Centennial Coal

Angus Place

Ventilation Facility Project Rehabilitation Management Plan

Angus Place Colliery

July 2013

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TABLE OF CONTENTS

Tables

Figures

Appendices

Abbreviations

AEMR	Annual Environmental Management Report (now known as Annual Review)
CCL	Consolidated Coal Lease
CEMP	Construction and Environmental Management Plan
DP&I	NSW Department of Planning and Infrastructure
DRE	Division of Resources and Energy (division of the NSW Department of Trade, Investment, Regional Infrastructure and Services)
EPL	Environment Protection Licence
ESP	Exchange Sodium Percentage
FCNSW	Forestry Corporation of NSW
ML	Mining Lease
MOP	Mining Operations Plan
Mtpa	Million tonnes per annum
NEPM	National Environment Protection Measure
OEH	NSW Office of Environment and Heritage
PA	Project Approval 06_0021
ROM	Run of mine
SMP	Subsidence Management Plan
TARP	Trigger Action Response Plan
VFP	Ventilation Facility Project
WIRES	Wildlife Information Rescue and Education Services

1. INTRODUCTION

Angus Place Colliery (Angus Place) is an underground coal mining operation located approximately 5 kilometres north of the village of Lidsdale, 8 kilometres northeast of the township of Wallerawang and approximately 15 kilometres northwest of the city of Lithgow in the Blue Mountains region of NSW. It is bordered by Springvale Colliery to the south, Ivanhoe Colliery to the northwest and the Wolgan Valley and Newnes Plateau to the north and east respectively. The locality of Angus Place is shown on **Figures 1** and **2**.

Angus Place has been in operation since 1979 and is operated by Centennial Angus Place Pty Ltd, a joint venture company owned in equal share between the Centennial Coal Company Ltd and SK Kores of Korea. Coal extraction utilising the longwall method of mining is currently undertaken within Mining Lease (ML) 1424 and Consolidated Coal Lease (CCL) 704. Project Approval (PA 06_0021) was granted by the then NSW Department of Planning (now the NSW Department of Planning and Infrastructure (DP&I)) in September 2006 for continuation of mining.

The main components of the site are an underground longwall mine and associated development units, supporting surface infrastructure, a coal stockpile area (identified as Kerosene Vale) and a haul road to Wallerawang power station. A second haul road to Mount Piper power station is owned by Coal Link Pty Ltd and operated by Angus Place. Angus Place currently operates 7 days a week, 24 hours per day, and has approval to extract up to 4 million tonnes per annum (Mtpa) of run of mine (ROM) coal from the Lithgow Seam. Mined coal is conveyed to the surface from a stackout/reclaim stockpile, which is equipped with underground feeders, enabling coal to be loaded onto the reclaim conveyor. Coal is then conveyed to the coal handling plant where it is crushed and sized, prior to delivery to the truck loading hoppers by conveyor. Angus Place holds coal supply contracts with Delta Electricity, therefore loaded trucks transport the coal to Mount Piper or Wallerawang power stations via private haul roads.

On 29 August 2011 approval to modify PA 06_0021 was granted to Angus Place. Modifications to the PA included the development and extraction of two additional longwall panels (Longwall 910 and 900W), increasing the coal production limit from 3.5Mtpa to 4 Mtpa and modifications for the improvement of the dirty water management system at the pit top.

On the 22nd of April 2013 a second approval to modify PA 06_0021 was granted to Angus Place. The approval allows for the development of underground roadways and a Ventilation Facility with associated infrastructure to the east of the existing Angus Place Colliery.

This Rehabilitation Management Plan was prepared in May 2013 by Angus Place as a requirement of PA 06_0021 as modified.

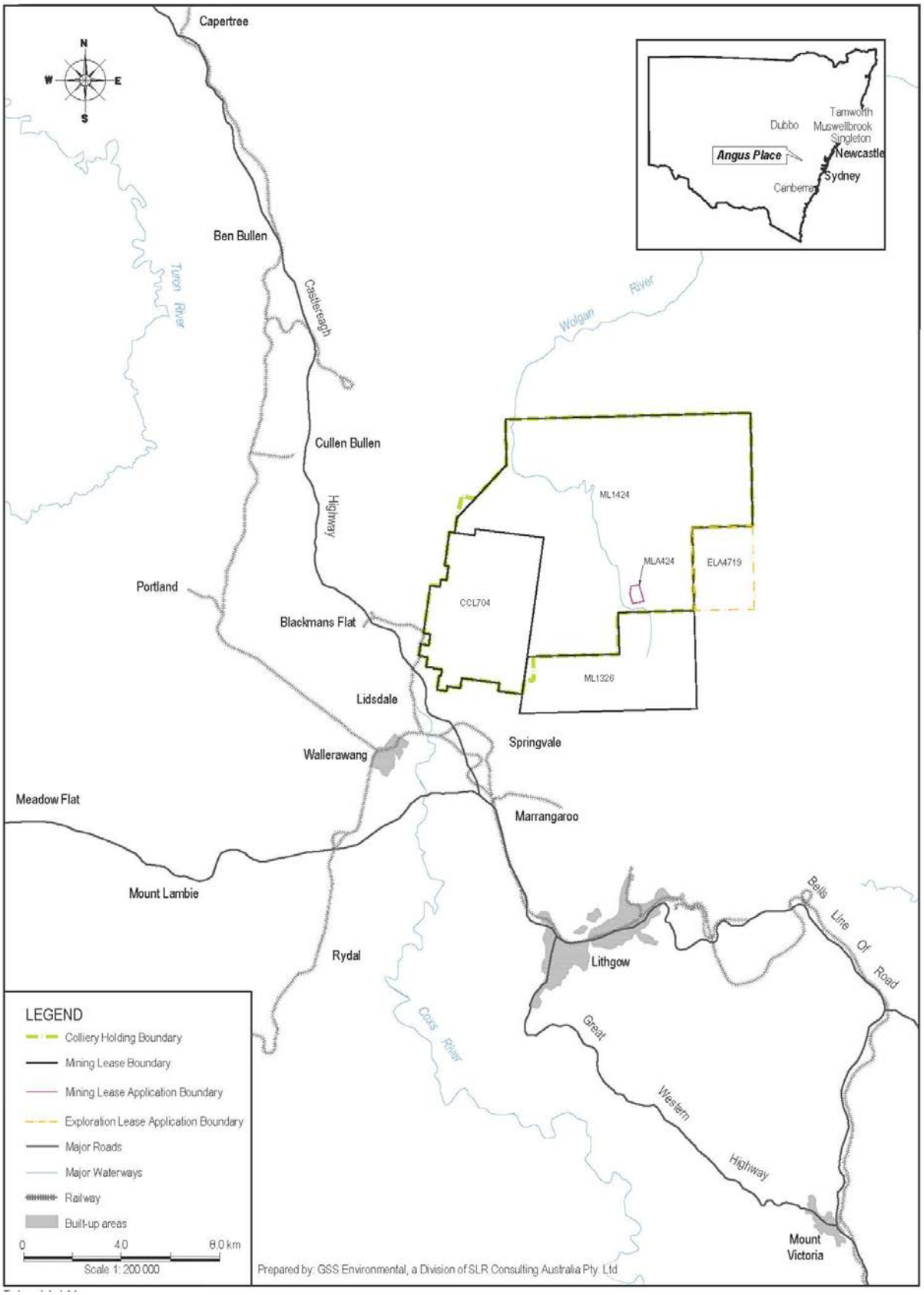

Figure 1 Regional Locality

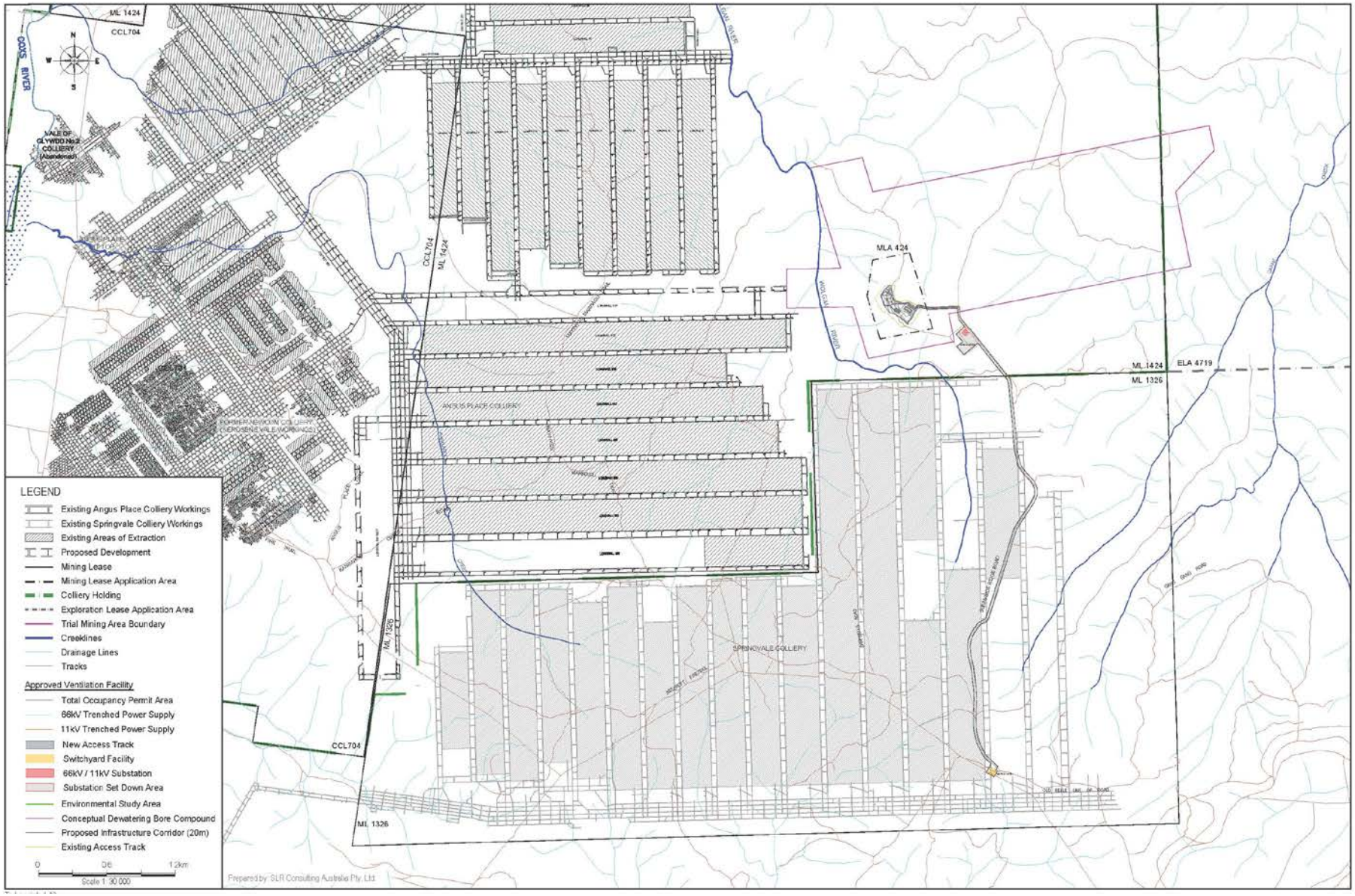

Figure 2 Locality Plan

2. PURPOSE

This document has been completed in order to fulfil the requirements of PA 06_0021 (as modified), as detailed in **Section 4**.

The purpose of the Rehabilitation Management Plan is to describe how land disturbed as a result of the Ventilation Facility Project (VFP) will be returned to the capacity which was present pre-mining. Specifically, the Rehabilitation Management Plan has been assigned the following key objectives:

- Describe rehabilitation strategies for areas that are expected to be affected by surface disturbance;
- Describe short, medium and long term objectives for the rehabilitation of the site;
- Describe an effective revegetation program;
- Describe an effective monitoring program to assess performance of the rehabilitated areas; and
- Describe objectives and preliminary success criteria for mine closure.

3. SCOPE

The VFP is comprised of two key components; a) the subsidence zone of the proposed underground roadways, and b) areas to be disturbed by proposed infrastructure. The total Project Area is 445.4ha.

The proposed underground roadways are located beneath the Newnes State Forest, managed by the Forestry Corporation of NSW (FCNSW). The Newnes State Forest covers an area approximately 300km² and extends north from the escarpment of the Lett River Valley. Surface infrastructure that will be developed in the Newnes State Forest includes the following;

- Development of underground access headings from Longwall 910 up to the proposed ventilation facility site;
- Continuation of underground roadways to develop gateroads from the ventilation shaft;
- Construction and operation of a ventilation facility, consisting of both upcast (exhaust) and downcast (intake) shafts;
- Implementation of ventilation facility backup generator and an above ground self bunded diesel storage tank (20,000L);
- Construction and operation of an air compressor station;
- Implementation of several surface to mine service boreholes;
- Personnel amenities such as a demountable first aid room and sanitary facilities;
- Permanent hardstand access arrangements and standing areas. Construction of adequate security fencing;

- Water management control ponds;
- Construction of fire tanks to protect assets from bushfire impacts;
- Shaft spoil emplacement area;
- New access track from Sunnyside Ridge Road to the ventilation facility;
- Construction and operation of two electrical substations;
- Provision of electrical power supply from trenched power lines to the ventilation facility;
- Switchyard at the existing power line to link to the proposed extension of the electrical power supply;
- Buried cables; and
- Boreholes to supply services such as concrete, ballast, stone dust, emulsion, electricity, communications and compressed air

The proposed disturbance area for the project totals 17.3ha. A plan showing Angus Place Colliery's location and the key components of the surface disturbance areas are shown in **Figure 2**.

The key objective of the implementation of this Rehabilitation Management Plan is to demonstrate successful rehabilitation, as defined by the criteria detailed in **Section 8**, of the land disturbed as a result of the VFP.

4. REGULATORY REQUIREMENTS

This document has been developed in accordance with Schedule 3, Condition 39 of PA 06_0021 (as modified). The requirements of this condition and where they have been addressed within this document is presented in **Table 1**.

Table 1. Project Approval Conditions Relevant to Rehabilitation Management Plan

Condition	Condition Requirement	Section Addressed
Schedule 3, Condition 39.	The proponent shall prepare and implement a Ventilation Facility Rehabilitation Management Plan to rehabilitate areas of disturbance caused by construction of the Mod-2 ventilation facilities and their supporting surface infrastructure and access track/roads, to the satisfaction of DRE. This Plan must:	This document
	a) Be prepared in consultation with the Department, OEH and Forests NSW;	Section 5
	b) Be submitted to the Executive Director of minerals Resources for Approval, prior to 1 August 2013;	This document

Condition	Condition Requirement	Section Addressed
Schedule 3, Condition 39.	c) Describe how the performance of the rehabilitation would be monitored and assed,	Monitored- Section 7 Assessed- Section 8
	d) Describe measures for soil erosion and sediment control;	Section 6.3.2
	e) Provide for progressive rehabilitation of temporarily disturbed areas and final rehabilitation following decommissioning of these facilities, including re-establishment of *Persoonia hindii*: and	Progressive - Section 6.3.2 Final - Section 9 *P. hindii* - Section 6.4
	f) Include a timetable for the implementation of the components of the Plan.	Section 10

This report has generally been prepared in accordance with the requirements of the following relevant strategic land use planning and resource management plans and policies relating to mine rehabilitation and mine closure. These include:

- EDG 03 Guidelines to the Mining, Rehabilitation & Environmental Management Process (NSW Department of Trade and Investment, 2012);
- The Strategic Framework for Mine Closure (ANZMEC & MCA, 2000);
- Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth of Australia, 2006)
- Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure and Completion (Federal Department of Industry, Tourism and Resources, 2002);and
- The current Mining Operations Plan (MOP).

5. CONSULTATION

The Rehabilitation Management Plan for the VFP has been submitted to the DP&I, NSW Office of Environment and Heritage (OEH) and FCNSW as part of the consultation process during the development of the plan. This consultation was undertaken prior to submitting for approval by the Executive Director Mineral Resources, NSW Department of Trade, Investment, Regional Infrastructure and Services' Division of Resources and Energy (DRE). Following the receipt of comment from the DP&I, this document was subsequently revised and recirculated for comment again to the DP&I, OEH and FCNSW prior to resubmission to the DRE for approval.

6. REHABILIATION MANAGEMENT PROGRAM

Angus Place is required, where necessary, to return any land disturbed due to exploration or mining activities, to a capacity which was present pre-mining. The rehabilitation management process to achieve this is shown in **Figure 3**. This section will provide details on developmental stages of this process, while **Section 7** and **Section 8** detail the monitoring and success criteria elements to best practice rehabilitation.

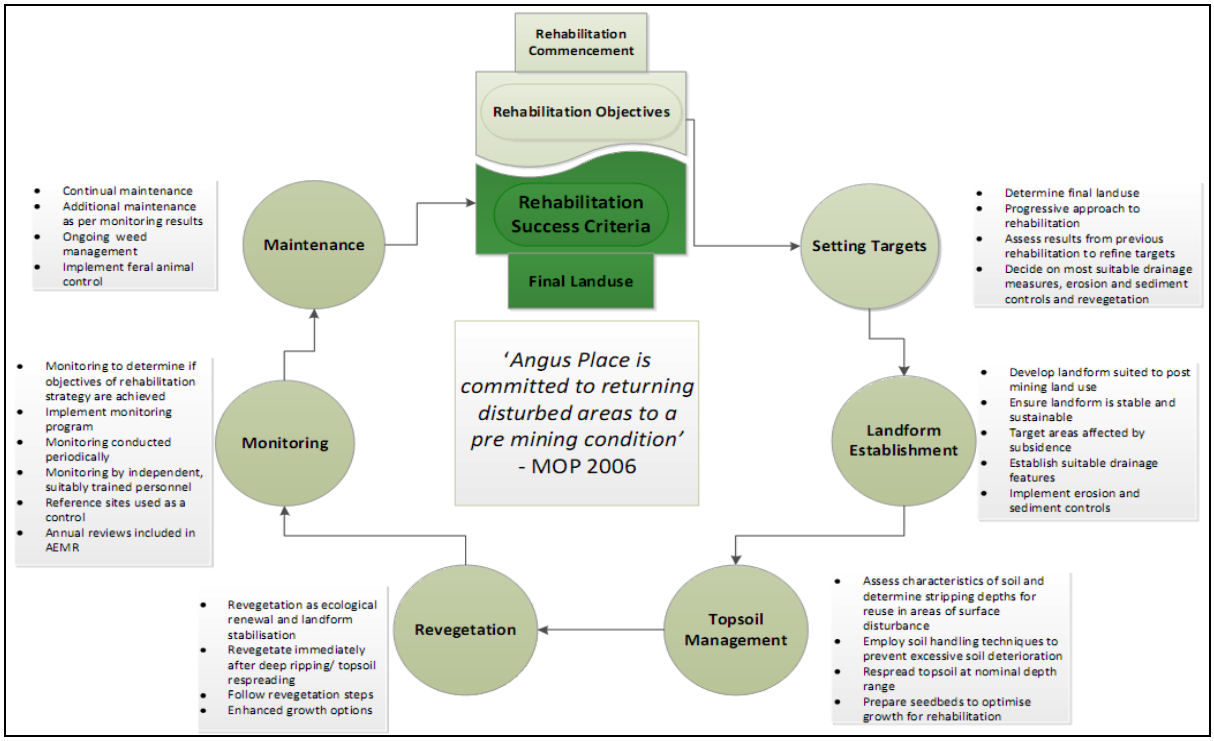

Figure 3 Rehabilitation Management Process Flowchart

6.1. Current Rehabilitation Objectives

The current approved MOP for Angus Place Colliery, and the conditions from the previous Mod 1 Project Approval, set out specific rehabilitation objectives. These objectives are as follows:

- Rehabilitation and the outcomes will be consistent with the Environmental Assessment which formed the basis for any approvals;
- Rehabilitation will be based on mine closure criteria and outcomes developed through stakeholder consultation;
- Compliance with the relevant regulatory requirements and that regulatory consensus is attained on the successful closure and rehabilitation of the site;
- Rehabilitation of native vegetation will be integrated with undisturbed native vegetation to provide consolidated areas and wildlife corridors where possible;
- The site will be rehabilitated to an agreed final land use compatible with the surrounding land fabric and land use requirements;
- The rehabilitation process will address limitations of land capability that may arise as a consequence of mining;
- The rehabilitation will be sustainable in terms of selected final land use;
- The rehabilitated site will be stable with permanent landforms with soils, hydrology and ecosystems having maintenance needs no greater than those of the surrounding land;

- Waste substances that have the potential to affect land use or result in pollution will be secured and safely contained until they can be removed from site by licenced waste contractors;

- The rehabilitated site will not present a hazard to persons, stock or native fauna;

- The site will be clean and tidy and any remaining structures will be left in a condition that provides for the safety of the public; and

- Mine closure works are completed as quickly and cost effective as possible whilst providing that the above objectives are achieved.

6.2. Targeted Rehabilitation

Rehabilitation will be undertaken following both construction and operation of the facility. Rehabilitation of disturbance areas following construction of the Ventilation Facility will be undertaken as soon as possible provided the land is not required during operation of the facility. Infrastructure items constructed as part of the Ventilation Facility will be removed from the areas prior to final rehabilitation and the re-establishment of vegetation.

In order to reduce the amount of disturbed land at any one time, rehabilitation will be targeted to areas that cease to be used for mining or mining-related activities as soon as practical. Results from current successful rehabilitation across the site will be used to refine the proposed rehabilitation methods including aspects such as the selection of appropriate drainage measures / structures and plant species for re-establishment. The locations of where erosion and sediment control structures will be installed are illustrated in the Angus Place Site Water Management Plan. Additional detail regarding the location of rehabilitation and the selection of plant species for revegetation has been provided in **Section 6.6**.

Rehabilitation will target areas of the Project Area that have been subject to direct surface disturbance and clearing, as well as areas affected by subsidence, and will be prioritised based on risk. In particular, rehabilitation of any public access area affected by subsidence will be undertaken upon identification. However, in some areas it will only be possible to undertake temporary rehabilitation due to continued operation of the Ventilation Facility. Temporary rehabilitation will generally be limited to sowing vegetation species that are associated with erosion and sediment control and stabilisation. These temporary rehabilitation works will commence as soon as possible following disturbance, provided the land is not required for operational purposes, and where access permits.

Therefore, while some rehabilitation measures will be instituted during operation, key rehabilitation steps will be undertaken following the decommissioning of surface infrastructure.

6.2.1. *Persoonia hindii* Management and Research Program

The VFP will involve the clearing of *Persoonia hindii* stems. Disturbance of this species, as well as rehabilitation, will only be undertaken in accordance with an approved *Persoonia hindii* Management and Research Program, which will be prepared in consultation with the OEH and FCNSW, by suitably qualified and experienced persons. In accordance with Condition 24A of PA 06_0021 (as modified), this document will be submitted to the DP&I for approval prior to the commencement of construction activities for the project modification (PA 06_0021 Mod 2) involving the clearing of *Persoonia hindii* stems.

6.3. Landform Establishment

6.3.1. Subsidence

The subsidence from the underground roadways is expected to be less than 20mm and unlikely, as described in the Angus Place Ventilation Facility Project – Subsidence Assessment (DgS, 2012). However, should subsidence impacts occur to surface features, rehabilitation will be undertaken in accordance with Trigger Action Response Plans (TARPs) and Subsidence Management Plan (SMP) as required by the current development consent conditions. Whilst the majority of subsidence impacts should be adequately repaired naturally through sedimentation and infilling of vegetation and surface debris, rehabilitation methods for surface features may include such actions as repairing surface cracks in roads and general disturbed areas where the land surface has been cleared, or surface cracking in the natural environment, and will be undertaken as per Best Practice for Landform Design in Rehabilitation (Department of Environment, 1998) and Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth of Australia, 2006).

Should cracking occur in roads or general disturbed areas, the surface will be graded and the cracks filled with sand, or other suitable material, prior to the surface being re-graded and compacted. If the area is no longer utilised, it will be deep ripped, topsoiled and appropriately revegetated.

Subsidence cracking on the Newnes Plateau may also occur in densely vegetated areas away from established tracks. In such instances where access by equipment is an issue, the most natural way to rehabilitate surface cracking is to place locally occurring vegetative matter above or within the cracks, hastening the natural processes that occur over a prolonged period. Appropriate materials placed in or above the cracks will be determined by the size of the cracks and the intended depth to which these materials would be used in the rehabilitation. Logs, sticks, leaf litter and local soil (ensuring a localised seed bank) could all be placed within and/or above the cracks. This form of rehabilitation would result in a natural looking rehabilitated crack that would continue to accumulate additional natural leaf litter and debris over time. Using this method of rehabilitation would avoid additional access requirements and significant disturbance to existing natural vegetation.

6.3.2. Surface Disturbance

Within the Project Area there are several infrastructure items that need to be constructed as part of the Ventilation Facility Project. The key items to be constructed are as detailed in **Section 3**. At mine closure these infrastructure areas will be required to be fully rehabilitated. This will firstly involve removing any physical items from these areas prior to the re-establishment of vegetation.

The primary objective of the rehabilitation of infrastructure areas will be to stabilise all re-topsoiled batters, road verges, drains, banks, and cleared areas through revegetation. All revegetation works will be scheduled to commence as soon as practicable and where access permits. Disturbance of native vegetation will be kept to a minimum and clearing will be constrained to the footprint area of the infrastructure items.

Prior to the re-establishment of vegetation cover, temporary control measures will be utilised for erosion and sediment control. These measures may include the use of sediment fences for non-channelised flow over disturbed areas, sand bags, rip rap, or any combination of those materials.

Consideration will be given to erosion and sediment control procedures for activities undertaken during the construction phase. These procedures may include restricted access during wet weather or to areas under rehabilitation, reporting of erosion and sediment hazards or incidents and regular checking and maintenance of structures. Further details regarding erosion and sediment controls in the construction and operational phases of the VFP are provided in Section 11.11 of the Construction and Environmental Management Plan (CEMP). A Sediment and Erosion Control Plan is also provided as Appendix 2 of the CEMP.

The spoil generated from shaft construction will be reused to fill the shafts during decommissioning and rehabilitation. The spoil will be stored within the S4 area and treated as a subsoil stockpile with regard to stockpile design and with appropriate erosion and sediment controls in place. The cuttings will be tested to ensure they are within the required limits of the National Environment Protection Measure (NEPM): Assessment of Site Contamination (National Environment Protection Council, 1999) - Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater, and if required will be either treated prior to use for rehabilitation or disposed of at a licensed facility.

The existing section of track for ESA6, linking the two roads would be used in part for the proposed switch yard, whilst the remaining section of track would be rehabilitated following the construction phase.

Given the minimal likely subsidence and small area of surface disturbance, the final landform post mining will consist of very minor changes in topography to that already existing. The topography changes will result from construction of areas requiring a level surface and minor subsidence.

6.4. Vegetation Clearance Procedures

Vegetation clearance procedures are provided in more detail in the Angus Place Flora and Fauna Management Plan. A summary of vegetation clearance procedures as they relate to the 17.3ha to be cleared for the Ventilation Facility area has been provided below:

Clearing Protocol

Where clearing of trees is required for the construction of the VFP and associated infrastructure, the following procedures will take place:

- Pre-clearing survey of individual trees which require removal, specifically directed towards detecting any fauna present. Investigation of trees should be conducted on the day that they are to be felled, to detect any individual animals present at the time;

- Where arboreal species are detected in a tree; that tree and a 10 metre buffer around it are to be left uncleared, and the animal left to vacate the tree of its own accord. Generally, this will occur overnight;

- Inspection of any safely accessible tree-hollows by a qualified ecologist prior to and during clearing should be undertaken to ensure removal and relocation of animals can occur and the following protocol should be adopted:

    - A qualified ecologist shall supervise the removal of the hollow-bearing trees to ensure the protection of native fauna;

    - Trees shall be soft-felled to minimise impacts upon any fauna inside (described below); and

    - Felled habitat trees shall be left for two days to allow fauna inside to escape unless the absence of fauna can be confirmed at an earlier time.

- Careful felling of hollow-bearing trees (as described below), and checking of tree-hollows to locate any wildlife;

- Collection of any wildlife located during clearing activities after all the above mitigation measures have been undertaken, and its immediate release into adjacent bushland; and

- In the event that an animal is found injured, the local Wildlife Information Rescue and Education Services (WIRES) organisation will be contacted immediately for assistance on phone number 1300 094 737.

Hollow-bearing Tree Management Protocol

Tree-hollows are an important resource for many native fauna species, and are vital for some species. The retention and protection of hollow-bearing trees is an important element in the maintenance of biodiversity and in the execution of an environmentally sound development. To this end, specific protocols relating to hollow-bearing trees include:

- Hollow-bearing trees removed are to be used in rehabilitation works around the site; and

- If hollow bearing trees are to be felled, a controlled felling technique will be used (described below).

Controlled Felling of Trees

In the case where a tree with hollows has to be felled within the Ventilation Facility Project area, the tree is assumed to provide habitat for fauna. A staged approach to clearing of any hollow-bearing trees will be undertaken to enable arboreal fauna (particularly gliders and possums) to safely leave the work area. This method provides a disturbance stimulus and time for fauna to leave the area. It also is likely to reduce the need for human intervention in the rescue and/or translocation of arboreal fauna. This method is recommended as preferable over the situation where the habitat tree is felled in the midst of a previously cleared swathe and escaping fauna must cross a treeless and open expanse (exposed to high risks of predation) to reach secure habitat. To minimise the risk of harm to any animal that may inhabit the tree, the following procedure shall be followed:

- Nudge the tree with mechanical plant to induce any fauna to vacate the tree. Then thump the tree two or three times sufficiently to cause vibration and sudden movement of small branches;

- Watch and wait for fauna to vacate the tree (5 minutes or more may be required for slow moving fauna). Repeat if necessary;

- Select the preferred direction of fall and any alternative directions;

- Extend the plant to push the tree at a good height above ground. Push the tree in the preferred direction of fall. If the tree is too strong for the mechanical pusher, try another preferred direction;

- If the tree is too strong to be pushed with all roots intact, excavate and cut some of the roots on the restraining side;

- Push the tree over or repeat the above steps until the tree can be successfully pushed over;

- Once felled the trees will be examined for the presence of fauna by a qualified ecologist, who will examine potential shelter sites (hollows);

- When an animal is detected in a tree, clearing activities are to be directed elsewhere to allow fauna time to leave, or the animal will be carefully removed from the tree. After fauna are observed to leave or are removed safely from the tree, the habitat tree will be disturbed again

and placed carefully in the direction of remaining trees (care is to be taken to ensure trees are not pushed into the 'Exclusion Zone'); and

- Any fauna disturbed during clearing procedures will first be permitted to escape into adjacent habitat. Where this does not occur or where fauna appear to be shocked or injured, fauna will be carefully captured and held in appropriate circumstances and a local wildlife rescue organisation will be contacted if required.

Using this method, the tree falls gently to the ground, restrained by the remaining root system. Fauna are generally not harmed. Note that a large excavator can serve as a tree pusher and enables the tree to be felled very accurately.

In these situations, as for tree pushing, the tree should be thumped to induce fauna to vacate it. Some reduction in the speed of fall of a tree is achievable by well-designed cutting of the tree. The appropriate design addresses the locations of the cuts and the size and shape of the wedge removed in the direction of fall. In cases where several adjacent trees have to be cut, it may be possible to create a bed of vegetation to break the fall of the most significant habitat tree.

Appropriate temporary housing for fauna is species-dependent. An appropriate large safe container will be used for capture of koalas, which are then transferred into a thick sack. Gliders, possums, snakes and frogs will be similarly held individually in a calico bag until release in adjacent habitat. Nesting birds and eggs will be placed in a covered cardboard box equipped with soft cloth. Rescued fauna will be protected from exposure to heat and removed from the area undergoing clearing activities to minimise exposure to noise. Any fauna which cannot be released immediately or by the evening of the day clearing occurred will be passed onto a wildlife rescue organisation/carer.

Appropriate measures are to be employed to ensure that machinery working within the site does not bring materials (soils etc.) onto the sites that may infect onsite vegetation with *Phytophthora cinnamomi.*

***Clearance of the Threatened Species Persoonia hindii*.**

The only threatened flora species identified within the VFP area is *Persoonia hindii*. In accordance with Schedule 3, Condition 24A of PA 06_0021 (as modified), the disturbance of *Persoonia hindii* will only be undertaken in accordance with an approved *Persoonia hindii* Management and Research Program (see **Section 6.2.1**). With recognition of the unavoidable impacts that will occur to this species, the following species-specific management measures will be implemented:

1. Seed collection and seed banking from plants / populations of *P.hindii* that are scheduled for clearing. This would only be undertaken once relevant scientific approval has been granted. This may include the deposition of collected seeds in the NSW Seedbank at the Royal Botanic Gardens or the NSW Seedbank of Greening Australia. This approach assists in the conservation of the genetic pool held by the plants proposed for removal, may allow for their future propagation and thus reduces the overall impact on the species (RPS, 2012).

2. Translocation of plants / populations of *P.hindii* from areas that are scheduled for clearing. This would only be undertaken once relevant scientific approval has been granted. Prior to clearing, a 'salvage dig' of mature plants will be undertaken, ensuring that adequate care is taken and that translocated populations are monitored after reestablishment. Possible sites for the re-establishment of *P.hindii* include other areas within 1km that already contain lower densities of the species (thus may contain unexploited habitat niches). Specific locations would be identified if this approach was approved by relevant authorities. Observations of this species growth habit could also be undertaken at the same time (RPS, 2012).

Specific detail regarding the monitoring methods, translocation sites, ongoing protection, and ongoing management methods to be adopted for the translocated *P. hindii* plants will be provided in the *Persoonia hindii Management and Research Program*. This document will be prepared in consultation with the OEH and FCNSW, and by suitably qualified and experienced persons prior to the commencement of construction activities for the project modification (PA 06_0021 Mod 2) involving the clearing of *Persoonia hindii* stems.

Additional general measures relating to clearing procedures within the Ventilation Facility area include:

- The Hanging Swamp to the west of the Ventilation Facility (APC-VS2) will be protected by a minimum 50m buffer within which no clearing will occur and the boundaries of the buffer zone will be physically marked and inspected during construction by Angus Place personnel; and

- The two areas of potentially significant ecological value to the north of the Ventilation Facility (APC-VS2) site identified in the Flora and Fauna Assessment will be protected by a minimum 50m buffer within which no clearing will occur and the boundaries of the buffer zone will be physically marked and inspected during construction by Angus Place Colliery personnel.

The location of the Hanging Swamp and the potentially significant ecological sites (areas with moist understorey) in relation to the VFP area are shown on **Figure 4**.

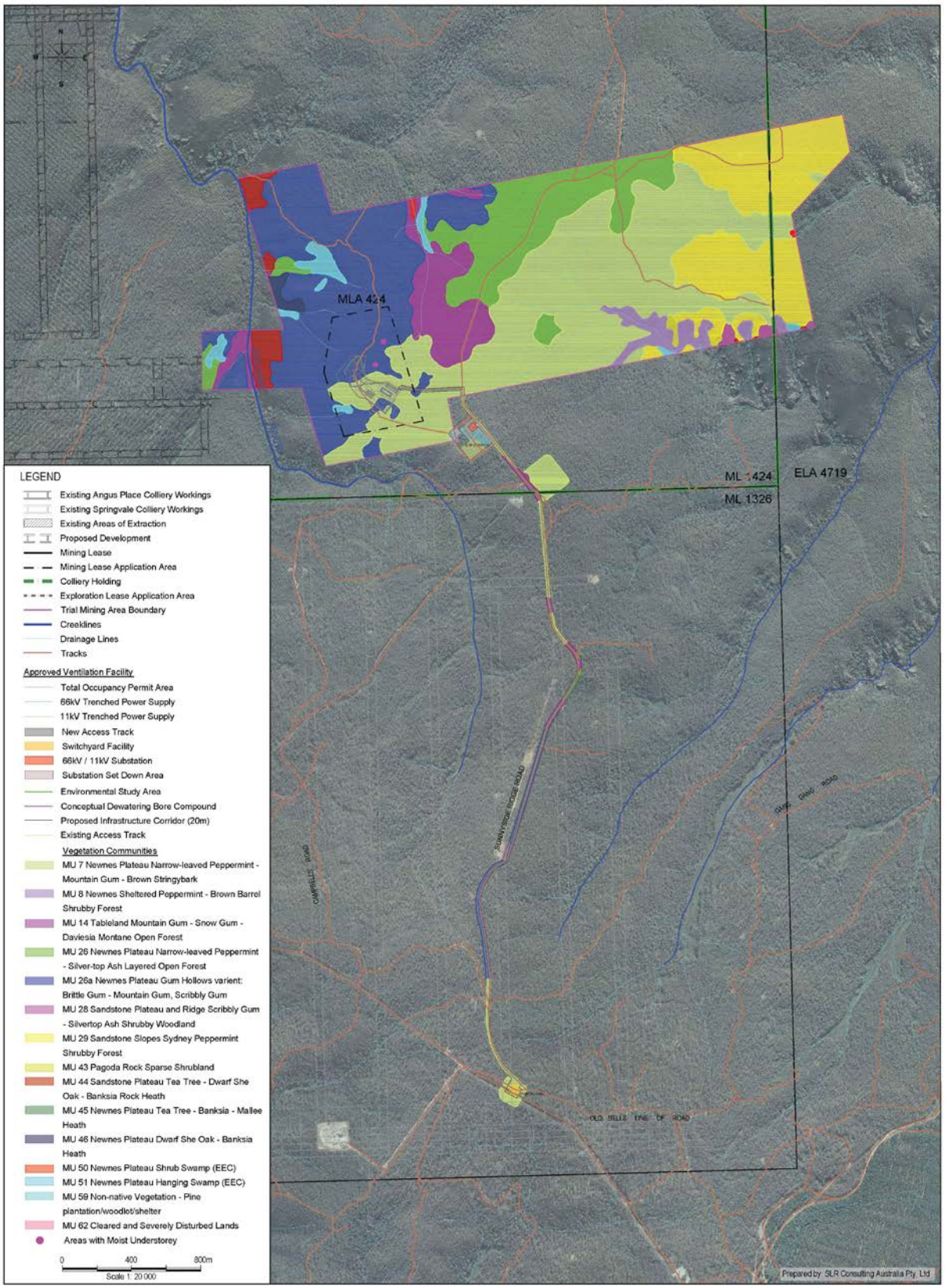

Figure 4 Vegetation Communities within the Ventilation Facility Project Area

6.5. Topsoil Management

Angus Place recognises the importance of appropriate soil identification, stripping, and management practices for successful rehabilitation and the achievement of the desired post-closure land use. Soil resources will be utilised to rehabilitate areas of direct surface disturbance. A description of appropriate topsoil resources within the project site and their management is included in the Soil and Land Resource Assessment (GSSE, 2012). An overview of topsoil management is provided in this section.

6.5.1. Topsoil Stripping and Handling

Where topsoil stripping and transportation is required, the following proposed topsoil handling techniques, as detailed in the Soil and Land Resource Assessment (GSSE, 2012) would be adopted to prevent excessive soil deterioration:

- Topsoil would be maintained in a slightly moist condition during stripping; material should not be stripped in either an excessively dry or wet condition;
- Soil would be graded or pushed into windrows with excavators, graders or dozers for loading into rear dump trucks by front-end loaders. This is the preferred method because it minimises compression effects of the heavy equipment that is often necessary for economical transport of soil material;
- Scrapers will not be used to form soil stockpiles, and only loose truck dumping will be undertaken;
- The surface of soil stockpiles will be left in a coarsely textured condition in order to promote infiltration and minimise erosion until vegetation is established;
- Topsoil stockpile heights would be designed to prevent biological and structural degradation. Where appropriate clayey soils will be stored in lower stockpiles for shorter periods of time compared to soils that have a coarser texture;
- Free-draining stockpiles would be created to minimise the formation of anaerobic zones;
- Stockpiles would be formed in a “chevron” profile with batters graded to achieve slopes approaching 18°;
- Where long-term stockpiling is planned (i.e. greater than 12 months), stockpiles would be seeded and fertilised. An annual cover crop species that produce sterile florets or seeds would be sown. The annual pasture species would not persist in the rehabilitation areas but would provide sufficient competition for emerging weed species and enhance the desirable microorganism activity in the soil;
- Prior to respreading stockpiled topsoil onto disturbed areas (particularly onto designated tree seeding areas), an assessment of weed infestation on stockpiles would be undertaken to determine if individual stockpiles require herbicide application and/or “scalping” of weed species prior to topsoil spreading, and
- Specific respreading depths for different landforms will be optimised during rehabilitation activities.

6.5.2. Topsoil Respreading and Seedbed Preparation

Where possible, topsoil would be re-spread directly onto cleared/ reshaped landforms. Where topsoil resources allow, topsoil would be spread to a nominal minimum depth range of 0.1m to 0.3m on all areas to be rehabilitated.

Thorough seedbed preparation would be undertaken to optimise establishment and growth of vegetation. All topsoiled areas would be lightly contour-ripped (after topsoil spreading) to create a "key" between the topsoil and the subsoil. Ripping will be undertaken on the contour and the tynes lifted for approximately 2m every 200m to reduce the potential for channelised erosion on slopes greater than 10°. Ripping will be undertaken when soil is moist and immediately prior to sowing for best results. The respread topsoil surface will be scarified prior to or during seeding to reduce runoff and increase infiltration.

For areas requiring long duration topsoil stockpiling opportunities will be investigated for the application of additional ameliorants (e.g. biosolids) to assist with the regeneration of the desirable microorganism activity in the soil.

6.6. Revegetation

The Rehabilitation Strategy proposed for disturbed areas includes a separate species mix for reforested areas. Endemic species mixes should be utilised where possible. Fertiliser will be applied with mixes where appropriate to increase the likelihood of initial revegetation success, however prior to application approval will be required from the land owner (that being FCNSW). The type, application rate, and concentration of the fertiliser used will be confirmed by a rehabilitation consultant before it is applied. Slow release fertilisers that have been designed for native species will be used preferentially, and sourced from licenced suppliers.

All revegetation operations are best undertaken immediately after ripping so that the ripped surface has minimal time to crust prior to seed application. The most effective way of controlling erosion will be to establish and/or maintain a healthy vegetation cover. Vegetation will provide effective surface protection against raindrop impact, bind the underlying soil to resist detachment by surface flows, and improve and maintain the soil's infiltration capacity thereby decreasing the velocity and volume of runoff. Vegetation will also improve the aesthetic appearance of each area and the operational efficiency of structural sediment and erosion control measures employed. The main revegetation steps will therefore include:

- Species selection;
- Sowing rates and species proportions;
- Seed pre-treatment;
- Equipment selection;
- Soil amelioration and fertiliser; and
- Timing.

Should natural revegetation require acceleration, the following rehabilitation methods and techniques will be implemented depending on the requirements. These include:

- Use of mulch for soil protection;

- Use of brush matting to import seed into cleared areas;
- Use of open weave jute mesh pegged in with steel pegs;
- Brush harvesting from nearby areas; and
- Ripping of compacted wheel tracks.

The species mix proposed for rehabilitation within the Project Area will be selected from the Species list in Appendix 2 of the Angus Place Ventilation Facility Flora and Fauna Assessment Report (RPS 2012) (see **Appendix 1**). The species used will reflect the relevant vegetation community present where revegetation will occur. The vegetation communities which were identified by RPS (2012) as likely to be directly impacted as a result of the construction of VFP infrastructure are shown on **Figure 4**, and have been listed below:

- MU 7 - Newnes Plateau Narrow-leaved Peppermint – Mountain Gum – Brown Stringybark Layered Forest;
- MU 14 - Tablelands Mountain Gum - Snow Gum – Daviesia Montane Open Forest
- MU 26 - Newnes Plateau Narrow-leaved Peppermint – Silvertop Ash Layered Open Forest;
- MU 26a - (= Variant of MU26) with Brittle Gum, Scribbly Gum and Mountain Gum;
- MU 45 - Newnes Plateau Tea Tree – Banksia – Mallee Heath;
- MU 59 - Non-native Vegetation – Pine plantation / woodlot / shelter; and
- MU 62 - Cleared and Severely Disturbed Lands.

The location of planned rehabilitation, as outlined in the approved MOP has been illustrated on **Figure 5**. Rehabilitation will be undertaken on the infrastructure corridors following the trenching of powerlines along Sunnyside Ridge Road and the new access track to the Ventilation Facility (APC-VS2). The sowing rates will be dependent on seed availability and appropriate mix of species as determined at the time of rehabilitation.

The overall prescribed sowing rate is 7.5 kg/ha of mixed seed, with seed pretreated where appropriate. Fertiliser (Granulock 15) will be mixed with seed at 100 kg/ha. Where possible the seed will be sourced or collected from plants within the Blue Mountains area. To improve the success of rehabilitation, fast growing pasture species will be sown to obtain initial ground coverage. As stated in the approved Angus Place Site Water Management Plan, a rapid growing and healthy annual pasture sward would provide sufficient competition to minimise the emergence of undesirable weed species. The annual pasture species would not persist in the rehabilitation areas but will provide sufficient competition for emerging weed species and enhance the desirable micro-organism activity in the soil.

Where possible, direct seeding will be used on broadscale areas where there is sufficient access. However where suitable access is not available, brush matting may be utilised in conjunction with hand seeding. The direct seeding option is less labour intensive than direct planting of tube stock and long term establishment of native bushland type habitat is often more readily achieved using this method. In the event the currently preferred site for the substation is chosen, there is potential for the area occupied by pine plantation to be planted with endemic species and returned to native forest.

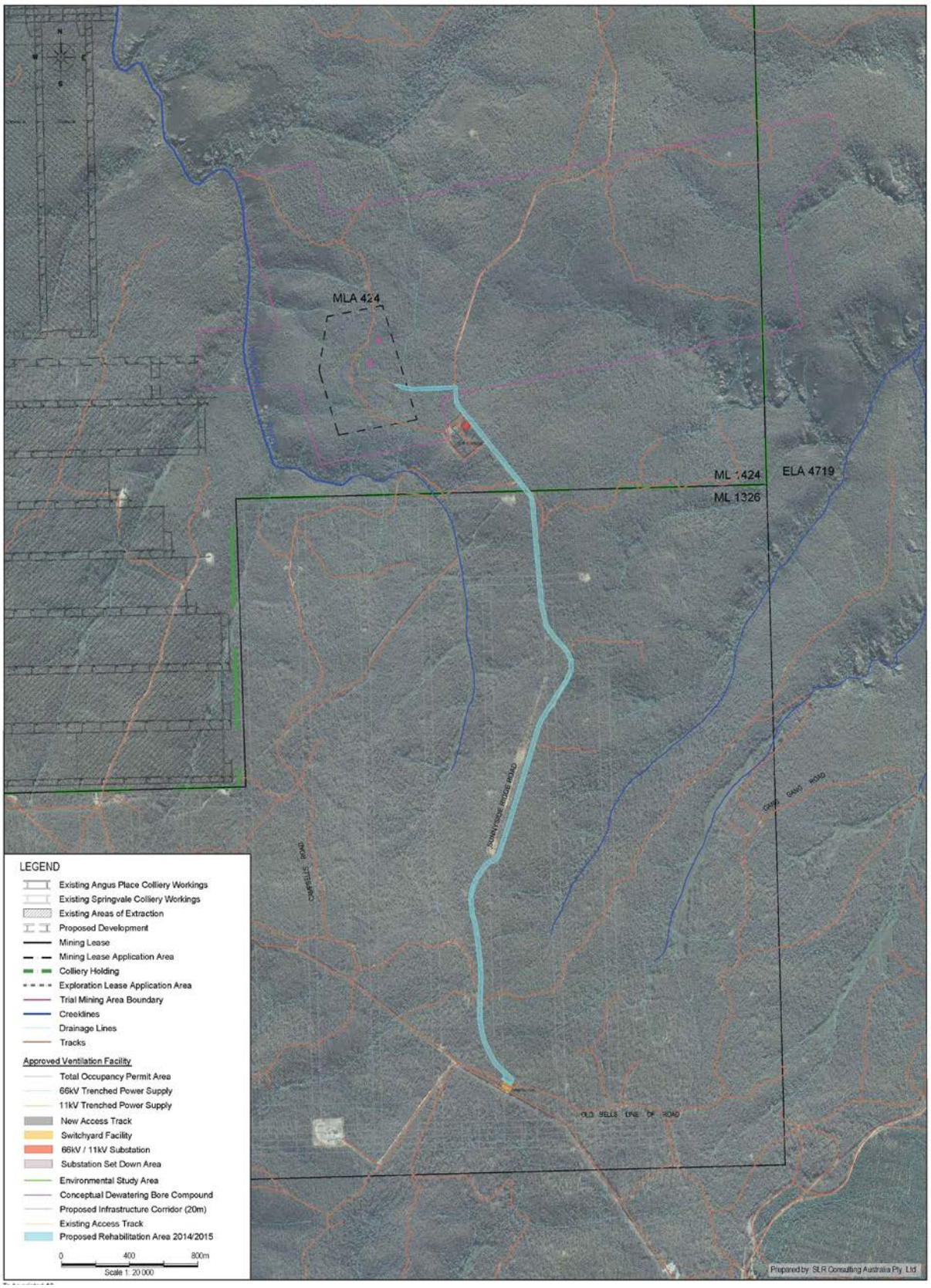

Figure 5 Proposed 2014/2015 Rehabilitation within the Ventilation Facility Project Area

6.7. Habitat Reconstruction

6.7.1. Pre-mining Habitat

The pre-mining habitat within the VFP area in the Newnes State Forest contains continuous native vegetation which is broken only by occasional fire trails. Native vegetation is periodically selectively logged but there are no areas of clear-felling. The habitat linkages throughout the area are considered to be in excellent condition. Habitat types within the VFP area comprise:

- Open forest communities (habitat for terrestrial mammals, small marsupial mammals and rats, common woodland bird species and reptiles);
- Swamp heath (providing resources for nectivorous mammals and birds and a range of common reptiles and amphibians);
- Canopy tree species and understorey proteaceous shrubs (foraging for a range of faunal guilds, including arboreal mammals, bats and birds);
- Hollow-bearing trees (providing roosting and nesting habitat for hollow-dwelling microchiropteran bat species);
- Roosting and den habitat for cave dwelling species; and
- Cleared areas provide foraging habitat along the ecotone between cleared and forested areas (such as for hunting by owls and microchiropteran bat species).

6.7.2. Habitat Rehabilitation

The VFP area provides habitat that is very similar to the vast and expansive areas of the surrounding forests on the Newnes Plateau, which are approximately 25,000ha in size. The threatened fauna recorded in this area are all highly mobile and are unlikely to be affected by the predominantly linear nature of the proposed clearing activities, as the works area is surrounded in all directions by existing forest and swamp habitat. Nonetheless, the following habitat reestablishment measures will be implemented during rehabilitation.

Cleared Vegetation

All vegetation material resulting from land clearing works associated with the Ventilation Facility Project area which cannot be utilised in rehabilitation or habitat enhancement programs and do not contain hollows, will be mulched and stockpiled for later use during rehabilitation and landscaping works. Utilisation of mulched vegetation will provide habitat for ground-dwelling fauna, assist in maintaining soil moisture content for vegetation establishment and assist in reducing erosion.

Rocks and Logs

Large vegetation and rocks that would interfere with soil stripping and re-spreading operations will typically be removed and placed in surrounding undisturbed areas for fauna habitat prior to stripping operations commencing.

Logs with a diameter of greater than 250mm will not be mulched, and instead will be utilised in rehabilitation and habitat enhancement works in surrounding undisturbed areas. Logs/fallen timber provide foraging and refuge habitat for a number of species, particularly terrestrial mammals and

woodland birds. Additionally, the microclimates provided around logs can assist in the establishment of flora species and the decomposing woody material can assist in soil conditioning.

6.8. Rehabilitation Maintenance

Areas of completed rehabilitation will be regularly inspected and assessed against rehabilitation objectives following consultation with FCNSW. Typically, rehabilitation monitoring will occur quarterly for the first 12 months after establishment and then every 12 months. The rehabilitation monitoring schedule is presented in **Table 2**. Rehabilitation monitoring will assess the following key aspects:

- Evidence of any erosion or sedimentation;
- Species composition;
- Vegetation cover and health;
- Soil quality;
- Availability and variety of habitat; surface and groundwater quality;
- Success of initial establishment of crop or grass cover and tree and shrub seeding / plantings;
- Natural regeneration of native species;
- Weed infestation (primarily noxious weeds, but also where rehabilitation areas are dominated by other weeds);
- Integrity of graded banks, diversion drains, waterways and sediment control structures; and
- General stability of the rehabilitation areas.

In accordance with Schedule 3, Condition 39 (c) of PA 06_0021 (as modified), specific criteria used to monitor and assess rehabilitation have been included in **Section 8**. Where rehabilitation success appears limited, maintenance works will be undertaken. This may include the following:

- Re-seeding and, where necessary, re-topsoiling and/or the application of specialised treatments such as composted mulch or biosolids to areas with poor vegetation establishment;
- Installation of tree guards around planted seedlings or construction of temporary fencing suitable for excluding native and feral fauna species should grazing by animals be excessive;
- Replacement of drainage controls if they are found to be inadequate for their intended purpose, or compromised by vegetation or wildlife;
- De-silting or repair of sediment control structures; and
- Where monitoring indicates the presence of excessive weeds or the potential for noxious weed infestation, necessary precautions to prevent the development of weeds within the rehabilitated areas will be undertaken, such as the use of licensed suppliers and contractors, topsoil stockpile management, hosing down equipment before entering the site, and undertaking hand removal and weed spraying programs, as detailed in **Section 6.8.1**.

Monitoring results, any required maintenance activities and any refinements of rehabilitation techniques will be reported in the sites Annual Environmental Management Report (AEMR).

6.8.1. Weed Management

The presence of weed species has the potential to have a major impact on revegetation and regeneration outcomes. Additionally, any presence of weed species within the surrounding land has the potential to significantly impact on the biodiversity value of the rehabilitated areas. Weed management will be a critical component of rehabilitation activities. Flora monitoring data for species present on the Newnes Plateau (including weed species) has been collected by Angus Place since 2004. This data can be used as baseline data to establish pre-disturbance conditions for the VFP. Results from the 2012 flora monitoring found that weed species were generally rare in the Newnes Plateau EECs, with *Hypochaeris radicata* being the most often encountered. Other weed species recorded were *Cirsium vulgare*, *Holcus lanatus* and *Sonchus* spp.

Similarly, the 2012 Flora and Fauna Assessment undertaken by RPS (2012) for the Mod 2 Ventilation Facility EA identified three weed species within the Ventilation Facility site. These species were *Hypochaeris glabra, Hypochaeris radicata*, and *Centaurium erythraea*. This is consistent with the species identified in the Mod 1 Flora and Fauna Assessment undertaken by RPS in 2010.

Weeds will be managed across the site through a series of control measures, including:

- Hosing down equipment in an approved wash down area before entry to site;
- Herbicide spraying (in consultation with FCNSW) or scalping weeds from topsoil stockpiles prior to re-spreading topsoil;
- Rehabilitation inspections to identify potential weed infestations; and
- Identifying and spraying existing weed populations on-site together with ongoing weed spraying over the life of the mine.

The spread of declared noxious weeds will be prevented by using the measures above. The monitoring and control of weed populations using herbicides within the site will significantly reduce weed infestations. Weed control, if required, will be undertaken in a manner that will minimise soil disturbance. Any use of herbicides will be carried out in accordance with the regulatory requirements. Records will be maintained of weed infestations and control programs will be implemented according to best management practice for the weed species concerned.

Current flora monitoring methodologies for the Newnes Plateau (including weed species) are detailed in **Section 7**. The standard monitoring plot design for areas rehabilitated with trees includes 2m x 2m quadrates to provide some estimate of statistical variance, a 20m x 10m plot overlying the 2 m quadrats and located 5 m either side of the centerline, for ease of monitoring, and a 50 m erosion monitoring transect on contour, running through the centre of the plot. Monitoring of weeds in the VFP areas will be undertaken quarterly during the first two years and biennially after that. Inspections will be opportunistic after significant rainfall events, and will monitor species identity, the approximate numbers/level of infestation, and the observations of any impacts to rehabilitation.

6.8.2. Feral Animal Control

Fauna monitoring at Angus Place is undertaken by an experienced ecology consultant in accordance with the approved Flora and Fauna Management Plan. Current fauna monitoring methodologies utilised on the Newnes Plateau (including pest species) include Elliott ground traps, tree-mounted Elliott traps, Tomahawk ground traps, tree-mounted tomahawk traps, large Elliott traps, glider funnels, hair funnels, Anabat recording, remote cameras, call broadcasting, litter searches, bird counts, and

amphibian searches. A combination of these methods will continue to be used by Angus Place on the Newnes Plateau, where appropriate, following rehabilitation of the VFP area. Specifically for the VFP area, monitoring of pest species will be undertaken quarterly during the first two years and biennially after that. Inspections will be opportunistic, and will monitor species identity, the approximate numbers/level of species abundance, and the observations of any impacts of pest species to rehabilitation. Feral animal control measures will be undertaken in accordance with the Pest Management Plan.

Currently at Angus Place, pest management is not considered a significant environmental risk, and no pest management activities are deemed necessary. Notwithstanding, a Pest Management Strategy exists for the site, which outlines the management of feral animals on site. Pest management methodologies that may be implemented as required to prevent detrimental impacts on rehabilitation at the Ventilation Facility site include ground baiting, trapping, shooting, and strategic aerial control programs. Goats, foxes, cats, rabbits, pigs and dogs will be controlled in accordance with Livestock Health and Pest Authority procedures.

In order to assess success with the above described rehabilitation management program, Angus Place has prepared a Rehabilitation Monitoring Program (**Section 7**) and Rehabilitation Success Criteria (**Section 8**).

7. REHABILITATION MONITORING

No rehabilitation monitoring or subsequent data analysis is currently required to be undertaken at Angus Place due to the minor nature of subsidence impacts and ongoing utilisation of pit top facilities. Detailed rehabilitation monitoring methods, locations of monitoring sites and data analysis required will be developed in consultation with a rehabilitation monitoring consultant following commencement of rehabilitation activities. The results of rehabilitation monitoring and data analysis methodologies will be reported in the AEMR.

Regular monitoring of the rehabilitated areas will be required during the initial vegetation establishment period and beyond to demonstrate whether the objectives of the rehabilitation strategy are being achieved and whether a sustainable, stable landform has been provided. **Table 2** presents the recommended monitoring program, including the specific aspects and elements to be monitored and monitoring frequencies for those various aspects.

Monitoring will be conducted periodically by independent, suitably skilled and qualified persons at locations which will be representative of the range of conditions on the rehabilitating areas. Annual reviews will be conducted of monitoring data to assess trends and monitoring program effectiveness. The outcome of these reviews will be included in the AEMR.

The monitoring methodologies currently in use at Angus Place Colliery will be adopted and modified where necessary to enable an assessment of trends and the progress towards the achievement of the success criteria indicators identified in **Section 8**, with the monitoring undertaken regularly in order to establish the trend towards achievement of those criteria.

These current quarterly monitoring methodologies for flora sites involve permanently marked 20 m x 20 m plots within which vegetation abundance and condition are measured. The exceptions are two sites where 10 m x 40 m plots are used instead. These latter sites differ from the others because the narrowness of the swamp makes longer, thinner plots more appropriate. At each site, researchers record all species within the plot; estimate cover/abundance using a modified Braun-Blanquet scale from 1 (cover less than 5% of site) to 7 (cover of greater than 75%); and estimate condition of common species using a pre-determined condition scale from 1 (severe damage/dieback) to 5 (healthy). Site photographs are also recorded.

The annual monitoring also includes a quantitative assessment of weedy species at a number of sites. Transects are established between the diagonal corners of the plots; at approximately 1 m intervals along these transects, a 0.5 m X 0.5 m quadrat is placed on the ground to assess the presence or absence of weeds. For those sites with 10 m X 40 m plots the assessment is carried out at 2 m intervals. A weed contractor and/or rehabilitation consultant will monitor the entire Ventilation Facility Project Area for weeds following rehabilitation, and the results of this monitoring will be reported on in the AEMR,

Current fauna monitoring methodologies utilised on the Newnes Plateau by Angus Place include Elliott ground traps, tree-mounted Elliott traps, Tomahawk ground traps, tree-mounted tomahawk traps, large Elliott traps, glider funnels, hair funnels, Anabat recording, remote cameras, call broadcasting, litter searches, bird counts, and amphibian searches.

The use of artificial habitat for fauna, such as nest boxes, will not commence until final rehabilitation for lease relinquishment at Angus Place. Consequently a nest box monitoring program has not yet been developed. This will be developed in consultation with a rehabilitation consultant during final rehabilitation of the site.

Landform stability and drainage will be monitored through geotechnical stability inspections to assess slope gradients and ensure all landforms are free-draining (except where specific structures have been constructed for the storage of water as required for sediment and erosion control or post mining landuse). Erosion monitoring will be undertaken along 50m transects 1 year after establishment then every 2 years. This monitoring will measure soil loss, the effectiveness of erosion control structures, the dimension and frequency of gully and rill erosion, and the effectiveness of contour banks and diversion drains to direct water into stable areas or sediment control basins.

Quarterly water quality monitoring will be undertaken by collecting water samples to ensure the quality of water leaving site is non-polluting and appropriate for end land use. Parameters that will be measured include EC, pH, TSS, and oil and grease. Monitoring will compare water quality with the criteria established in the Site Water Management Plan.

Topsoil will be monitored by analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months. The soil sampling will monitor EC, pH, sodium content, presence of macro and micro nutrients, as well as nutrient accumulation and recycling processes, as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts.

Specific performance indicators for rehabilitation monitoring were prepared as part of the approved MOP. These performance indicators reflect biophysical process such as landform establishment, growth medium development, ecosystem establishment and ecosystem development. This table has been included as **Appendix 2**.

In addition to the rehabilitated areas, at least two reference sites will be monitored to allow a comparison of the development and success of the rehabilitation against a control. Reference sites indicate the condition of surrounding un-disturbed areas. These reference sites will contain similar vegetation communities to their corresponding rehabilitation sites and will be determined in consultation with a rehabilitation monitoring consultant prior to commencement of the program. Additional detail regarding monitoring of the reference sites, including a figure showing their location, will be provided in the AEMR when monitoring commences.

In developing the rehabilitation monitoring program, the following aspects will be taken into consideration.

- Replicated monitoring sites are needed in representative rehabilitation areas of different ages. One monitoring site per 20 to 40 ha is recommended for each major age class of the rehabilitation areas.

- Sites should be monitored quarterly after establishment for the first 12 months, and then every 12 months following.

- A standard monitoring plot design for areas rehabilitated with trees. The design includes:

    - 2 m x 2 m quadrates – these will provide some estimate of statistical variance, so that if required, statistical analyses can be undertaken to objectively compare different rehabilitation treatments and changes over time;

    - A 20 m x 10 m plot overlying the 2 m quadrats and located 5 m either side of the centerline, for ease of monitoring; and

    - A 50 m erosion monitoring transect on contour, running through the centre of the plot.

Figure 6 shows the monitoring plot design that is to be adopted for the monitoring of an area revegetated with trees.

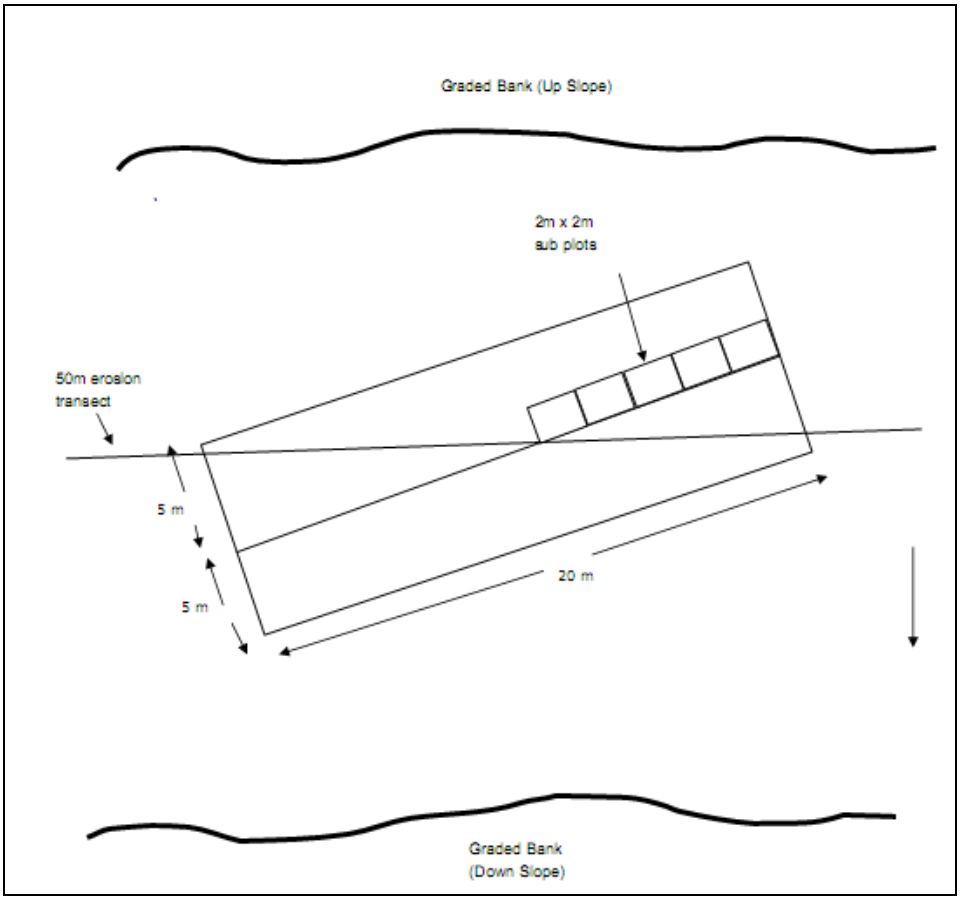

Figure 6 Typical Monitoring Plot Design

For the areas rehabilitated with grass, it is proposed that transects be established across 'typical' sections of rehabilitation at the site and monitored for grass cover, pasture species diversity, weed occurrence, percentage of bare ground, extent and type of erosion, rock presence, topsoil presence/absence and other factors likely to influence rehabilitation development. Rehabilitation methods will be improved as additional knowledge develops from monitoring data collected through these programs. More specifically, monitoring of the elements in **Table 2** will be undertaken to determine the level of achievement of success criteria. Monitoring for each element in **Table 2** will continue at the specified frequency until the success criteria in **Table 3** have been reached.

Table 2. Rehabilitation Monitoring Program

Aspect of Rehabilitation	Elements to be Monitored	Monitoring Frequency
Ecosystem Establishment		
General Description	• Describe the vegetation in general terms, e.g. mixed eucalypt woodland with grass understorey and scattered shrubs, dense Acacia scrub, etc.	Quarterly for the first 12 months after establishment and then every 12 months
2m x 2m quadrats	• Count the number of plants of all species, excluding grass • Measure live vegetation cover for understorey and grasses (separately) using a line intercept method • Record details of ground cover (litter, logs, rocks etc.) • Record details of survival of any planted seedlings (species, survival rates, growth rates). • Record detail of any seed establishment (germination rates, species emerging, from planted seed or the seed bank).	Quarterly for the first 12 months after establishment and then every 12 months
20m x 10m plots	• Count, by species, all trees >1.6m tall. • Tag and measure DBH of trees >1.6m tall, to a maximum of 10 for any one species. • Record canopy cover over the whole 20m centreline when trees are tall enough • Subjectively describe tree health, by species if relevant, noting signs of drought stress, nutrient deficiencies, disease and severe insect attack. Where health problems are noted, record the percentage of unhealthy trees. • Record any new plant species not present in the smaller plots, including any problem and declared noxious weeds • Take five surface soil samples (e.g. at approx. 5m intervals along the centreline) and bulk these for analyses of: pH, EC, chloride and sulfate; exchangeable Ca/Mg/K/Na; cation exchange capacity; particle size analysis and R1 dispersion index; 15 bar and field capacity moisture content; organic carbon; total and nitrate nitrogen; total and extractable phosphorus; Cu, Mn and Zn.	Quarterly for the first 12 months after establishment and then every 12 months
50m transect	• Along the 50m erosion monitoring transect, record the location, number and dimension of all gullies >30cm wide and/or 30cm deep. • Erosion pins should be established in plots located in newer rehabilitation to record sheet erosion if present	1 year after establishment and then every 2 years
Rehabilitation in general	• When traversing between monitoring plots, note the presence of species of interest not previously recorded (e.g. key functional or structural species, protected species, noxious weeds), as well as obvious problems including any extensive bare areas (e.g. those greater than 0.1ha). • Observations such as this can provide useful, broad scale information on rehabilitation success and problems.	Quarterly for the first 12 months after establishment and then every 12 months

Aspect of Rehabilitation	Elements to be Monitored	Monitoring Frequency
Photographic record	• For each 20m x 10m plot, a photograph should be taken at each end of the plot, along the centreline looking in.	Quarterly for the first 12 months after establishment and then every 12 months
Habitat	• General observations relating to the availability and variety of food sources (e.g. flowering/fruiting trees, presence of invertebrates etc). • Availability and variety of shelter (e.g. depth of leaf litter, presence of logs, hollows etc.). • Presence/absence of free water in the rehabilitated areas	Quarterly for the first 12 months after establishment and then every 12 months
Fauna	• General observations of vertebrate species (including species of conservation significance). • Detailed fauna surveys including presence and approximate abundance and distribution of vertebrate species (focussing on species of conservation significance).	After rehabilitation is 3 years old undertake monitoring biennially in both Autumn and Spring
Invertebrate	• Diversity and abundance of present species	Bi-Annually, during Autumn and Spring
Weeds and pests	• Species identity. • Approximate numbers/level of infestation. • Observations of impact on rehabilitation (if any).	Quarterly during the first two years and biennially after that. Inspections should be opportunistic after significant rainfall events.
Geotechnical Stability		
	• Assessment of the stability of batters and also looking at surface settlements (sink holes). In particular where these features could impact on the performance of any surface water management system. • Surface integrity of landform cover/capping (measurement of extent of integrity failure). • Presence / absence of landform slumping.	Annually
Surface and Groundwater		
	• Groundwater quality and depth. • Efficiency of landform surface water drainage systems (integrity of banks and drains) • Water quality including pH, EC and total suspended solids of water in water storages, and pits, sedimentation dams.	Quarterly or following rainfall events Monitoring of receiving waters

8. REHABILITATION SUCCESS CRITERIA

Preliminary success criteria (or closure criteria) for the rehabilitation areas are presented in **Table 3**. The success criteria are performance objectives or standards against which rehabilitation success in achieving a sustainable system for the proposed post-mine land use is demonstrated. Satisfaction and maintenance of the success criteria (as indicated by monitoring results) will demonstrate that the rehabilitated landscape is ready to be relinquished from the mine's financial assurance and could be handed back to stakeholders in a productive and sustainable condition.

The success criteria will be reviewed every three to five years with stakeholder participation to ensure the nominated success criteria remain realistic and achievable. Angus Place has an existing relationship with FCNSW and therefore it is expected that the open communications will continue to facilitate agreements on rehabilitation and closure criteria.

The success criteria comprise indicators for vegetation, fauna, soil, stability, land use and safety on a landform-type basis that reflects the nominated post-mine land use of a mosaic of native woodland and forests. For each element, standards that define rehabilitation success at mine closure are provided. Based on the generic indicators in **Table 3**, each criterion will be further developed to be specific, measurable, achievable, realistic and outcome based, and to reflect the principle of sustainable development. This will be based on results of further research and ongoing monitoring of the progressive rehabilitation areas. Further detail regarding rehabilitation success criteria is included in the approved MOP rehabilitation table, which has been provided as **Appendix 2**.

Table 3. Preliminary Rehabilitation Success Criteria

Rehabilitation Element	Indicator	Performance Measure	Criteria
Landform stability	*Slope gradient*	Annual geotechnical stability inspection	Within 12-months of undertaking rehabilitation, no less than 75% of the area has slopes <10°. Where the slopes are steeper, additional water management structures will be utilised (as required). Where reject layers are present and exposed, the landform is capped with a minimum of 1.5m of inert material and be free-draining.
	Erosion control	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Within 12 months of undertaking rehabilitation: • Erosion control structures are installed at intervals commensurate with the slope of the landform. • Average soil loss per annum is <40 tonnes/ha/yr (sheet erosion). • Dimensions and frequency of occurrence of erosion rills and gullies are generally no greater than that in reference sites that exhibit similar landform characteristics.
	Surface Water Drainage	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years. Annual geotechnical stability inspection	Within 12 months of undertaking rehabilitation: • Use of contour banks and diversion drains to direct water into stable areas or sediment control basins. • All landforms will be free draining except where specific structures (i.e. LDP003) have been constructed for the storage of water as required for sediment and erosion control or some post mining landuse.
Water quality	*EC, pH, TSS and oil and grease*	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Ensure receiving waters affected by surface water runoff have contaminant limits of the Environment Protection Licence (EPL) at all times.

Rehabilitation Element	Indicator	Performance Measure	Criteria
Topsoil	*Salinity (electrical conductivity)*	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	Soil salinity content is <0.6 dS/m within 12 months of rehabilitation.
	pH		Soil pH is between 5.5 and 8.5 within 12 months of rehabilitation.
	Sodium content		Soil Exchange Sodium Percentage (ESP) is <15% within 12 months of rehabilitation.
	Nutrient cycling		Within 12 months of rehabilitation, nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts. Adequate macro and micro-nutrients are present.
Vegetation	*Land use*	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months.	Area accomplishes and remains as a healthy native woodland within 3 years prior to mine closure.
	Surface cover	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Within 3 years prior to mine closure: • Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present). • No bare surfaces >20 m2 in area or >10 m in length down slope.
	Species composition	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months.	Within 3 years prior to mine closure, subject to proposed land use, comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland.
	Resilience to disturbance	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months.	Within 3 years prior to mine closure: • Established species survive and/or regenerate after disturbance. • Weeds do not dominate native species after disturbance or after rain. • Pests do not occur in substantial numbers or visibly affect the development of native plant species. These indicators will be at levels similar to pre-disturbance conditions.

Rehabilitation Element	Indicator	Performance Measure	Criteria
	Sustainability	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months.	Within 3 years prior to mine closure: • Species are capable of setting viable seed, flowering or otherwise reproducing. • Evidence of second generation of shrub and understorey species. • Vegetation develops and maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons. • More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead. These indicators will be at levels similar to pre-disturbance conditions.
Fauna	*Vertebrate species*	Results from ecological monitoring undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months.	Within 3 years prior to mine closure: • Representation of a range of species characteristics from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine closure. • The number of vertebrate species does not show a decrease over a number of successive seasons prior to mine closure.
	Invertebrate species	Results from ecological monitoring undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months.	Within 3 years prior to mine closure representatives of a broad range of functional indicator groups involved in different ecological processes are present in numbers similar to pre-disturbance conditions.
	Habitat structure	Results from ecological monitoring undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months.	Within 3 years prior to mine closure typical food, shelter and water sources required by the majority of vertebrate and invertebrate inhabitants of that ecosystem type are present, including: a variety of food plants; evidence of active use of habitat provided during rehabilitation such as nest boxes, and logs and signs of natural generation of shelter sources including leaf litter. These indicators will be at levels similar to pre-disturbance conditions.
Safety	*Risk assessment*	Risk assessment results.	Any future risk assessments to be undertaken in accordance with relevant guidelines and Australian Standards and risks reduced to levels agreed with the stakeholders.

9. FINAL LANDUSE

The proposed post mining land use for the Project Area is State Forest. The final landuse and biodiversity/habitat values for this site will be consistent with analogue communities, as listed in **Section 6.6**. The final land use will be determined in consultation with FCNSW. The final landform for the Ventilation Facility Site will be managed in consultation with FCNSW. It is expected that any surface subsidence less than 20mm will not impact on land capability and agricultural suitability. The appropriate rehabilitation and management techniques, as outlined in this report, when implemented

on infrastructure areas post mining, will ensure land capability, agricultural suitability and forestry values are re-instated. The final landform will only consist of negligible to very minor changes in topography of that which already exists on site. The very minor changes in topography will be caused by minimal subsidence and the construction of infrastructure which requires a level surface.

Provided that environmental controls (particularly subsidence management and erosion and sediment controls) are in place and operating effectively Ventilation Facility Project, there should be no adverse effects to the Project Area or surrounding land.

10. TIMETABLE FOR IMPLEMENTATION

This section outlines a timetable for the implementation of the components of the Rehabilitation Management Plan.

Table 4. Timetable for implementation of VFP Rehabilitation Management Plan

Project Stage	Indicative Timeframe	Component of the Plan
Land Clearing	June 2013 to December 2013	Vegetation Clearance Procedures*
Construction	October 2013 to April 2016	Topsoil Management Targeted Rehabilitation
Operational	April 2016 to September 2030	Targeted Rehabilitation Landform Establishment Rehabilitation Maintenance
Decommissioning	September 2030 to March 2031	Targeted Rehabilitation
Final Rehabilitation	March 2031	Final Land use Rehabilitation Maintenance

*Clearing of *Persoonia hindii* will only be undertaken in accordance with an approved *Persoonia hindii* Management and Research Program
Note: Timeframes dependent on Approvals therefore dates subject to variation.

Whilst partial rehabilitation will be undertaken for construction areas no longer required for operation, the point at which full rehabilitation (including returning the land to its final landform) would be undertaken will depend in part upon the results of the trial mining and any subsequent applications for mining in this area if it is proven to be a viable resource.

Infrastructure items that will be constructed as part of the proposed Ventilation Facility Project will be fully rehabilitated, upon the cessation of mining activities. This will firstly involve removing any physical items from these areas prior to the re-establishment of vegetation.

11. TRIGGER ACTION RESPONSE PLAN

The following TARP for rehabilitation has been developed to identify required management actions in the event of impacts specifically to rehabilitation areas, or where rehabilitation outcomes are not achieved in an acceptable timeframe. Where necessary, rehabilitation procedures will be amended accordingly with the aim of continually improving rehabilitation standards.

The TARP is provided as **Table 5**, and will be reviewed and may be revised as conditions at Angus Place change or new risks to rehabilitation are identified.

Table 5. Rehabilitation Trigger Action Response Plan

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Landform stability	Slope gradient	Trigger	At least 75% of the rehabilitation area to have slopes <10°.	<65% of the rehabilitation area has slopes <10°.	<55% of the rehabilitation area has slopes <10°.
		Response	No response required. Continue monitoring program.	Undertake regrading and revegetation of the area.	Undertake a review of the landform design, including survey if required. Undertake regrading and revegetation of the area. Notify DTIRIS and relevant stakeholders.
	Erosion control	Trigger	Average soil loss per annum is <40 tonnes/ha/yr (sheet erosion).	Average soil loss per annum is >40 tonnes/ha/yr (sheet erosion).	Average soil loss per annum is >50 tonnes/ha/yr (sheet erosion).
		Response	No response required. Continue monitoring program.	An inspection of the site will be undertaken by a suitably trained person. Investigate opportunities to install water management infrastructure to address soil loss. Remediate as appropriate.	Engage a consultant to assist with the management of erosion and sedimentation at the site and provide recommendations to appropriately remediate the soil loss. Remediate as soon as practicable. Notify DTIRIS and relevant stakeholders.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
		Trigger	Dimensions and frequency of occurrence of erosion rills and gullies are no greater than that in reference sites that exhibit similar landform characteristics.	Dimensions and frequency of occurrence of erosion rills and gullies are <20% greater than that in reference sites that exhibit similar landform characteristics.	Dimensions and frequency of occurrence of erosion rills and gullies are >20% greater than that in reference sites that exhibit similar landform characteristics.
		Response	No response required. Continue monitoring program.	An inspection of the site will be undertaken by a suitably trained person. Investigate opportunities to install water management infrastructure to address soil loss. Remediate as appropriate.	Engage a consultant to assist with the management of erosion and sedimentation at the site and provide recommendations to appropriately remediate the soil loss. Remediate as soon as practicable. Notify DTIRIS and relevant stakeholders.
	Surface water drainage	Trigger	All landforms will be free draining (except where specific structures have been constructed for the storage of water as required for sediment and erosion control or post mining landuse).	Landforms exhibiting minor drainage issues.	Landforms exhibiting significant drainage issues.
		Response	No response required. Continue monitoring program.	An inspection of the site will be undertaken by a suitably trained person. Investigate opportunities to install water management infrastructure to address soil loss from rehabilitation areas. Remediate as appropriate.	Engage a consultant to assist with the management of erosion and sedimentation at the site and provide recommendations to appropriately remediate the soil loss. Remediate as soon as practicable. Notify DTIRIS and relevant stakeholders.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Water Quality	Monitoring parameters	Trigger	Surface water quality of runoff from rehabilitation areas is within EPL criteria and any site specific trigger values established within the Site Water Management Plan	Water quality exceeds trigger values for further investigation but does not threaten or cause material harm to the environment	Water quality exceeds criteria, threatening or causing material harm to the environment
		Response	No response required. Continue monitoring program.	Review and investigation of water quality monitoring and management where appropriate. Implement relevant TARP responses and remedial measures where required as per Site Water Management Plan.	Reporting as per PIRMP and all statutory reporting requirements. Implement relevant TARP responses as per Site Water Management Plan. Undertake immediate review to determine source of issues and implement remediation measures identified as soon as practicable. Notify DTIRIS and relevant stakeholders.
Topsoil	Monitoring parameters	Trigger	Soil quality within criteria as outlined in the Rehabilitation Strategy	Soil quality exceeds criteria as outlined in the Rehabilitation Strategy inhibiting progress of revegetation	Soil quality exceeds criteria as outlined in the Rehabilitation Strategy prohibiting revegetation
		Response	No response required. Continue monitoring program.	Investigate use of appropriate soil ameliorants or management options to address soil quality.	Engage a consultant to assist with recommendations to appropriately remediate topsoil quality. Remediate as soon as practicable. Notify DTIRIS and relevant stakeholders.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Vegetation	Land use	Trigger	Rehabilitation area accomplishes and remains as a healthy native woodland/grassland.	Six months following revegetation works, less than 80% of the rehabilitation area accomplishes and remains as a healthy native woodland/grassland.	Less than 50% of the rehabilitation area accomplishes and remains as a healthy native woodland/grassland.
		Response	No response required. Continue monitoring program.	Investigate use of appropriate management options to remediate.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to remediate. Remediate as appropriate. Notify DTIRIS and relevant stakeholders.
	Surface cover	Trigger	Six months following revegetation works, a minimum of 70% vegetative cover is present within rehabilitation areas (or 50% if rocks, logs or other features of cover are present).	Minimum of 60% vegetative cover is present within rehabilitation areas.	Minimum of 50% vegetative cover is present within rehabilitation areas.
		Response	No response required. Continue monitoring program.	Review procedures where required to increase vegetation cover.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to remediate. Remediate as appropriate. Notify DTIRIS and relevant stakeholders.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
		Trigger	Six months following revegetation works, no bare surfaces >20 m^2 in area or >10 m in length down slope within rehabilitation areas.	Bare surfaces >20 m^2 in area or >10 m in length down slope within rehabilitation areas.	Bare surfaces >30 m^2 in area or >20 m in length down slope within rehabilitation areas.
		Response	No response required. Continue monitoring program.	Review procedures where required to increase vegetation cover.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to remediate. Remediate as appropriate. Notify DTIRIS and relevant stakeholders.
	Species composition for woodland	Trigger	Species composition to comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland.	Six months following revegetation works, species composition shows less than 75% of species are native trees, shrubs and grasses representative of regionally occurring woodland.	Species composition shows less than 50% of species are native trees, shrubs and grasses representative of regionally occurring woodland.
		Response	No response required. Continue monitoring program.	Engage weed management contractor to remove introduced species from the site.	Engage weed management contractor to remove introduced species from the site as soon as practicable. Investigate management measures to assist native plant establishment including use of ameliorants and implement as appropriate. Notify DTIRIS and relevant stakeholders.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
	Species composition for grassland	Trigger	Species composition to comprise a mixture of native grasses or improved pastures, representative of adjacent grasslands.	Six months following revegetation works, species composition shows less than 75% of species are native grasses or improved pastures representative of regionally occurring grasslands.	Species composition shows less than 50% of species are native grasses or improved pastures representative of regionally occurring grasslands.
		Response	No response required. Continue monitoring program.	Engage weed management contractor to remove introduced species from the site.	Engage weed management contractor to remove introduced species from the site as soon as practicable. Investigate management measures to assist native plant establishment including use of ameliorants and implement as appropriate. Notify DTIRIS and relevant stakeholders.
	Resilience to disturbance	Trigger	Established species survive and/or regenerate after disturbance.	Minor occurrences of established species do not survive and/or regenerate after disturbance.	Significant numbers of established species do not survive and/or regenerate after disturbance.
		Response	No response required. Continue monitoring program.	Review procedures where required to increase resilience to disturbance.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to remediate. Undertake management measures and revegetation as soon as practicable. Notify DTIRIS and relevant stakeholders.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
		Trigger	Weeds do not dominate native species after disturbance or after rain.	Weeds dominate native species (>30%) after disturbance or after rain.	Weeds dominate native species (>50%) after disturbance or after rain.
		Response	No response required. Continue monitoring program.	Engage weed management contractor to remove introduced species from the site.	Engage weed management contractor to remove introduced species from the site as soon as practicable. Investigate management measures to assist native plant establishment including use of ameliorants and implement as appropriate. Notify DTIRIS and relevant stakeholders.
		Trigger	Pest numbers are comparable to baseline data or visibly affect the development of native plant species.	Pest numbers increase by <15% and visibly affect the development of native plant species in rehabilitation areas.	Pest numbers increase by >15% and significantly affect the development of native plant species in rehabilitation areas.
		Response	No response required. Continue monitoring program.	Increase the intensity of the current program of pest management and monitoring.	Engage pest management contractor to assist with managing high numbers of pests from the site as soon as practicable. Consider options for implementing a joint pest management program with surrounding collieries/land users. Notify DTIRIS and relevant stakeholders.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
	Sustainability	Trigger	Six months following revegetation works, species are capable of setting viable seed, flowering or otherwise reproducing. Evidence of second generation of shrub and understorey species.	Most species are observed to be setting viable seed, flowering or otherwise reproducing. Minor evidence of second generation of shrub and understorey species.	Rare occurrences of species are observed to be setting viable seed, flowering or otherwise reproducing. Little to no evidence of second generation of shrub and understorey species.
		Response	No response required. Continue monitoring program.	Review procedures where required to increase vegetation health.	Engage a consultant to undertake an inspection and provide recommendations to appropriately address issues. Implement management measures as soon as practicable. Notify DTIRIS and relevant stakeholders.
		Trigger	Six months following revegetation works, more than 75% of shrubs and/or trees within rehabilitation areas are healthy when ranked healthy, sick or dead.	Less than 65% of shrubs and/or trees within rehabilitation areas are healthy when ranked healthy, sick or dead.	Less than 55% of shrubs and/or trees within rehabilitation areas are healthy when ranked healthy, sick or dead.
		Response	No response required. Continue monitoring program.	Review procedures where required to increase vegetation health.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to remediate. Undertake management measures as soon as practicable. Revegetate if necessary. Notify DTIRIS and relevant stakeholders.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Fauna	Vertebrate species	Trigger	Representation of a range of species characteristics from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine closure.	Representation of >70% of species from each faunal assemblage group present in the ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine closure.	Representation of <70% of species from each faunal assemblage group present in the ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine closure.
		Response	No response required. Continue monitoring program.	Investigate use of appropriate management options to increase fauna assemblages. Implement management options as appropriate.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to increase fauna assemblages. Implement management options as soon as practicable. Notify DTIRIS and relevant stakeholders.
		Trigger	Three years prior to mine closure, the number of vertebrate species does not show a decrease over a number of successive seasons prior to mine closure.	Three years prior to mine closure, the number of vertebrate species shows a decrease of <30% from baseline data.	Three years prior to mine closure, the number of vertebrate species shows a decrease of >30% from baseline data.
		Response	No response required. Continue monitoring program.	Investigate use of appropriate management options to increase fauna assemblages. Implement management options as appropriate.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to increase fauna assemblages. Implement management options as soon as practicable. Notify DTIRIS and relevant stakeholders.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
	Invertebrate Species	Trigger	Three years prior to mine closure, the number of functional indicator groups are >90% of baseline levels.	Three years prior to mine closure, the numbers of functional indicator groups are 70% - 90% of baseline levels.	Three years prior to mine closure, the number of functional indicator groups are <70% of baseline levels.
		Response	No response required. Continue monitoring program.	Investigate use of appropriate management options to increase invertebrate species and indicator groups. Implement management options as appropriate.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to increase invertebrate species and indicator groups. Implement management options as soon as practicable. Notify DTIRIS and relevant stakeholders.
	Habitat Structure	Trigger	Three years prior to mine closure, typical food, shelter and water sources are present and comparable to surrounding vegetation and baseline data.	Three years prior to mine closure, 70% to 90% of typical food, shelter and water sources are present and comparable to surrounding vegetation and baseline data.	Three years prior to mine closure, <70% of typical food, shelter and water sources are present and comparable to surrounding vegetation and baseline data.
		Response	No response required. Continue monitoring program.	Investigate use of appropriate management options to increase habitat quality. Implement management options as appropriate.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to increase habitat quality. Implement management options as soon as practicable. Notify DTIRIS and relevant stakeholders.

12. REPORTING

Results from the rehabilitation monitoring, undertaken in accordance with this Rehabilitation Management Plan, will be reported in the AEMR/Annual Review with an analysis against the relevant impact assessment criteria. Additionally, any required maintenance activities and any refinements of rehabilitation techniques will also be included

A copy of the AEMR/Annual Review will be provided to the DP&I, OEH, FCNSW and DRE.

13. PERIODIC REVIEW

This Rehabilitation Management Plan will be reviewed every three years, or in the event that the following occur:

- Government agencies raise issues that necessitate a review;
- There are changes to the Rehabilitation Management Program ; and
- Monitoring demonstrates that impacts are such that a review is warranted.

Any modifications to the Rehabilitation Management Plan will be undertaken in consultation with the appropriate government agencies, and a copy of the updated Rehabilitation Management Plan will be provided to the DP&I, OEH, FCNSW and DRE.

14. REFERENCES

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GSS Environmental (2012) Angus Place Ventilation Facility Project: Modification 2 of Project Approval 06_0021 - Rehabilitation Strategy.

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National Environment Protection Council (1999) National Environment Protection Measure: Assessment of Site Contamination Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater.

NSW Department of Trade and Investment (2012) EDG03 Guidelines to the Mining, Rehabilitation & Environmental Management Process.

RPS (2012) Angus Place Ventilation Facility Project: Modification 2 of Project Approval 06_0021 - Flora and Fauna Assessment.

APPENDIX 1: Rehabilitation Species List

Family	Scientific Name	Common Name
TREES		
Casuarinaceae	*Allocasuarina nana*	Dwarf She-oak
Myrtaceae	*Eucalyptus blaxlandii*	Blaxland's Stringybark
Myrtaceae	*Eucalyptus dalrympleana*	Mountain Gum
Myrtaceae	*Eucalyptus dives*	Broad-leaved Peppermint
Myrtaceae	*Eucalyptus fastigata*	Brown Barrel
Myrtaceae	*Eucalyptus gregsoniana*	Wolgan Snow gum
Myrtaceae	*Eucalyptus oreades*	Blue Mountains Ash
Myrtaceae	*Eucalyptus pauciflora*	Snow Gum
Myrtaceae	*Eucalyptus radiata*	Narrow-leaved Peppermint
Myrtaceae	*Eucalyptus sclerophylla*	Scribbly Gum
Myrtaceae	*Eucalyptus sieberi*	Silvertop Ash
Myrtaceae	*Eucalyptus viminalis*	Ribbon Gum
SHRUBS		
Apiaceae	*Platysace linearifolia*	Narrow-leafed Platysace
Araliaceae	*Polyscias sambucifolia*	Elderberry Panax
Asteraceae	*Cassinia arcuata*	Sifton Bush
Asteraceae	*Cassinia cunninghamii*	Cunningham's Everlasting
Asteraceae	*Olearia erubescens*	Silky Daisy Bush
Casuarinaceae	*Allocasuarina distyla*	-
Epacridaceae	*Brachyloma daphnoides*	Daphne Heath
Epacridaceae	*Epacris microphylla*	Coral Heath
Epacridaceae	*Epacris pulchella*	Wallum Heath
Epacridaceae	*Leucopogon lanceolatus*	Lance-leaf Beard-heath
Epacridaceae	*Monotoca elliptica*	Tree Broom-heath
Epacridaceae	*Monotoca scoparia*	Prickly Broom-heath
Euphorbiaceae	*Amperea xiphoclada var. xiphoclada*	Broom Spurge
Fabaceae/faboideae	*Daviesia latifolia*	-
Fabaceae/faboideae	*Daviesia squarrosa*	-
Fabaceae/faboideae	*Gompholobium huegelii*	Pale Wedge Pea
Fabaceae/faboideae	*Mirbelia platylobioides*	-
Fabaceae/faboideae/Faboideae	*Phyllota squarrosa*	Dense Phyllota
Fabaceae/faboideae/Mimosoideae	*Acacia buxifolia*	Box-leaf Wattle
Fabaceae/faboideae/Mimosoideae	*Acacia rubida*	Red-stemmed Wattle
Fabaceae/faboideae/Mimosoideae	*Acacia terminalis*	Sunshine Wattle
Myrtaceae	*Baeckea linifolia*	Weeping Baeckea
Myrtaceae	*Leptospermum arachnoides*	-
Myrtaceae	*Leptospermum continentale*	Tea-tree
Myrtaceae	*Leptospermum grandifolium*	Woolly Tea-tree
Myrtaceae	*Leptospermum obovatum*	-
Myrtaceae	*Leptospermum polygalifolium* subsp. *polygalifolium*	Tantoon

Family	Scientific Name	Common Name
Myrtaceae	*Leptospermum trinervium*	Slender Tea-tree
Proteaceae	*Banksia spinulosa*	Hairpin Banksia
Proteaceae	*Banksia ericifolia* var. *ericifolia*	Heath-leaved Banksia
Proteaceae	*Grevillea acanthifolia subsp. acanthifolia*	-
Proteaceae	*Grevillea laurifolia*	Laurel-leaf Grevillea
Proteaceae	*Hakea dactyloides*	Broad-leaved Hakea
Proteaceae	*Hakea sericea*	Needlebush
Proteaceae	*Isopogon anemonifolius*	Flat-leaved Drumsticks
Proteaceae	*Lomatia myricoides*	River Lomatia
Proteaceae	*Lomatia silaifolia*	Crinkle Bush
Proteaceae	*Persoonia chamaepitys*	Mountain Geebung
Proteaceae	***Persoonia hindii***	**-**
Proteaceae	*Persoonia myrtilloides subsp. myrtilloides*	-
Proteaceae	*Persoonia oblongata*	-
Proteaceae	*Persoonia recedens*	-
Proteaceae	*Petrophile pulchella*	Conesticks
Proteaceae	*Petrophile sessilis*	Conesticks
Rhamnaceae	*Pomaderris andromedifolia*	-
Rutaceae	*Boronia microphylla*	Small-leaved Boronia
Santalaceae	*Leptomeria acida*	Native Currant
Santalaceae	*Omphacomeria acerba*	-
Scrophulariaceae	***Derwentia blakelyi***	**-**
GROUNDCOVERS		
Asteraceae	*Arrhenechthites mixta*	Purple Fireweed
Asteraceae	*Helichrysum rutidolepis*	Pale Everlasting
Asteraceae	*Hypochaeris glabra**	Smooth Catsear
Asteraceae	*Hypochaeris radicata**	Flatweed
Asteraceae	*Lagenophora stipitata*	-
Asteraceae	*Senecio linearifolius*	Fireweed
Clusiaceae	*Hypericum gramineum*	Small St Johns Wort
Cyperaceae	*Gahnia aspera*	Saw Sedge
Cyperaceae	*Gahnia microstachya*	-
Cyperaceae	*Gahnia sieberiana*	Red-fruited Saw-sedge
Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge
Cyperaceae	*Lepidosperma limicola*	-
Dennstaedtiaceae	*Pteridium esculentum*	Bracken
Dilleniaceae	*Hibbertia obtusifolia*	Grey Guinea Flower
Droseraceae	*Drosera peltata*	Sundew
Droseraceae	*Drosera spathulata*	Common Sundew
Euphorbiaceae	*Poranthera microphylla*	-
Gentianaceae	*Centaurium erythraea**	Common Centaury

Family	Scientific Name	Common Name
Gleicheniaceae	*Gleichenia dicarpa*	Pouched Coral Fern
Goodeniaceae	*Dampiera stricta*	Blue Dampiera
Goodeniaceae	*Goodenia bellidifolia*	Daisy-leaved Goodenia
Goodeniaceae	*Goodenia hederacea* subsp. *hederacea*	Ivy-leaved Goodenia
Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort
Haloragaceae	*Gonocarpus teucroides*	Raspwort
Iridaceae	*Patersonia glabrata*	Leafy Purple-flag
Iridaceae	*Patersonia sericea*	Wild Iris
Lomandraceae	*Lomandra filiformis* subsp. *coriacea*	Wattle Mat-rush
Lomandraceae	*Lomandra filiformis* subsp. *filiformis*	Wattle Mat-rush
Lomandraceae	*Lomandra glauca*	Pale Mat-rush
Lomandraceae	*Lomandra longifolia*	Spiky-headed Mat-rush
Lomandraceae	*Lomandra multiflora*	Many-flowered Mat-rush
Orchidaceae	*Dipodium punctatum*	Hyacinth Orchid
Oxalidaceae	*Oxalis perrenans*	Yellow-flowered Wood Sorrel
Phormiaceae	*Dianella caerulea* var. *producta*	Blue Flax Lily
Phormiaceae	*Dianella revoluta* var. *revoluta*	Spreading Flax Lily
Poaceae	*Austrodanthonia racemosa var. racemosa*	Wallaby Grass
Poaceae	*Austrostipa pubescens*	Tall Speargrass
Poaceae	*Joycea pallida*	Silvertop Wallaby Grass
Poaceae	*Microlaena stipoides* var. *stipoides*	Weeping Rice Grass
Poaceae	*Poa seiberiana* var. *cyanophylla*	-
Proteaceae	*Grevillea laurifolia*	Laurel-leaf Grevillea
Restionaceae	*Baloskion australe*	-
Restionaceae	*Empodisma minus*	-
Stylidiaceae	*Stylidium graminifolium*	Grass Trigger Plant
Stylidiaceae	*Stylidium lineare*	Narrow-leaved Trigger Plant
Thymelaeaceae	*Pimelea linifolia* subsp. *linifolia*	Slender Rice Flower
Tremandraceae	*Tetratheca rupicola*	Black-eyed Susan
Violaceae	*Hybanthus monopetalus*	Slender Violet
Violaceae	*Hybanthus vernonii* subsp. *vernonii*	-
Violaceae	*Viola betonicifolia*	Native Violet
Violaceae	*Viola hederacea*	Ivy-leaved Violet
Xanthorrhoaceae	*Xanthorrhoea resinosa*	-
CLIMBERS		
Pittosporaceae	*Billardiera scandens*	Hairy Appleberry

APPENDIX 2: MOP Rehabilitation Table

6. REHABILITATION TABLES

Table 12. Rehabilitation Table

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Phase – Decommissioning						
Domain 1 – Infrastructure						
All infrastructure removed	Services removed	Quarterly Rehabilitation Inspection report	Services removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Offices removed	Quarterly Rehabilitation Inspection report	Offices and foundations removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Workshops removed	Quarterly Rehabilitation Inspection report	Workshops, floors, footings etc. removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Fuel and chemical tanks and drums removed	Quarterly Rehabilitation Inspection report	Tanks, drums, compounds, footings and bunds removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Roads and tracks removed	Quarterly Rehabilitation Inspection report	Bitumen and gravel roads removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Water pumps and pipe lines removed	Quarterly Rehabilitation Inspection report	Pumps and pipelines removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
All hazardous materials and contaminated materials appropriately removed/remediated	Hazardous materials audits undertaken and contamination at acceptable levels	Contamination audit report(s) completed by specialist at mine closure	Hydrocarbons less than assessment criteria	NSW EPA (1994) NSW EPA (1998)	No	Not commenced
		Contamination audit report(s) completed by specialist at mine closure	Heavy metals less than assessment criteria	NSW EPA (1998)	No	Not commenced
Groundwater piezometers sealed	Groundwater piezometers and bores removed	Quarterly Rehabilitation Inspection report	Backfill and remove seal	Bore licence 10BL601829 Condition 11.	No	Not commenced
Management of European heritage site	Removal of concrete footings, foundations and associated cement structures	Quarterly Rehabilitation Inspection report	Removal of concrete footings, foundations and associated cement structures	Historic Heritage and Significance Assessment for the Vale of Clwydd No.2 Colliery (RPS, 2011)	No	Not commenced
	VOC#2 drift entry way and the building above it retained with its foundation stone inscription left intact	Quarterly Rehabilitation Inspection report	Drift entry, building and inscription retained	Historic Heritage and Significance Assessment for the Vale of Clwydd No.2 Colliery (RPS, 2011)	No	Not commenced
	Assessment of structural integrity by a structural engineer	Structural assessment completed by specialist	Assessment report received from structural engineer	Historic Heritage and Significance Assessment for the Vale of Clwydd No.2 Colliery (RPS, 2011)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Domain 2 – Subsidence Management Area						
All underground mining infrastructure removed	Subsidence survey monitoring lines removed following completion of subsidence	Quarterly Rehabilitation Inspection report	Survey pegs removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Fuel and chemical tanks and drums removed	Quarterly Rehabilitation Inspection report	Tanks, drums, compounds, footings and bunds removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
Groundwater piezometers sealed	Groundwater piezometers and bores removed	Quarterly Rehabilitation Inspection report	Backfill and remove	Bore licence 10BL601829 Condition 11.	No	Not commenced
Domain 3 - Water Management Area						
All hazardous materials and contaminated materials appropriately removed/remediated	Hazardous materials audits undertaken and contamination at acceptable levels	Contamination audit report(s) completed by specialist at mine closure	Hydrocarbons less than assessment criteria	NSW EPA (1994) NSW EPA (1998)	No	Not commenced
		Contamination audit report(s) completed by specialist at mine closure	Heavy metals less than assessment criteria	NSW EPA (1998)	No	Not commenced
Infrastructure removed	Dams and ancillary infrastructure removed apart from those required for post mining land use purposes	Quarterly Rehabilitation Inspection report	Dams removed apart from those required for post mining land use purposes	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Domain A Rehabilitation – Woodland						
All infrastructure removed	Services removed	Quarterly Rehabilitation Inspection report	Services removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Offices removed	Quarterly Rehabilitation Inspection report	Offices and foundations removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Workshops removed	Quarterly Rehabilitation Inspection report	Workshops, floors, footings etc. removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Fuel and chemical tanks and drums removed	Quarterly Rehabilitation Inspection report	Tanks, drums, compounds, footings and bunds removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Roads and tracks removed	Quarterly Rehabilitation Inspection report	Bitumen and gravel roads removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Water pumps and pipe lines removed	Quarterly Rehabilitation Inspection report	Pumps and pipelines removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
All hazardous materials and contaminated materials appropriately removed/remediated	Hazardous materials audits undertaken and contamination at acceptable levels	Contamination audit report(s) completed by specialist at mine closure	Hydrocarbons less than assessment criteria	NSW EPA (1994) NSW EPA (1998)	No	Not commenced
		Contamination audit report(s) completed by specialist at mine closure	Heavy metals less than assessment criteria	NSW EPA (1998)	No	Not commenced
Groundwater piezometers sealed	Groundwater piezometers removed and sealed	Quarterly Rehabilitation Inspection report	Backfill and remove	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Domain B Rehabilitation – Grassland						
All infrastructure removed	Services removed	Quarterly Rehabilitation Inspection report	Services removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Offices removed	Quarterly Rehabilitation Inspection report	Offices and foundations removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSS, 2010a)	No	Not commenced
	Workshops removed	Quarterly Rehabilitation Inspection report	Workshops, floors, footings etc. removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSSE, 2010a)	No	Not commenced
	Fuel and chemical tanks and drums removed	Quarterly Rehabilitation Inspection report	Tanks, drums, compounds, footings and bunds removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSSE, 2010a)	No	Not commenced
	Mine owned roads and tracks removed	Quarterly Rehabilitation Inspection report	Bitumen and gravel roads removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSSE, 2010a)	No	Not commenced
	Water pumps and pipe lines removed	Quarterly Rehabilitation Inspection report	Pumps and pipelines removed	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
All hazardous materials and contaminated materials appropriately removed/remediated	Hazardous materials audits undertaken and contamination at acceptable levels	Contamination audit report(s) completed by specialist at mine closure	Hydrocarbons less than assessment criteria	NSW EPA (1994) NSW EPA (1998)	No	Not commenced
		Contamination audit report(s) completed by specialist at mine closure	Heavy metals less than assessment criteria	NSW EPA (1998)	No	Not commenced
Domain C - Water Management Area						
All hazardous materials and contaminated materials appropriately removed/remediated	Hazardous materials audits undertaken and contamination at acceptable levels	Contamination audit report(s) completed by specialist at mine closure	Hydrocarbons less than assessment criteria	NSW EPA (1994) NSW EPA (1998)	No	Not commenced
		Contamination audit report(s) completed by specialist at mine closure	Heavy metals less than assessment criteria	NSW EPA (1998)	No	Not commenced
Infrastructure removed	Dams and ancillary infrastructure removed apart from those required for post mining land use purposes	Quarterly Rehabilitation Inspection report	Dams and ancillary infrastructure removed apart from those required for post mining land use purposes	Mod 1 Rehabilitation Strategy Section 3.3.2.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Phase – Landform Establishment						
Domain 1 – Infrastructure						
Landform generally blends in with surrounding landscape and is stable	Slope Gradient	Annual geotechnical stability inspection	No less than 75% of rehabilitation area has slopes <10°	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
	Minimal active erosion	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Erosion control structures are installed at intervals commensurate with the slope of the landform	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Average soil loss per annum is <40 tonnes/ha/yr (sheet erosion)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Dimensions and frequency of occurrence of erosion rills and gullies are generally no greater than that in reference sites that exhibit similar landform characteristics	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
	Drainage condition	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Construction of contour banks and diversion drains to direct water into stable areas or sediment control basins	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Landform generally blends in with surrounding landscape and is stable	Drainage condition	Annual geotechnical stability inspection	All landforms free draining except where specific structures have been constructed for the storage of water as required for sediment and erosion control or post mining landuse	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Water quality non-polluting and appropriate for end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced
Domain 2 - Subsidence Management Area						
Landform generally blends in with surrounding landscape and is stable	Minimal active erosion	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Erosion control structures are installed at intervals commensurate with the slope of the landform	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Average soil loss per annum is <40 tonnes/ha/yr (sheet erosion)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Landform generally blends in with surrounding landscape and is stable	Minimal active erosion	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Dimensions and frequency of occurrence of erosion rills and gullies are generally no greater than that in reference sites that exhibit similar landform characteristics	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
	Drainage condition	Annual geotechnical stability inspection	Construction of contour banks and diversion drains to direct water into stable areas or sediment control basins	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Water quality non-polluting and appropriate for end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced
Domain 3 - Water Management Area						
Landform generally blends in with surrounding landscape and is stable	Drainage condition	Annual geotechnical stability inspection	Construction of contour banks and diversion drains to direct water into stable areas or sediment control basins	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Landform generally blends in with surrounding landscape and is stable	Drainage condition	Annual geotechnical stability inspection	All landforms free draining except where specific structures have been constructed for the storage of water as required for sediment and erosion control or post mining landuse	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Water quality non-polluting and appropriate for end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced
Domain A Rehabilitation – Woodland						
Landform generally blends in with surrounding landscape and is stable	Slope Gradient	Annual geotechnical stability inspection	No less than 75% of the rehabilitation area has slopes <10°	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Annual geotechnical stability inspection	Where reject layers are present and exposed, the landform is capped with a minimum of 1.5 metres of inert material and be free draining	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
	Minimal active erosion	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Erosion control structures are installed at intervals commensurate with the slope of the landform	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Landform generally blends in with surrounding landscape and is stable	Minimal active erosion	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Average soil loss per annum is <40 tonnes/ha/yr (sheet erosion)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Dimensions and frequency of occurrence of erosion rills and gullies are generally no greater than that in reference sites that exhibit similar landform characteristics	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
	Drainage condition	Annual geotechnical stability inspection	Construction of contour banks and diversion drains to direct water into stable areas or sediment control basins	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Annual geotechnical stability inspection	All landforms free draining except where specific structures have been constructed for the storage of water as required for sediment and erosion control or post mining landuse	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Water quality non-polluting and appropriate for end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced
Domain B Rehabilitation – Grassland						
Landform generally blends in with surrounding landscape and is stable	Slope Gradient	Annual geotechnical stability inspection	No less than 75% of the rehabilitation area has slopes <10°	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Annual geotechnical stability inspection	Where reject layers are present and exposed, the landform is capped with a minimum of 1.5 metres of inert material and be free draining	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
	Minimal active erosion	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Erosion control structures are installed at intervals commensurate with the slope of the landform	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Average soil loss per annum is <40 tonnes/ha/yr (sheet erosion)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Landform generally blends in with surrounding landscape and is stable	Minimal active erosion	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Dimensions and frequency of occurrence of erosion rills and gullies are generally no greater than that in reference sites that exhibit similar landform characteristics	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
	Drainage condition	Results from erosion monitoring (50m transect) undertaken 1 year after establishment then every 2 years.	Construction of contour banks and diversion drains to direct water into stable areas or sediment control basins	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Annual geotechnical stability inspection	All landforms free draining except where specific structures have been constructed for the storage of water as required for sediment and erosion control or post mining landuse	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Water quality non-polluting and appropriate for end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced
Domain C – Water Management Area						
Landform generally blends in with surrounding landscape and is stable	Drainage condition	Annual geotechnical stability inspection	Construction of contour banks and diversion drains to direct water into stable areas or sediment control basins	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Annual geotechnical stability inspection	All landforms free draining except where specific structures have been constructed for the storage of water as required for sediment and erosion control or post mining landuse	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Water quality non-polluting and appropriate for forestry end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Phase - Growth Medium Development						
Domain 1 – Infrastructure						
Class VIII – Timber	Soil in shaped areas to be ameliorated to sustain forestry ecosystems	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	ESP <15%	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	pH >5.5 and <8.5	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	EC <0.6ds/m	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months Photographic records	Nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Class VIII - Timber	Soil in shaped areas to be ameliorated to sustain forestry ecosystems	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	Adequate macro and micronutrients are present	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Class IV – Grazing, occasional cultivation	Develop a stable landform suitable for grazing	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	ESP <15%	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	pH >5.5 and <8.5	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	EC <0.6ds/m	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months Photographic records	Nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Class IV – Grazing, occasional cultivation	Develop a stable landform suitable for grazing	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	Adequate macro and micronutrients are present	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain 2 - Subsidence Management Area						
Class VIII – Timber	Soils ameliorated to sustain native ecosystems as required	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	ESP <15%	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	pH >5.5 and <8.5	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	EC <0.6ds/m	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Class VIII – Timber	Soils ameliorated to sustain native ecosystems as required	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months Photographic records	Nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	Adequate macro and micronutrients are present	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain 3 - Water Management Area						
Water quality non-polluting and appropriate for forestry end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Domain A Rehabilitation – Woodland						
Land capability VIII and capable of sustaining native ecosystem	Soils ameliorated to sustain native woodland ecosystems as required	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	ESP <15%	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	pH >5.5 and <8.5	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	EC <0.6ds/m	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months Photographic records	Nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Land capability VIII and capable of sustaining native ecosystem	Soils ameliorated to sustain native woodland ecosystems as required	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	Adequate macro and micronutrients are present	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain B Rehabilitation – Grassland						
Land capability IV and capable of sustaining grasslands	Soils ameliorated to sustain grasslands	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	ESP <15%	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	pH >5.5 and <8.5	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	EC <0.6ds/m	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	Nutrient accumulation and recycling processes are deemed to be occurring	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Land capability IV and capable of sustaining grasslands	Soils ameliorated to sustain grasslands	Analyses of soil samples from 20 m x 10 m plot sampling undertaken quarterly for the first 12 months then every 12 months	Adequate macro and micronutrients are present	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain C – Water Management Area						
Water quality non-polluting and appropriate for forestry end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced
Phase - Ecosystem Establishment						
Domain 1 – Infrastructure						
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Area accomplishes and remains as a healthy woodland/grassland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	No bare surfaces >20 m^2 in area or >10 metres in length down slope	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Species composition to comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland/grassland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Established species survive and/or regenerate after disturbance	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Opportunistic inspections after significant rainfall events. Photographic records	Weeds do not dominate native species after disturbance or after rain	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially.	Pests do not occur in substantial numbers or visibly affect the development of native plant species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Photographic records	Species are capable of setting viable seed, flowering or otherwise reproducing	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Photographic records	Evidence of second generation of shrub and understorey species in woodland areas (not applicable to grassland areas)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Vegetation in woodland areas develops and maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons (not applicable to grassland areas)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	More than 75% of shrubs and/or trees in woodland areas are healthy when ranked healthy, sick or dead (not applicable to grassland areas)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain 2 - Subsidence Management Area						
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Area accomplishes and remains as a healthy native woodland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	No bare surfaces >20 m^2 in area or >10 metres in length down slope	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Species composition to comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Established species survive and/or regenerate after disturbance	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Opportunistic inspections after significant rainfall events. Photographic records	Weeds do not dominate native species after disturbance or after rain	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially.	Pests do not occur in substantial numbers or visibly affect the development of native plant species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Photographic records	Species are capable of setting viable seed, flowering or otherwise reproducing	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Photographic records	Evidence of second generation of shrub and understorey species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Vegetation develops and maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain 3 - Water Management Area						
Water quality non-polluting and appropriate for forestry end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Domain A Rehabilitation – Woodland						
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Area accomplishes and remains as a healthy native woodland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	No bare surfaces >20 m^2 in area or >10 metres in length down slope	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Species composition to comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Established species survive and/or regenerate after disturbance	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Opportunistic inspections after significant rainfall events. Photographic records	Weeds do not dominate native species after disturbance or after rain	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially.	Pests do not occur in substantial numbers or visibly affect the development of native plant species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Photographic records	Species are capable of setting viable seed, flowering or otherwise reproducing	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Photographic records	Evidence of second generation of shrub and understorey species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Vegetation develops and maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Domain B Rehabilitation – Grassland						
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Area accomplishes and remains as a healthy native grassland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	No bare surfaces >20 m^2 in area or >10 metres in length down slope	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Species composition to comprise a mixture of grasses representative of regionally occurring species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Established species survive and/or regenerate after disturbance	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Opportunistic inspections after significant rainfall events.	Weeds do not dominate native species after disturbance or after rain	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially.	Pests do not occur in substantial numbers or visibly affect the development vegetation growth	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Photographic records	Species are capable of setting viable seed, flowering or otherwise reproducing	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain C – Water Management Area						
Water quality non-polluting and appropriate for forestry end land use	Water quality	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced
Phase - Ecosystem Development						
Domain 1 – Infrastructure						
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months.	Area remains as a healthy native woodland/grassland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	No bare surfaces >20 m^2 in area or >10 metres in length down slope	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Species composition to comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland/grassland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Established species survive and/or regenerate after disturbance	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Opportunistic inspections after significant rainfall events.	Weeds do not dominate native species after disturbance or after rain	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially.	Pests do not occur in substantial numbers or visibly affect the development of native plant species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Photographic records	Species are capable of setting viable seed, flowering or otherwise reproducing	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Photographic records	Evidence of second generation of shrub and understorey species in woodland areas (not applicable to grassland)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Woodland vegetation maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons (not applicable to grassland)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	More than 75% of woodland shrubs and/or trees are healthy when ranked healthy, sick or dead (not applicable to grassland)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain 2 - Subsidence Management Area						
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Area remains as a healthy native woodland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	No bare surfaces >20 m^2 in area or >10 metres in length down slope	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Species composition to comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Established species survive and/or regenerate after disturbance	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Opportunistic inspections after significant rainfall events.	Weeds do not dominate native species after disturbance or after rain	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially.	Pests do not occur in substantial numbers or visibly affect the development of native plant species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Photographic records	Species are capable of setting viable seed, flowering or otherwise reproducing	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Photographic records	Evidence of second generation of shrub and understorey species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Vegetation maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain 3 - Water Management Area						
Ecosystem health	Remaining water management structures are safe, stable and non-polluting	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Domain A Rehabilitation – Woodland						
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Area remains as a healthy native woodland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	No bare surfaces >20 m^2 in area or >10 metres in length down slope	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Species composition to comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Established species survive and/or regenerate after disturbance	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Opportunistic inspections after significant rainfall events.	Weeds do not dominate native species after disturbance or after rain	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially.	Pests do not occur in substantial numbers or visibly affect the development of native plant species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Photographic records	Species are capable of setting viable seed, flowering or otherwise reproducing	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Photographic records	Evidence of second generation of shrub and understorey species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Vegetation maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Domain B Rehabilitation – Grassland						
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Area remains as a healthy native grassland	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present)	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	No bare surfaces >20 m^2 in area or >10 metres in length down slope	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Species composition to comprise a mixture of grasses representative of regionally occurring species	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Results from 20 m x 10 m plot sampling, and 2 m x 2 m quadrat sampling, undertaken on rehabilitation areas quarterly for the first 12 months then every 12 months. Photographic records	Established species survive and/or regenerate after disturbance	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially. Opportunistic inspections after significant rainfall events.	Weeds do not dominate native species after disturbance or after rain	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
		Quarterly rehabilitation inspections during the first two years then biennially.	Pests do not occur in substantial numbers or visibly affect the development of vegetation	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced

Rehabilitation Objective	Indicator	Performance Measure	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP
Ecosystems established consistent with analogue vegetation communities	Vegetation association – community and structure development consistent with analogue communities	Photographic records	Species are capable of setting viable seed, flowering or otherwise reproducing	Mod 1 Rehabilitation Strategy Section 5.(GSSE, 2010a)	No	Not commenced
Domain C – Water Management Area						
Ecosystem health	Remaining water management structures are safe, stable and non-polluting	Quarterly water quality monitoring (or following rainfall) in accordance with the Site Water Management Plan	Complies with water quality criteria established in the Site Water Management Plan	Angus Place Site Water Management Plan, Section 8.2 (2012)	No	Not commenced

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