into SEB-Offset vegetation. This work was conducted within the Mining Lease during 2013 and 2014. Results are detailed in the following report:

EBS (2015), *Kanmantoo Copper Mine, Environmental Management, Revegetation and SEB Offset Program, Annual Report 2014*. Report to Hillgrove Resources. EBS Restoration, Adelaide. Pages 12-19

This report can be viewed on the Hillgrove Web Page via the link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to '*EBS Progress Report August 2015*' and click to download… Open the downloaded document...

7. Studies into the Cryptogamic cover at Kanmantoo, as a precursor to research which will endeavour to culture or collect sufficient Cryptogamic material for inclusion in direct seeding and hydroseeding programs. Results are detailed in the following report;

Coles R.B., (2015) *Report on Kanmantoo Cryptogams September 2015*. Report to Hillgrove Resources.

This report can be viewed on the Hillgrove Web Page via the link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to '*Cryptogam Report R Coles Sept 2015*' and click to download… Open the downloaded document.

Further baseline studies during the 2015/ 2016 reporting period have been deferred until Hillgrove's financial position is projected to improve during the second-half of 2017.

2015/ 2016 Reporting Period

The South Australian Seed Conservation Centre's Final Report summarises results for several of the above preliminary studies and provides an invaluable reference guide to assist with future SEB-Offset and mine rehabilitation programs. This report can be viewed by following the link:

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate to the file: '*SASCC Final Report 2016',* which provides access to the following report…

South Australian Seed Conservation Centre (2016) *Report for Hillgrove Resources Ltd, Seed Biology Research Kanmantoo Restoration Project. Botanic Gardens of South Australia.*

2016/2017 Reporting Period

No new investigative studies were commenced during this reporting period.

The first cohort of *Lomandra effusa* seedlings propagated by the Mt Lofty Botanic Gardens Nursery were delivered to the mining lease and were planted in test plots on the batters of rehabilitated mine landforms during this reporting period. The success of these test plots will guide how we proceed with future *Lomandra effusa* propagation from seed and how this rolls-out into *Lomandra effusa* SEB-offset areas associated with EPBC 2013/6965.

Further investigative studies will be scheduled in future reporting periods as required.

3.7.8 Item 8: Enhancement of Native Vegetation Remnants

Vegetation condition assessment suggests there is potential to improve the overall quality of the mapped remnants through a vegetation enhancement program containing the following elements:

- Control of Scheduled and recognised pest plants
- Feral animal control
- Spot-spraying programs to inhibit growth and seed set for selected weed species

- Brush cutting programs to knock down weed seed heads and inhibit seed bank replenishment
- Targeted direct seeding as niche plantings
- Tube stock plantings of selected mid-storey and canopy species

Vegetation enhancement programs were limited to scoping studies during the 2014/2015 reporting period. The commencement of on-ground works was incorporated into work programs during the 2015-2016 reporting period.

2016/2017 Reporting Period

Vegetation enhancement works during this reporting period included woody weed control within the ML targeting Aleppo pines and boxthorns. Discussion with the Monarto Zoo has indicted that the zoo would be interested in removing woody-weed species and non-endemic native species from the ML and Mine Rd SEB-offsets as forage for zoo animals. In this case, the stumps of harvested weedy trees & shrubs would be poisoned, resulting in a progressive removal of woody weeds from both areas.

Harvest programs by the zoo on the Mine Rd SEB-offset areas would target non-endemic native species grown as windbreaks or on-farm rehabilitation. For example, *Acacia iteaphylla* (Flinders Ranges wattle) has been cultivated widely, but it is non-endemic to our region and easily becomes an invasive woody weed with long-lived seed. *A. iteaphylla*, boxthorn, *Paraserianthes lophantha* (Cape Leeuwin wattle) and other similar species could be progressively (and selectively) removed, prior to replacement by endemic tube-stock. This program should commence in the 2017/2018 reporting period.

Regular slashing of weedy pasture on the Mine Rd areas was carried out to reduce the seed set of weedy species and encourage recruitment and spread of native grass species out of direct-seeded strips into surrounding weedy pasture areas. Significant recruitment of *Austrostipa* and *Rytidosperma* within weedy pasture areas could be observed by the end of the 2017/2017 reporting period.

3.7.9 Item 9: Adjustment of boundaries and resurvey

On-ground surveys did not indicate that either the SEB-Offset patch boundaries or the initially mapped property boundaries required adjustment during this reporting period.

3.7.10 Item 10: Build-up seed reserves/ order seeds

AS reported previously, Hillgrove has invested considerable effort into the development of our seed production, seed collection, broad-acre seed multiplication and seed storage capacity. Our programs focus on collecting and nurturing local-provenance genetic material. Within seed multiplication areas, particular care is taken to support the growth of parent plants with minimal inputs to prevent possible epigenetic creep that could be fostered if we allowed seeds to be grown under ‘soft’ conditions (i.e. through fertilising or over-irrigation to drive seed production volume at the expense of seed quality). Hillgrove has not purchased additional seed from external sources to date, with all direct seeded patches being established using locally-collected or locally grown seed.

Hillgrove's main seed bank programs can be summarised as follows:

- Development and ongoing management of a 1ha intensively managed Seed Production Area (SPA), located in the NW corner of ML6345 (The Kanmantoo Copper Mine), see the yellow highlighted area in Figure 6, above. The SPA is planted with locally collected native plant species considered to be the 'germplasm' for our SEB-Offset and mine rehabilitation programs. The SPA allows us to compensate for seasonal rainfall variations below our 425mm long-term average by carefully applying sub-surface irrigation 'only when absolutely necessary'. This provides a stable seed output as a contributor to our foundation seed mix of around 20 species.

- Development and ongoing management of a 5ha Seed Multiplication Area (SMA), located on Hillgrove-owned land adjacent to the ML's eastern boundary (see yellow highlighted area in Figure 7, above). The SMA surface was prepared through topsoil pre-stripping, deep ripping and power-rake cultivation to produce a fine seed bed. The SMA was then direct-sown with native grass seed produced in the SPA and originally sourced from local provenance seed sources. The SMA produced approximately 350kg of high-quality seed during 2014 and more than 350kg of seed during 2015, providing us with the bulk of seed stock required for our direct-seeding programs.

- EBS conducts our annual wild seed collection programs within the ML and near-mine region. Over the past 4-years, EBS have identified and mapped a wide range of reliable seed-producing patches to provide species diversity for our direct-seeding programs. The wild-seed collection program targets species typically associated with the ML's *E. odorata* and L. effusa vegetation communities to supplement seed from the SPA and SMA.

- As SEB-offset patches begin to mature, they rapidly become a valuable source of mixed native grass seed. During the spring 2017 harvest, approximately 400kg of mixed seed was harvested from Mine Rd. In combination with the SMA, it expected that these areas will add approximately 500kg of seed to our reserves for 2017/2018.

- EBS processes and stores seed from the ML's seed production and seed collection programs. Seed mixes are packed into wool bales in 20kg batches prior to direct seeding in April each year. Seed mixes are formulated to represent the species found in our vegetation communities at the relative population densities you would expect to see represented by each species. Seed viability data provided by the Botanic Gardens project is a key reference defining the absolute quantity of seed for each species in a 20kg seed-mix batch.

For details, please see: EBS (2015), *Kanmantoo Copper Mine, Environmental Management Annual Report 2014*, Pages 7 to 11, and Pages 18 and 26

And: South Australian Seed Conservation Centre (2015), "*Germination Research on Selected Taxa"* Note pages 11 to 12, 24 to 33 and 36 to 38.

Seed Reserves: 2016/ 2017 Reporting Period

EBS reported that approximately 940kg of seed was in-store at the end of the reporting period. Together with approximately 500kg of mixed native grass seed harvested by November 2017, seed reserves will total approximately 1,440kg by mid-November 2017. EBS has yet to commence wild-seed harvest for 2017, so it is anticipated that seed reserves will exceed 1,500kg by the end of 2017. This will provide ample capacity to provide seed mixes for direct-seeding and hydroseeding programs in autumn 2018.

Details of seed reserves are contained in the 2016/2017 EBS annual report, which can be accessed via the link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to the following documents;

'2016_2017 EBS Annual Report.pdf'

3.7.11 Item 11: Land preparation

Initial areas of the Mine Rd SEB-Offset patches were prepared using a topsoil pre-strip technique in autumn 2015, where a Cat 16G grader was used to strip up to 150mm of topsoil from bays approximately 6m wide and windrow the stripped topsoil in the middle of each bay (see Figure 26, below). Topsoil pre-Stripping was conducted on retired cropping land, parallel to local contours. Equivalent unstripped bays were surveyed between stripped bays to provide protection from wind and water erosion. The untreated bays will be stripped and sown in autumn 2018.

A Cat 623 Scraper was used to accurately and cleanly lift topsoil and remove it from the planting bays (see Figure 27, below). The topsoil was deposited in a gully erosion channel running through the Mine Rd paddocks, then progressively compacted and profiled to form a wide drainage channel with low gradient (see Figure 28, below) Pasture and weed seeds germinated prolifically in the new drainage channel, forming a grassed waterway which has significantly improved resistance to erosion.

Figure 26: Windrowing topsoil in the middle of sowing bays with Cat grader (NW Woodlands – Kanmantoo Copper Mine)

Figure 27: Lifting windrowed topsoil from sowing bays with a Cat Scraper (NW Woodlands), April 2013

Figure 27A: NW Woodlands sowing bay with established native grass sward, 3 years after sowing (November 2016)

Figure 28: Stage 1 of progressively filling gully erosion with stripped topsoil and creating an improved drainage channel 'before and after' (Mine Rd SEB-Offset areas)

Figure 29: ‘Before and after’ photos of Stage 1 gully erosion backfill completion – Mine Rd. Note that the 3m deep erosion gully has been replaced with a broad, gently inclined grassed waterway with good erosion resistance

Figure 29A: Grassed waterway replacing backfilled gully erosion, November 2016. Note mature grass cover and no visible erosion following high rainfall during winter

Once topsoil had been stripped, the subsoil was deep ripped with the grader to break up cultivation plough-pans generated through over 100-years of cropping activity. Deep ripping significantly improves rainfall infiltration and water storage (see Figure 30, below).

Figure 30: Deep-ripping with grader to improve water infiltration prior to initial cultivation with power rake (NW Woodlands – Kanmantoo Copper Mine)

Once deep ripped, a seed bed is prepared using a tractor and power rake. The power rake is similar to a modified rotary-hoe which has short metal pins instead of rotary hoe blades. The power rake finely cultivates the top 25-30mm of the seed bed, providing an ideal surface texture for sowing native seed (see Figures 31 to 33, below).

Figure 31: Preparing the seed bed with a power rake and tractor (Mine Rd SEB-Offset areas)

Figure 32: Power rake and tractor used to finely cultivate the seed bed to a depth of 25-30mm

Figure 33: Mine Rd SEB-Offset strips prepared for direct seeding, April 2015. Note lighter-coloured seed sown on the soil surface prior to incorporation by the power rake

Figure 33A: Mine Rd SEB strips, 18-months post planting, November 2016

Figure 34: Overview of Mine Rd SEB-Offset areas post-topsoil stripping and prior to direct seeding, April 2015

Figure 34A: Overview of Mine Rd SEB-Offset areas, 18-months post-planting, November 2016. Note mown strips of weedy pasture between direct-seeded strips. Mown strips will be prepared and sown at a later date.

Figure 35: Native vegetation/ SEB-Offset establishment in direct seeded strips Mulawa, Nov 2015

Figure 36: 141 Mine Rd, Nov 2015

Figure 35A: Native vegetation / SEB-Offset establishment in direct seeded strips Mulawa, Nov 2016

Figure 36A: 141 Mine Rd, Nov 2016

Note the alternating rows of unprepared and prepared ground in Figures 33 & 34 (above). The unprepared rows (green areas) provide erosion protection for the prepared (pre-stripped and cultivated) rows. The unprepared rows will be pre-stripped and sown in later seasons, eventually providing a continuous sward of direct-seeded native vegetation.

Please note: The Cat 623 scraper was not available to complete all of the topsoil pick-up from the Mine Rd plots. This required a grader to complete topsoil removal by pushing topsoil to one side of each pre-stripped row. Some smearing of topsoil resulted, with a percentage of associated weed seeds remaining on one side of some pre-stripped rows.

To date, weed competition in the grader-finished rows has been higher than in the fully pre-stripped rows, but remains within acceptable limits for native sward establishment (see Figures 35 & 36, above). The balance of topsoil remaining on the inter-rows will be collected when they are pre-stripped in a future season.

2015/ 2016 Reporting Season

Land preparation activities during the 2015/16 reporting season were limited to weed and weed seed-bank reduction through slashing and selective weed spraying on the unstripped inter-rows. The weedy inter-rows were slashed in spring 2016 to reduce seed set and weed-seed contamination of the native plant swards. The potential for seed spread into weed-free pre-stripped rows by barley grass (*Hordeum* sp) growing in adjacent weed pasture strips, can be illustrated by the flowing photograph (Mine Rd SEB Area - October 2016)

Figure 37: Note small silver barley grass seed visible on the edge of the Stipa-dominated sward (above).

The potential for weed-seed spread into establishing direct-seeded strips was substantially reduced following careful mowing of the weedy pasture margins using a commercial front-deck mower. This is illustrated by the flowing photograph…

Figure 38: Reduction of seed spread following inter-row sward mowing

Note that overhanging barley grass, wild oats (*Avena fatua*) and ryegrass (*Lolium rigidum*), previously present in Figure 38 (above), have been mown and the clippings have been blown away from the native sward into the weedy pasture inter-rows (Mine Rd SEB areas, October 2016). The mower's cutter-deck vortex acted to 'vacuum' loose weed seeds that may have fallen into the edges on the native swards, substantially reducing the spread of weed seeds into these areas.

2016/2017 Reporting Period

Although topsoil pre-stripping programs to complete preparation of the Mine Rd patches were deferred during this reporting period, the un-sown mid-rows at Mine Rd were again mown several times to reduce the set of weed seeds and prevent incursion of weed seeds into SEB-offset strips.

Figure 39: Mulawa SEB-offset area, highlighting mown mid-rows to reduce weed seed set, September 2017

The removal of topsoil from the remaining weedy pasture inter-rows on the Mine Rd SEB-offset areas will recommence in autumn 2018 if the financial position of the Mine continues to improve as it is currently expected to do so. Following pre-strip and soil preparation, the inter-rows will be direct seeded with a seed mix containing approximately 30 local native species commensurate with the establishment of a *E. odorata*/ *A. pycnantha* open woodland communities. This step will complete the preparation of the initial Mine Rd patches prior to establishment of a continuous block of native vegetation over the Mine Rd SEB-Offset areas.

3.7.12 Item 12: Planting programs; Hillgrove's 2015 SEB-Offset planting program for the controlled action covered by EPBC 2013/6965 commenced on two paddocks totalling 20.3ha, on the Mine Rd properties known as 'Mulawa' and '141 Mine Rd'.

As topsoil pre-stripping only prepares half of the total available area initially, *the 2015 planting program totalled approximately 10.15ha* (see Figure 37, above). The unprepared inter-row strips act as weedy pasture 'nursery rows' for one or more seasons, while the pre-stripped direct

seeded rows establish. The un-prepared rows reduce wind and water erosion and improve the early survival of native plant seedlings in direct-seeded areas.

Once established, the pre-stripped and direct-seeded rows can act as ‘nursery rows’ for the remaining weedy pasture rows, allowing them to be pre-stripped and direct seeded as ‘phase 2’ of the process. Phase 2 completes the ‘landscape-scale’ conversion of cropping land to native vegetation, producing a continuous sward of vegetation over the assigned SEB-offset area.

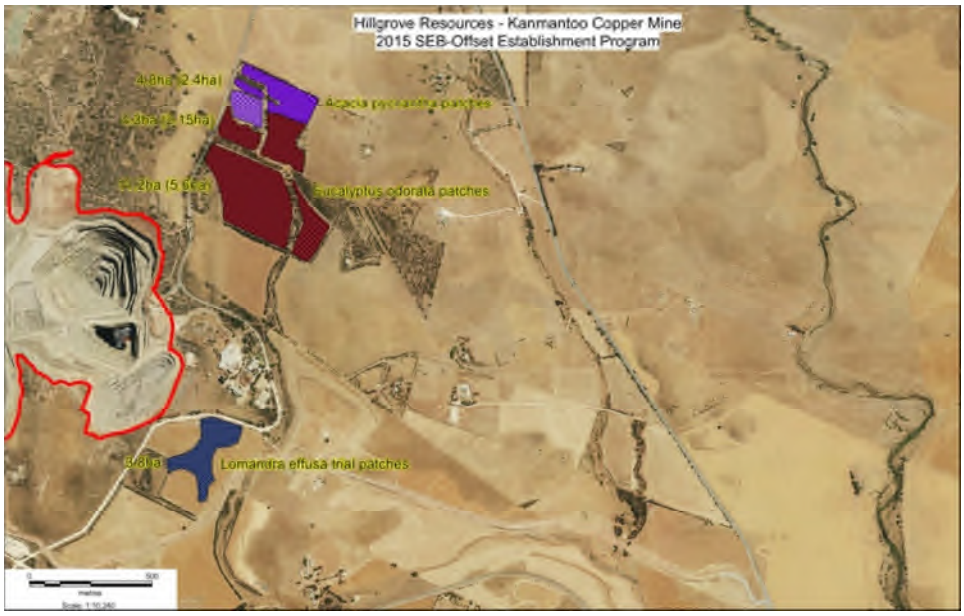

Figure 40: 2015 SEB-Offset Planting Program

This work is summarised by the EBS Annual Report … EBS (2015), *Kanmantoo Copper Mine Annual Report 2014,* Pages 12 to 18 and is updated by the 2015/16 EBS Annual report.

Planting included approximately 2.4ha of seed mixes tailored to develop an *Acacia pycnantha* open woodland community and approximately 7.7ha of a *Eucalyptus odorata* grassy woodland community. Figure 41, (below) illustrates bales of prepared seed (left) and bales of seed being distributed into bins (right) prior to direct seeding the Mine Rd SEB-Offset patches by hand. Seed mix composition was summarised in the EBS (2015) Annual Report (above), pages 13 and 14.

Figure 41: Bales of native seed prior to direct-seeding

Trial plantings to assess seed treatments and *Lomandra effusa* seed establishment were carried out in the blue highlighted patch to the south of the Mine Rd plantings in Figure 40 (above). This trial tested the topsoil pre-stripping method in conjunction with seed pre-treatments ranging from nil to 1000mg/L GA or 10% (V/V) Smoke water. A series of 8 small-scale replicate plots were established during 2015.

This work is summarised in the Botanic Gardens Report; See: South Australian Seed Conservation Centre (2015), "*Germination Research on Selected Taxa"* Note pages 8 to 9 and page 19.

Figure 42, (below), illustrates one of the small-scale Lomandra seed pre-treatment trial pots. By the end of the 2016/2017 reporting period, observations have suggested that this method does not provide a viable technique to establish *Lomandra effusa* SEB-offsets on a large-scale. However, results from direct seeding into topsoil pre-stripped areas on Mine Rd strongly suggest that establishment of *Lomandra effusa* SEB-offsets would have the greatest probability of success through planting *L. effusa* tubestock 'nodes' into pre-stripped and direct-seeded grassland communities. A topsoil pre-strip area within the approved SEB-offset plan will be used to test this approach commencing autumn 2018.

Figure 42: 2015 *Lomandra effusa* seed pre-treatment trial plots

2014/2015 and 2015/ 2016 Reporting periods

Progress towards the establishment of approved SEB-offsets during the 2014/2015 and 2015/2016 reporting periods have been described in previous compliance reports. *Please refer to the 2014/2015 and 2015/2016 EPBC compliance reports for details...*

2016/2017 Reporting Period

Planting on the Mine Rd SEB-offset areas during winter 2017 included a total of 6,260 canopy and mid-story tube stock plants placed within the western-most direct-seeded strips. This also included approximately 100 *Diuris behrii* orchid plants, which were produced for our SEB-offset program through Hillgrove's ongoing collaboration with the Native Orchid Society of South Australia. The remaining topsoil pre-strip and direct seeding is scheduled to commence within the Mine Rd patches in April 2018. Topsoil pre-strip and direct seeding will also commence on land allocated to other SEB-offset areas, adjacent to the Mine's Access Road in autumn 2018.

Please see the EBS annual report for details of work completed during this reporting period…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to the following documents;

'2016_2017 EBS Annual Report.pdf'

3.7.13 Item 13: Assess results and adjust methods

Initial results from topsoil pre-strip trials for SEB-Offset establishment within the NW corner of the ML, Smelter Rd and Mine Rd have proven very promising with strong stands of native vegetation established during the first 5-years of establishment. Figure 43 (below), illustrates the sequence of native vegetation establishment with minimal weed competition on the 'Smelter Rd' SEB-Offset trail area within the ML.

Preliminary observations from the nearby Mine Rd SEB-Offset patches indicate they are trending towards the promising result we have observed on the Smelter Rd trial area. *Initial observations indicate that an adjustment to planting methodology is not warranted at this stage.*

Figure 43: Rehabilitation of Smelter Rd just prior to direct seeding, April 2012. Smelter Rd provides an analogue site for the Mine Rd plantings. It provides a benchmark to track the development of direct-seeded vegetation using the topsoil pre-strip technique.

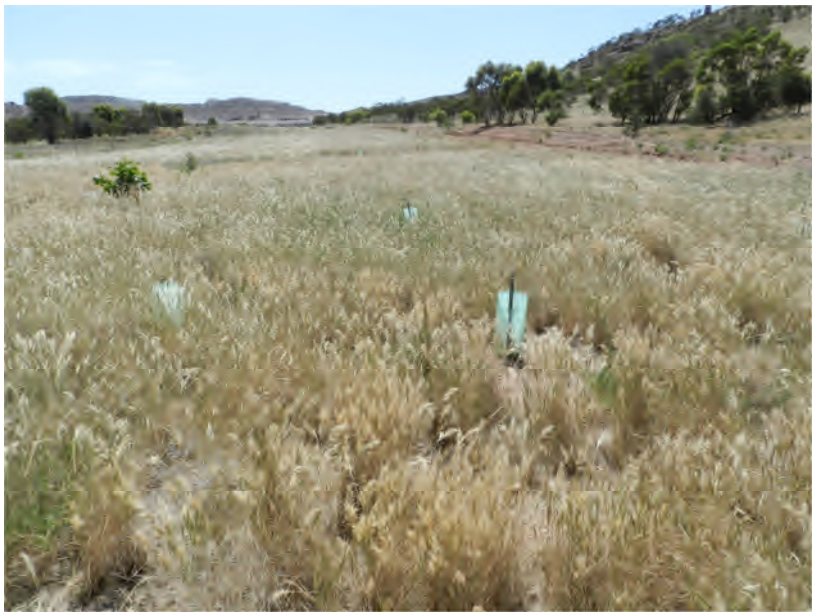

Figure 43A: Establishment of native vegetation in the third year following topsoil pre-strip (Smelter Rd, Kanmantoo Copper Mine), October 2015. Note *A. pycnantha* beginning to emerge above grasses.

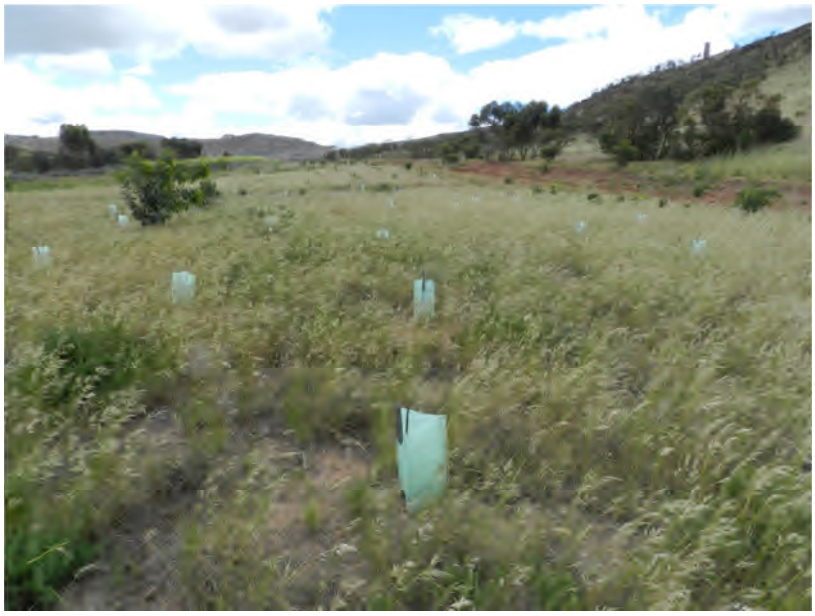

Figure 43B: Smelter Rd rehabilitation, Year 4 – October 2016, *A. pycnantha* and *Atriplex* spp. emerging from a well-established *Rytidosperma* (Wallaby Grass)/ *Stipa* sward. This patch will mature to form a grassy-woodland vegetation association dominated by an *A. pycnantha*, *E. odorata* and *A. verticillata* overstorey.

Figure 43C: Smelter Rd rehabilitation, Year 5 – July 2017, *A. pycnantha, A. verticillata* and *Atriplex* spp. emerging from a maturing *Rytidosperma* (Wallaby Grass)/ *Austrotipa* sward. This patch is developing into an *A. pycnantha* open woodland community.

Figure 44: Mine Rd SEB-Offset area, Year 2 January 2017. The above photo illustrates the species diversity emerging from the Mine Rd SEB-offset strips in year 2. Up to 15 species could be observed in some strips by the end of the reporting period. Mine Rd is proving to be on a similar path to Smelter Rd, in terms of patch maturation and vegetation community diversity.

3.7.14 Item 14: Replanting program

Initial results during 2014/ 2015 were promising. Replanting was not warranted at this stage of the SEB-Offset establishment program. Establishment within the Mine Rd plots will be assessed during late spring 2016. Replanting will only be considered if establishment is poor or weed competition is excessive.

2015/2016 Reporting Period

Weed control efforts during the 2015/16 period have significantly reduced weed competition in the Mine Rd SEB areas. Subsequent selective weed control and spot spraying within the direct-seeded areas have reduced weed pressure, producing weed-free patches in many cases. This is illustrated by the photo below, which highlights the largely weed-free soil surface between the native grasses establishing within the pre-stripped areas. Areas still exhibiting weed competition will be managed through selective herbicide treatment during 2016/17.

Based on the current level of establishment observed in the Mine Rd. SEB-Offset patches, we do not consider that re-planting will be required at the time of writing this report.

Figure 45: Bare earth with low weed competition between establishing native grass plants – Mine Rd SEB-Offset areas, October 2016

2016/2017 Reporting Period

The Mine Rd SEB-offset areas continued to develop very well during this reporting period, with low weed emergence and high species diversity in most strips. Hard-seeded species continue to emerge and increase the diversity of establishing vegetation communities. Development of direct-seeded areas continues to be excellent and it is not anticipated that the Mine Rd SEB-offsets will require re-seeding in the near future.

Figure 46: 141 Mine Rd SEB-offset Jan 2017, highlighting emergence of mid-story species within ground-story diversity.

3.7.15 Item 15: Establish heritage (or other) agreement

All areas allocated for SEB-Offset establishment are on Hillgrove-owned land. Both Hillgrove's CEO and our Environment Manager have undertaken to allow the establishment of Heritage Agreements (or similar instruments) over the SEB-Offset patches, with the Heritage Agreements (or similar) to be lodged against the Land Titles for each property.

Though Heritage Agreements (or similar) are not currently established for the Mine Rd patches, it is Hillgrove's intention to proceed with establishment in the foreseeable future.

3.7.16 Item 16: Inspect and maintain fences

The presence of livestock on neighbouring properties requires ongoing inspection and maintenance of fences to ensure that livestock do not stray onto the Mine Rd SEB-Offset patches. Fences around 141 Mine Rd and Mulewa are in 'good' to 'barely passable' condition and will require replacement when funding is available. Funding for fence replacement will be sought through Hillgrove's Capex program when business conditions improve.

2015/2016 Reporting Period

The removal of livestock from the Mine Rd patches and adjacent Hillgrove-owned land has significantly reduced livestock pressure on the ageing fences surrounding 141 Mine Rd and Mulawa. Fence inspections and repairs were carried out on both properties during autumn/ winter 2016. The majority of fence repairs related to damage caused by falling trees during an unusually windy/wet season.

It is expected that capital works submissions to replace fences surrounding 141 Mine Rd and Mulawa will be submitted during 2017.

3.8 EPBC Act - Compliance report for EPBC 2013/6965

This report is intended to satisfy Hillgrove's obligation to prove compliance with the conditions associated with EPBC 2013/6965. We believe that we have adequately addressed the NVMP and we are making good progress in all areas.

The initial report for 2014/ 2016 was published on the Hillgrove Resources web page. The report can be viewed via the link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to '*2015 EPBC Act Compliance Report*' and click to download… Open the downloaded document.

The 2015/ 2016 Compliance Report has also been posted on Hillgrove's web page and can be accessed via the link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to '*2016 EPBC Act Compliance Report*' and click to download… Open the downloaded document.

The 2016/2017 Compliance Report has also been posted on Hillgrove's web page and can be accessed via the link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to '*2017 EPBC Act Compliance Report*' and click to download… Open the downloaded document.

3.9 Participation in audit (if required)

Hillgrove will actively assist with an audit of our compliance with EPBC 2013/6965 if requested to do so.

2016/2017 Reporting Period

Hillgrove participated in a site inspection by the ADE and DSD staff on 18May17. A report of this inspection was returned to Hillgrove on 29Aug17. A copy of the inspection report and accompanying cover letter can be accessed via the following links;

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation', then Navigate to the following documents;

'EPBC 2013 6965 site inspection close out.pdf'

and…

'Mining Inspection Report_Kanmantoo Copper Mine_May 2017'

Click to download… Open the downloaded document...

During the site inspection, the reporting officer found that there were no non-compliances with approval conditions, but commented that some areas had not yet commenced management actions.

Hillgrove acknowledges these comments and intends to re-commence management actions as approved in autumn 2018.

3.10 Approval for non-approved activities

No non-approved activities have been undertaken or are planned to be undertaken at the time of writing this report.

3.11 Revision of NVMP (if required by the Minister)

Mine activities have proceeded in accordance with approvals. A formal request for revision of the NVMP has not been received from The Minister at the time of writing this report.

Due to program deferrals as a result of difficult operating conditions for Hillgrove since 2015, we may voluntarily seek to revise the current NVMP if it is shown that the program of SEB-offset commencements cannot be brought back into alignment with the approved program during the next reporting period (2017/2018).

In addition, the 'topsoil pre-strip method' of SEB-offset establishment has proven to be so successful, that a revision of the land areas currently allocated for SEB-offset establishment may be warranted. This would see a 1 for 1 exchange of Hillgrove-owned land currently under cropping, for the areas currently allocated to SEB-offsets under this approval. This would result in no change to the total area of each category of SEB-offset delivered under this approval, but it would significantly improve the likelihood of achieving a high-quality outcome for the SEB-offset program overall. If these changes prove to be viable, a revised NVMP could possibly be proposed in the next reporting period (2017/2018).

3.12 5-year sunset date for commencement

Work commenced according to approvals on the 11th of September 2014. Subsequently, the 5-year sunset date for commencement will not apply to this approval.

3.13 Publication of NVMP

The NVMP was published on Hillgrove's Web Page and can be accessed via the following link…

http://www.hillgroveresources.com.au/article/Community/Mine_Life_Extension

Navigate down the page to 'Extension Documentation'

Navigate to 'PEPR Appendices Vol 3' and click to download…Open the downloaded document…

The NVMP is located under 'Appendix 9b Native Vegetation Management Plan 2014' and extends from page 147 to 213. The approved NVMP will continue to be available via the Hillgrove web page for the life of the Action.

4.0 Conclusions

Hillgrove Resources have actively worked towards complying with both the spirit and intent of the approval granted by EPBC 2013/6965.

Vegetation disturbance associated with EPBC 2013/6965 was commenced on 11Sep14 and continued to the approved limit of disturbance during the initial reporting period (11Sep14 to 11Sep15). Vegetation disturbance has not subsequently extended beyond the limit described by the approved NVMP.

Hillgrove have addressed all of the elements outlined by our NVMP. Progress has been made on the establishment of SEB-Offset areas, with approximately 10ha of plantings commenced in the 2014/ 2015 reporting period. This work included part-remediation of gully erosion SEB-Offset areas. Work during the 2015/ 2016and 2016/2017 reporting period consolidated initial plantings through intensive weed control and patch management activities.

Additional topsoil pre-strip and direct seeding plantings were not undertaken during 2015/2016 or 2016/2017 reporting periods; however a large tubestock planting program was completed on the Mine Rd SEB-offset areas during this reporting period. Topsoil pre-strip and direct seeding will resume in autumn 2018.

A range of investigative studies have been completed within the allocated SEB-Offset areas and reports associated with these studies have been posted on Hillgrove's web page.

Seed production programs and wild-seed seed collection programs are continuing. Adequate seed supplies were available for the 2015 Mine Rd plantings and the 2016/ 2017 mine landform rehabilitation programs. It is expected that adequate seed supplies will be available to commence catch-up on deferred plantings and complete scheduled plantings in autumn 2018, without the need to purchase additional seed from external sources. Seed stocks are expected to exceed 1,400kg by autumn 2018 .Approximately 16.5ha of SEB-offset commencements (as required by EPBC 2013/6965) and 23.5ha of mine landform rehabilitation are scheduled for autumn 2018.

Observations continue to suggest that the topsoil pre-strip technique is well suited to the conversion of farming land to native vegetation with minimal follow-on weed competition. Management programs during 2016/2017 further consolidated the initial plantings and provided an excellent basis for the resumption of topsoil pre-strip and direct seeding in 2018.

Hillgrove will continue to work actively towards establishment of our assigned SEB-Offsets and look forward to reporting improved progress against our NVMP in the 2017/ 2018 Compliance Report.