Environmental Management System

Rix's Creek South

REHABILITATION STRATEGY

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Approval:	Group Environmental Manager – The Bloomfield Group
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2.2	19/01/21	Address DPIE comments	Dianne Munro Hansen Bailey	Chris Knight Bloomfield	Chris Knight Bloomfield

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1 Introduction

1.1 Project Background

1.1.1 Overview

Rix's Creek Mine (RCM) is owned and operated by The Bloomfield Group (Bloomfield). RCM comprises the original Rix's Creek Mine, now known as Rix's Creek South (RCS) and the former Integra Open Cut Project Mine now known as Rix's Creek North (RCN). RCN was in care and maintenance when it was purchased by Bloomfield in 2015, and operations resumed in 2016. RCS has been in continuous operation by Bloomfield since project commencement in 1990.

RCS is located approximately 5 to 10 km north-west of Singleton both east and west of the New England Highway (NEH) (**Figure 1**).

This Rehabilitation Strategy has been developed in accordance with Schedule 2, Condition B72 of Project Approval SSD 6300 for Rix's Creek South. This version of the Rehabilitation Strategy builds on both the August 2015 version and the 2019 version which was updated in response to the Independent Planning Commission (IPCN) "recommendations", specifically R8 to R15 which relate to rehabilitation and mine closure.

1.1.2 Approved Development

The RCS Continuation of Mining Project was approved on 12 October 2019 for a period of 21 years under Development Consent SSD 6300. SSD 6300 is supported by the 'Rix's Creek Mine Continuation of Mining Project Environmental Impact Statement' (AECOM, 2015) (EIS) and subsequent document as defined in condition A2(c) of SSD 6300 (EIS documents).

RCS is approved to continue mining operations with Run of Mine (ROM) coal extraction approved up to 3.6 Mtpa per year. Mining methods will continue as a multi-seam bench open cut techniques, utilising excavators, front end loaders and trucks as well as other ancillary equipment. Run of mine (ROM) coal will be processed onsite at the existing CHPP which has capacity to accept the proposed increase in throughput. Product coal will then be transported by rail to the Port of Newcastle. It is estimated that the Mine will yield a total of 32 million saleable tonnes of coal at an overburden ratio of approximately 10.5:1, before coal seams are exhausted under SSD6300.

The components of RCS comprise:

- The ongoing use of, and future additions to, the existing mine fleet;
- Use of the existing mine infrastructure facilities including the CHPP;
- Continuation of operating hours - 24 hours a day 7 days a week;
- Use of existing and new rejects and tailings emplacements;
- Rail transport of product coal to the port of Newcastle;
- Mine closure and rehabilitation; and
- Environmental management.

1.2 Project Area

RCS is located in the Upper Hunter Valley, within the Singleton local government area, approximately 1.5km northwest of Singleton. The site occupies an area of approximately 1,823 hectares (ha), and is dissected in half by the New England Highway. Refer **Figure 1** for the Project location and **Figure 2** for the layout of the existing Project area.

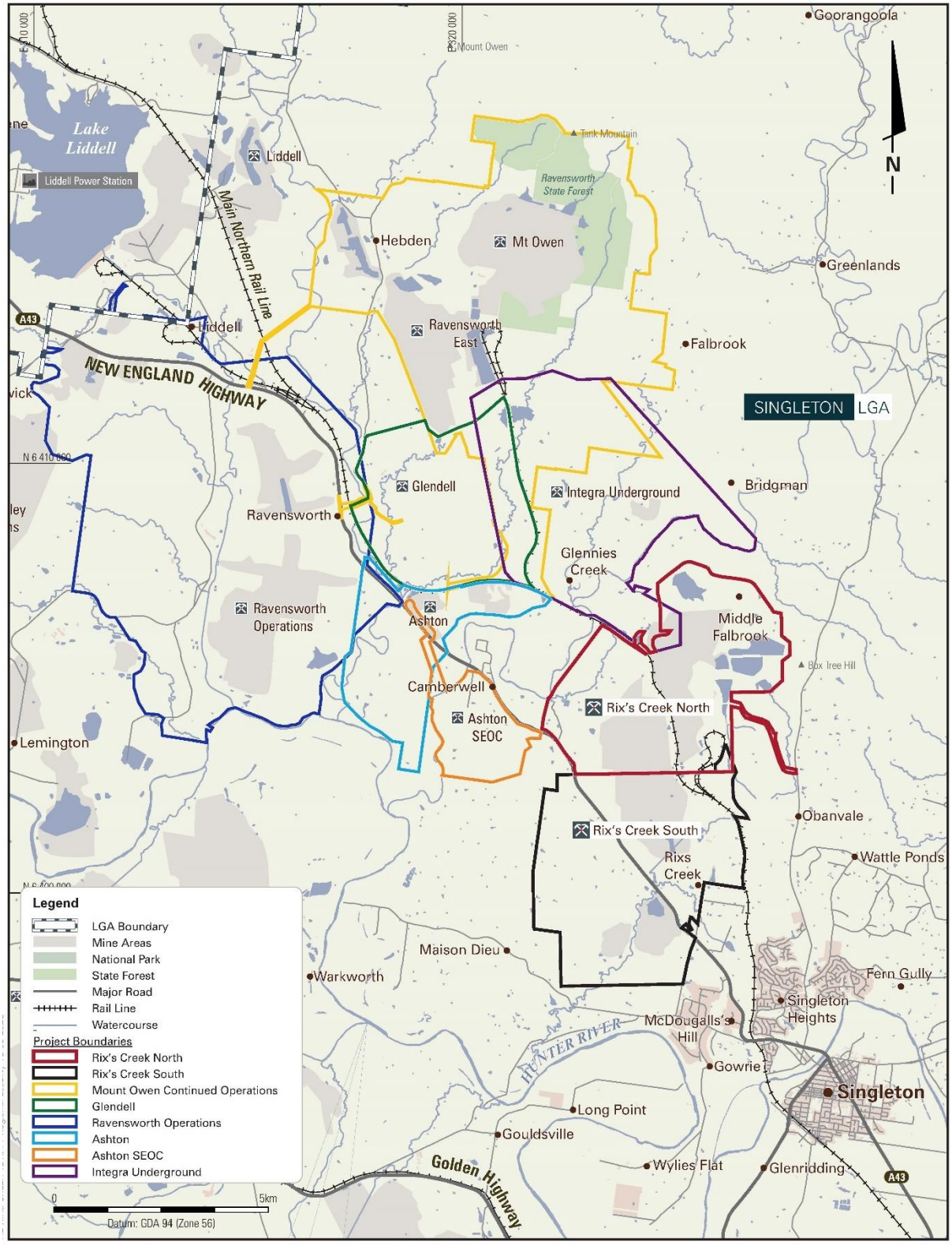
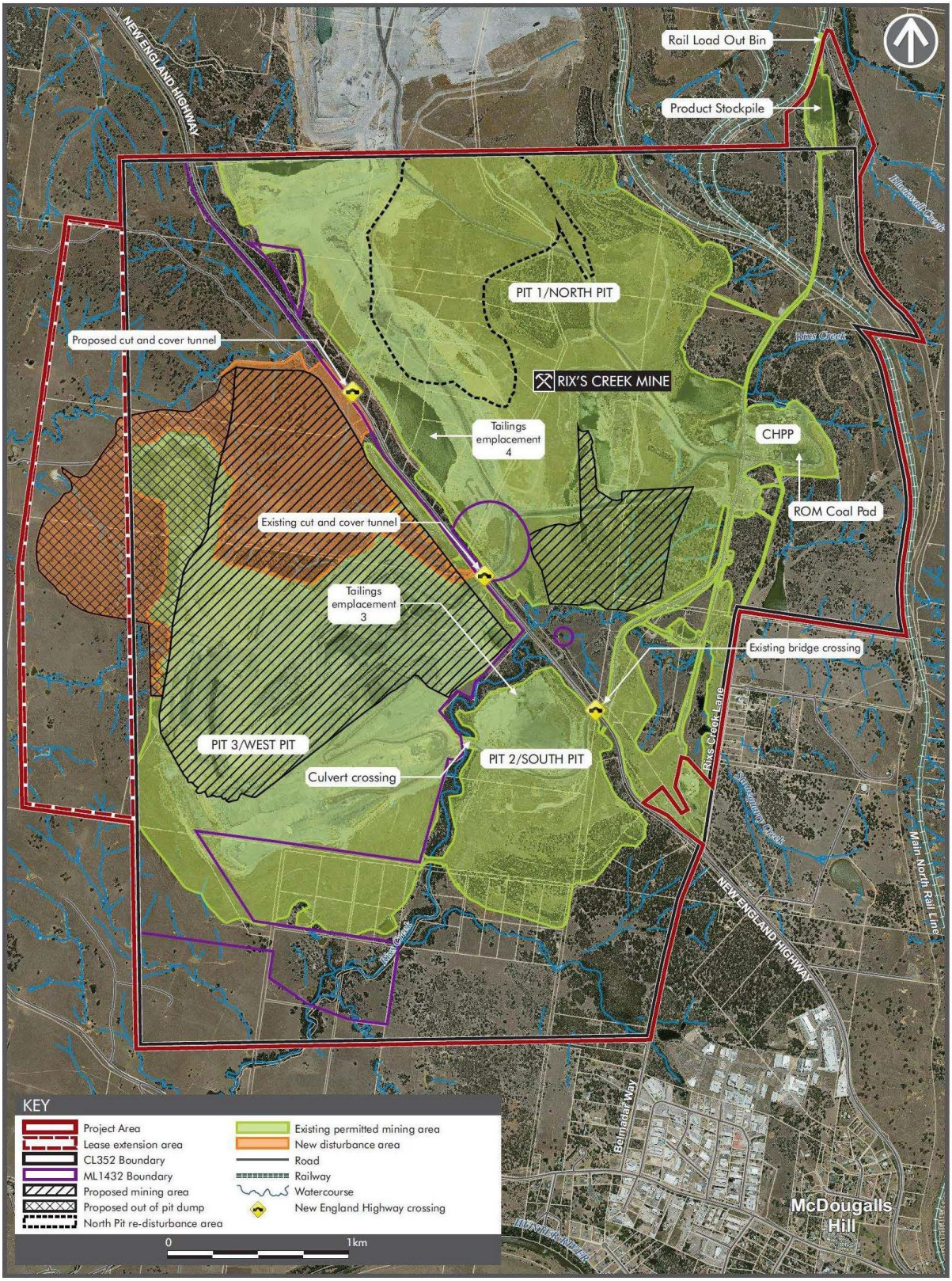


Figure 1
Locality



Source: Appendix 2 SSD 6300

Figure 2
Conceptual Approved Rix's Creek South Mine

1.3 Purpose of the Report

The following section provides information on the various regulatory requirements that form the basis for the Rehabilitation Strategy, whilst also collating all relevant rehabilitation objectives and practices as have been documented in the Mining Operations Plan (MOP) (which also meets the requirements of the Rehabilitation Management Plan required under condition B74 of SSD6300) and EIS documents.

Where the Rehabilitation Strategy refers to other RCM or RCS management plans or MOP, should there be any inconsistencies between the plans, all other plans take precedence to this one.

1.3.1 Regulatory Requirements

The operations at RCS are subject to the conditions of development consent SSD 6300. The specific requirements for the Rehabilitation Strategy are presented in **Table 1.**

Other relevant conditions are provided in **Section 1.3.2** and **Appendix A**.

Table 1
SSD 6300 Management Plan Conditions

Ref	Condition	Section
B69	The Applicant must rehabilitate the site to the satisfaction of the Resources Regulator. This rehabilitation must be generally consistent with the proposed rehabilitation activities described in the document/s listed in condition A2(c) (and shown conceptually in the figure in Appendix 7), and must comply with the objectives in Table 6. *Table 6 is reproduced in Section 1.3.2.*	1.3.1
B70	The rehabilitation objectives in Table 6 apply to the entire site, including all landforms constructed under either this consent or previous consents. However, the Applicant is not required to undertake any additional earthmoving works on landforms that have been approved and constructed under previous consents.	1.3.1
B72	The Applicant must prepare a Rehabilitation Strategy for the development to the satisfaction of the Planning Secretary. This strategy must:	-
	(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	Appendix B
	(b) be prepared in consultation with the Resources Regulator and Council;	Appendix B
	(c) be submitted to the Planning Secretary for approval within six months of commencing development under this consent;	Appendix B
	(d) building on the Rehabilitation Objectives in Table 6, describe the overall rehabilitation outcomes for the site, and address all aspects of rehabilitation including mine closure, final landform (including final voids), post-mining land use/s and water management;	5 5.7.4 5.8 5.4
	(e) align with strategic rehabilitation and mine closure objectives and address the principles of the Strategic Framework for Mine Closure (ANZMEC and MCA, 2000);	Table 2 Table 3
	(f) describe how the rehabilitation measures would be integrated with the measures in the Biodiversity Management Plan referred to in condition B50;	6.4

Ref	Condition	Section
	(g) describe how rehabilitation will be integrated with the mine planning process, including a plan to address premature mine closure;	6 8.4
	(h) identify and describe all rehabilitation domains and define completion criteria for each;	5 Table 4
	(i) include indicative mine plans and scheduling for life-of-mine rehabilitation showing each rehabilitation domain;	6
	(j) include details of target vegetation communities and species to be established within the proposed revegetation areas;	0 6.4.4
	(k) investigate opportunities to refine and improve the final landform and final void outcomes over time;	6.2 5.8
	(l) include a risks and opportunities assessment and risk register that includes risks associated with unplanned closure or care and maintenance;	4
	(m) include a post-mining land use strategy to investigate and facilitate post-mining beneficial land uses for the site (including the final void), that: (i) align with regional and local strategic land use planning objectives and outcomes; (ii) support a sustainable future for the local community; (iii) utilise existing mining infrastructure, where practicable; and (iv) avoid disturbing self-sustaining native ecosystems, where practicable;	6 5 5.3 5.9
	(n) include a stakeholder engagement plan to guide rehabilitation and mine closure planning processes and outcomes;	3.5
	(o) investigate ways to minimise adverse socio-economic effects associated with rehabilitation and mine closure; and	4.5
	(p) include a program to review and refine the final landform and final void outcomes to meet the relevant Rehabilitation Objectives in Table 6, in consultation with the Resources Regulator and the Council every three years.	8.3.3
B37	The Applicant must implement the Rehabilitation Strategy approved by the Planning Secretary.	

1.3.1.1 Director-General's Requirements

The Rix's Creek Continuation of Mining Project Environmental Impact Statement has been prepared in accordance with Division 4.1, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) which ensures that the potential environmental effects of a proposal are properly assessed and considered in the decision-making process.

In preparing this Rehabilitation Strategy, the Director–General's Requirements (DGRs) issued for the Rix's Creek Continuation of Mining Project (SSD 13_6300) on 3 March 2014 have been addressed as required by Clause 75F of the EP&A Act, whilst the Strategy also provides a platform for the rehabilitation program across the entire Mine. The key matters raised by the Director-General for

consideration in the Rehabilitation Strategy are outlined in **Table 2** along with a reference to where the requirements are addressed in the report.

Table 2
Director General Requirements Applicable to Rehabilitation Impact Assessment

Director Generals Requirement		Section Addressed
Rehabilitation	Rehabilitation – including the proposed rehabilitation strategy for the site (assuming closure of the mine upon completion of the proposed development), having regard to the key principles in the Strategic Framework for Mine Closure, including: • rehabilitation objectives, methodology, monitoring programs,	This document
	• performance standards and proposed completion criteria;	7
	• nominated final land uses and land forms (including cross sections), having regard to any relevant strategic land use planning or resource management plans or policies;	5 and 6
	• justification for inclusion and proposed location of a final void, and consideration of alternatives; and	5.8
	• the potential for integrating this strategy with adjacent mines.	6.7

1.3.1.2 IPC Requirements

The key matters pertaining to rehabilitation and mine closure which were raised in the IPC report are listed in **Table 3**, along with a reference to where the requirements are addressed in this document.

Table 3
IPC Report Recommendations

IPC Recommendation		Section
R8	That in order to address the principles of *Strategic Framework for Mine Closure,* the applicant implement the recommendations of the Unger Report requiring the applicant to prepare a stakeholder engagement strategy that ensures that stakeholders' specific issues of rehabilitation and closure are addressed appropriately in the Rehabilitation Strategy	3.5 and 6.7
R9	That the applicant records all targeted consultation on mine rehabilitation and closure planning within the Rehabilitation Strategy and demonstrates where issues raised in community consultation have been considered in the development of the Rehabilitation Strategy	3.5
R10	That the applicant collates and includes all relevant rehabilitation objectives and practices identified within the MOP and other EIS documents into the Rehabilitation Strategy so that it is a consolidated reference for the rehabilitation and closure of the mine	1.3.2

IPC Recommendation		Section
R11	in order to address the principles of *Strategic Framework for Mine Closure*, the Commission recommends that the Rehabilitation Strategy:	-
a	Identify all mine closure domains;	Table 5
b	Label and describe all domains including the proposed post mining land use;	5
c	Ensure that rehabilitation and closure objectives, performance standards and completion criteria exist for all domains;	Table 9
d	consider sudden unplanned closure and temporary closure (care and maintenance);	4 & Appendix C
e	include a detailed commitment register;	1.3.2.2
f	Identify and consult with stakeholders to explore closure risks and opportunities further; and	4.2
g	include a plan to ensure that the Rehabilitation Strategy is updated and refined regularly to reflect changes in mine development and operational planning and environmental conditions	4.4
R12	That the applicant carry out an evaluation of the socio –economic impacts of mine closure during the preparation of, and in the regular updates to, a Detailed Mine Closure Plan	4.5
R13	That the applicant include a section in the Rehabilitation Strategy outlining the knowledge base around the past rehabilitation performance. This is intended to demonstrate that the site is able to achieve the proposed post mining land use. This knowledge base should be a summary of all existing baseline aspects as they relate to mine closure and demonstrate the outcomes from past rehabilitation showing where any lessons learnt have been incorporate in to the rehabilitation and mine closure planning for the site. The inclusion of this information in the Rehabilitation Strategy could further improve the provision of information to the community on progressive rehabilitation performance and site knowledge and which would support the proposed post mining land uses	2.2
R14	That the Rehabilitation Strategy be revised to demonstrate a risk based approach to rehabilitation and closure. This would include the preparation of a register outlining the risks and opportunities relating to the closure of the mine. This should include not only the risks and opportunities relating to the physical closure and rehabilitation works, but also give regard to any existing legacy of residual (future) risks in accordance with the Principles of the *Strategic Framework for Mine Closure*	4 and 8.4
R15	That the Rehabilitation Strategy be revised to include additional detailed information around the final void water levels and water quality, including an assessment of any potential beneficial uses for the water that could be consider following closure of the mine	5.8
R17	That the applicant explores opportunities to undertake an assessment of void water re-use. where opportunities are identified, these should be included in the Rehabilitation Strategy	5.8

IPC Recommendation		Section
R26	That the applicants Heritage Management Plan and Rehabilitation Strategy detail how the Coke Ovens will be better accessed by the public given the historical significance of the site and provide options on how the site can be managed throughout the life of the Project and beyond mine closure.	5.2

1.3.2 Regulatory Rehabilitation Objectives

Condition B69 of SSD 6300 requires Bloomfield to comply with the objectives in Table 6 of that condition. These objectives have been reproduced in **Table 4**.

Table 4
Rehabilitation Objectives (Table 6 of SSD6300)

Feature	Objective	Section
All areas of the site affected by the development	• Safe, stable and non-polluting • Fit for the intended post-mining land use/s • Establish the final landform and post-mining land use/s as soon as practicable after cessation of mining operations • Minimise post-mining environmental impacts	5
Areas proposed for native ecosystem re-establishment	• Establish/restore self-sustaining native open woodland ecosystems • Establish local plant community types • Establish: - riparian vegetation, within any diverted and/or re-established creek lines and retained water features; - habitat, feed and foraging resources for threatened fauna species; and - vegetation connectivity and wildlife corridors, as far as is reasonable and feasible	*Biodiversity Management Plan*
Areas proposed for agricultural land	• Establish/restore grassland areas to support sustainable agricultural activities • Use species found in the local area that are suitable for pasture production • Achieve land and soil capabilities that are equivalent or better than pre-mining • Locate adjacent to surrounding agricultural land, where practicable	0
Final Landform	• Stable and sustainable for the intended post-mining land use/s • Integrated with surrounding natural landforms and other mine rehabilitated landforms including Rix's Creek North, to the greatest extent practicable • Incorporate micro-relief and drainage features that mimic natural topography and mitigate erosion, to the greatest extent practicable • Maximise surface water drainage to the natural environment,	5 6.7 6.2.1 5.4

Feature	Objective	Section
	excluding final void catchment (i.e. free draining) • Reduce highwall slopes to a maximum of 18 degrees (excluding slopes below the post-mining standing water level in any final void) • Minimise visual impacts, where practicable, particularly from public views and the Granbalang Trig Station	5.8 5
Final void	• Designed as longterm groundwater sink to prevent the release of saline water into the surrounding environment, unless further mine planning and final landform design processes identify a more suitable outcome for the final void (see condition B72) • Minimise to the greatest extent practicable: - the size and depth of final voids; - the drainage catchment of final voids; - any high wall instability risk; and - the risk of flood interaction • Maximise potential for beneficial reuse, where practicable	5.8
Highwall access to future underground coal resources	• Rehabilitate as soon as practicable, unless the Applicant proceeds with an underground mining proposal (subject to separate approval), and this is subject to a development application at least 5 years prior to cessation of mining operations	**5.3**
Surface infrastructure of the development, including infrastructure constructed under DA 49/94	• To be decommissioned and removed, unless the Resources Regulator agrees otherwise • Cut and cover tunnels under the New England Highway to be demolished and removed, or filled, unless RMS agrees otherwise	5.3
Rehabilitation materials	• Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and reused as rehabilitation resources, to the greatest extent practicable • Maximise use of biosolids (or similar organic recycled material) to enhance soil quality for revegetation	6.3 6.4 5.7.3 6.3.6
Water quality	• Water retained on the site is fit for the intended post-mining land use/s • Water discharged from the site is suitable for receiving waters and fit for aquatic ecology and riparian vegetation	5.4 5.6
Community	• Ensure public safety • Minimise adverse socio-economic effects associated with mine closure • Provide public access to the Coke Ovens (see condition B59(f)(iv))	5.8 4.5 *Historical Heritage Management Plan*

1.3.2.1 Mining Operations Plan

The aim of the rehabilitation program at the Mine is to reinstate the pre-mining land use of grazing land, with the post mined lands being revegetated with pasture species and areas of trees over grass to provide enhanced habitat for both native animals and domesticated stock. The focus on the earthworks and rehabilitation program is to provide stable landforms, compatible with the surrounding landscape that will allow optimal post mining landuse in terms of current social and economic constraints.

The proposed final landform at the Mine will:

- Provide a post mining landscape which will be safe and non-polluting, with a stable drainage network;
- Not impact the area of Land and Soil Capability Class 2 lands (SLR Consulting Australia Pty Ltd, 10 June 2015);
- Provide slopes of less than or equal to 10º (18%) (Land and Soil Capability Class 4 and 5) over the majority of the site;
- Provide slopes between 10-18º (18 to 33%) (Land and Soil Capability Class 6) where identified;
- Have 80.7ha of land below water in the final void; and
- Limit areas of greater than 18° (33%) slopes to the batters of the tunnels under the highway and sections of the batters of the final void (Land and Soil Capability Class 7), prior to the void filling with water.

1.3.2.2 EIS Documentation

The EIS describes the overarching objectives with the following commitments to rehabilitation;

- Rehabilitation works will be closely integrated with mine production and will be undertaken progressively as mining proceeds.
- Disturbed land will be returned to a stable condition with a land capability at least equal to that which existed prior to mining.
- Creation of stable landforms compatible with the surrounding landscape.
- Establishment and maintenance of native vegetation links within the Mine Lease and to adjoining lands.
- Re-establish land with agricultural capability similar to the land prior to mining disturbance
- Re-establishment of grazing lands on the most suitable areas of the site.
- To maintain a natural land form and the visual character of the site consistent with rural areas in the vicinity of the Mine.
- To establish surface water control devices that mimic pre mining hydrology.
- To reinstate the Mine area into a mix of appropriate land uses suitable for the soil and landscape within which the Mine is situated, as well as having consideration of the Mine proximity to Singleton and potential higher uses which may be suitable for the location.

The overarching commitments within the EIS have provided the basis for the development of the Rehabilitation Strategy. Both the EIS and Rehabilitation Strategy will inform future MOPs.

1.4 Report Structure

This report is structured as follows:

Section 1.0 Introduction – outlines the Project and presents the purpose of the report.

Section 2.0 History of land management at Rix's Creek Mine – includes rehabilitation goals and objectives and lessons learnt.

Section 3.0 Stakeholder consultation.

Section 4.0 Risk Assessments, including impact and opportunities.

Section 5.0 Proposed future use of disturbed areas

Section 6.0 Phases in the Rehabilitation Strategy - Safeguards and management - provides a summary of environmental mitigation and management responsibilities in relation to rehabilitation and land management for the Project.

Section 7.0 Performance Criteria, Measures and Indicators.

Section 8.0 Rehabilitation monitoring and reporting.

Section 9.0 Bibliography.

Section 10.0 Acronyms.

2 History of Land Management at Rix's Creek Mine

2.1 Overview

The Mine commenced operations in July 1990 following the granting of development consent on 19 October 1989. Since that time, the site has operated with a fleet of bulldozers, scrapers and more recently front end loaders, excavators and trucks to remove and manage overburden, topsoil and subsoil material with site currently occupying an area of approximately 1,823 ha and the project expansion for the continuation of mining with a final footprint of 2004.6 ha.

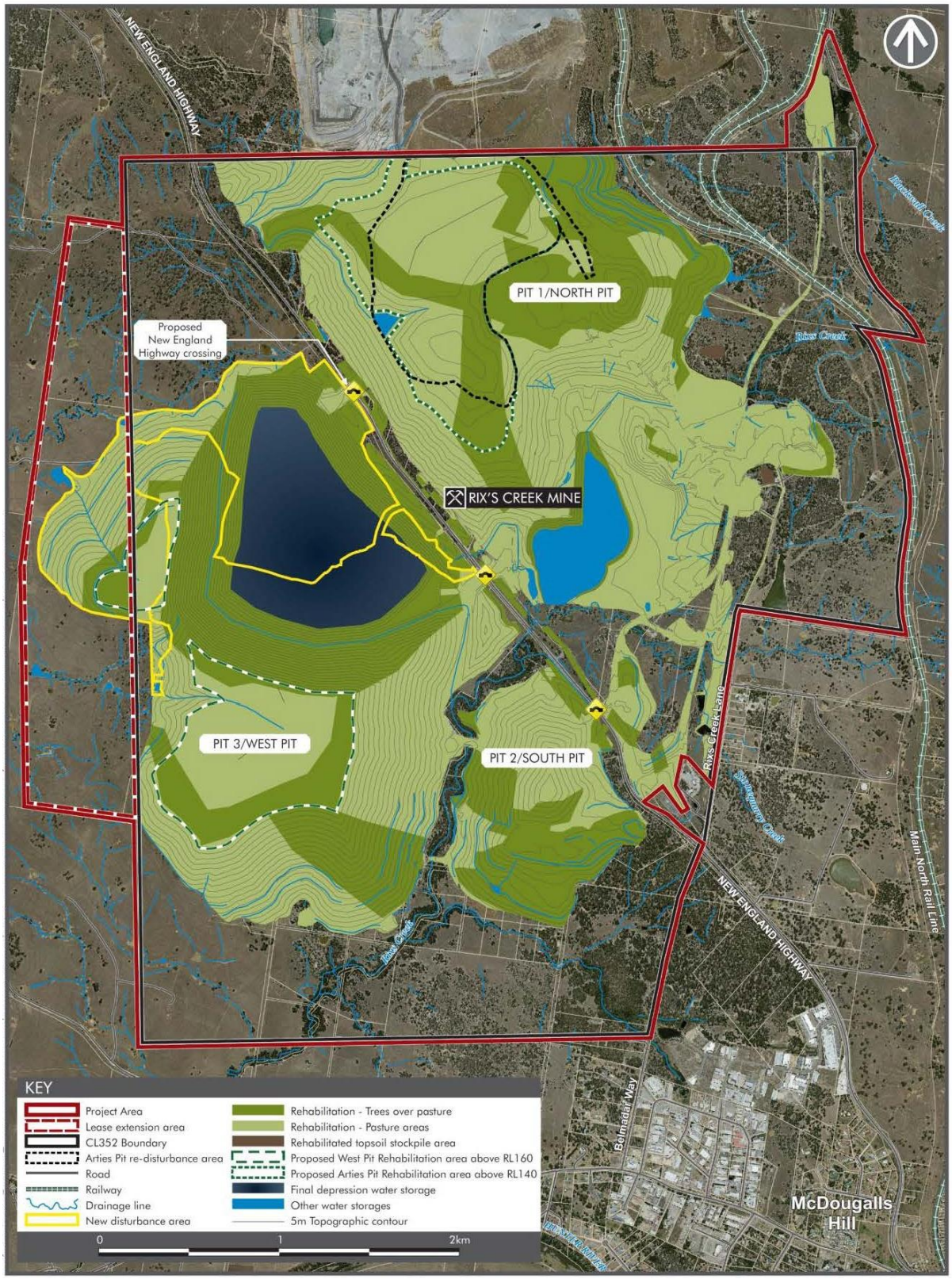
Historically voids from the mining operations have been used to manage tailings. Previous tailing emplacements have been dewatered and dried and the area covered with overburden material and rehabilitated with a pasture base plant community during the life of the Project. The success of recent trials linked to the drying of tailings from the CHPP will allow co-disposal of tailings with coarse reject, thus removing the need for additional tailings emplacements.

All carbonaceous and coarse reject materials are covered by a minimum of two metres of inert overburden material before the spoil area is shaped and rehabilitated. This mitigates any potential risk of spontaneous combustion and the stability of tip faces within the spoil area.

The rehabilitation program at the Mine is supported by over 80 year's company experience in mining and over 25 years in land management. The objective of the program is to reinstate the pre-mining land capability of grazing land, with stable landforms, compatible with the surrounding landscape, and allow for a range of possible post-mining land-uses. **Figure 3** shows the approved post mining landform.

The key elements of the rehabilitation program have and will continue to include:

- Setting overall rehabilitation aims and objectives;
- Developing appropriate rehabilitation performance indicators and completion criteria;
- Implementing in a timely manner the land rehabilitation program;
- Developing, reviewing and implementing a rehabilitation assessment program;
- Integration of the rehabilitation program into the Mine Environmental Management System (EMS) and Environmental Management Plans (EMP). The EMS and EMP provide a framework for environmental standards and procedures that are followed during construction, operation and decommissioning of its mining operations;
- Conducting a number of audits and inspections throughout the year, including regular internal EMS and compliance audits and other less routine audits. Site based environmental personnel also conduct regular inspections of all work areas. These assessments are reported in the site Annual Review (AR) which compiles monitoring results and discusses trends, system changes and responses to any potential issues identified during monitoring. Targets and future initiatives are also identified;
- Environmental monitoring and reporting are disseminated via the Rix's Coal Mine Community Consultative Committee (CCC), engagement with regulators and the company website – www.bloomcoll.com.au; and
- A request for rehabilitation sign-off to regulators, supported by results of the monitoring and reporting initiative above.



Source: Appendix 7 SSD 6300

Figure 3
Conceptual Approved Final Landform

2.2 Lessons Learnt

Table 5 provides a summary of all existing baseline aspects as they relate to mine closure and how the knowledge, skills and lessons learnt from these practices have been incorporated into the rehabilitation and mine closure planning and day to day practices for the site.

Current trials underway are the Grazing Land Monitoring Trial at Rix's Creek Mine and an ACARP trial conducted at Rix's Creek Mine on how to economically protect high erodible spoil materials in rehabilitation. Both projects will have key outcomes and learnings that will enhance site knowledge and improve rehabilitation and final land use outcomes.

Table 5
Lessons Learnt from Past Practices

Outcome	Lesson Learnt
University of Newcastle Masters Thesis by CP Phillips "Utilisation of Sewage Sludge for Mine Site Rehabilitation – The Rix's Creek Mine Trial – 1992-1993"	
16 plots which received an application of biosolids produced dry biomass yields at least 125% higher than that of the standard plot. The particular significance of this result is that plots of pure overburden that were amended by an application of biosolids were able to sustain high biomass yields.	The most important conclusion of the trial was that biosolids application improved mine site rehabilitation techniques. No problems were encountered with the integration of biosolids into a normal rehabilitation program.
2005 Rix's Creek Beneficial use of Biosolids Trial collaboration with Thiess Services Pty Ltd and Sydney Water Corporation.	
A dewatered biosolids added nutrients and organic matters to topsoil and top soil substitutes which saved cost of using artificial fertilisers. Biosolids were incorporated into the subsoil clay material layer and topsoil layer during the rehabilitation process. Biosolids application rates of 50dt/ha (180mm thick) commensurate with current practice at State Forest NSW.	The application of biosolids improved mine site rehabilitation.
Resources Recovery Management – Rix's Creek Pasture Assessment Trial September 2014 – October 2017	
The purpose of this trial was to assess the quality and quantity of pasture produced on mine rehabilitation sites and determines the suitability of the site for the intended agricultural end use. Improved pasture was sown on four treatments, which included a Control using conventional fertiliser, Biosolids, and two Alternate Waste Treatment (AWT) Compost treatments. An un-grazed Native Pasture area was also sampled to gather comparable baseline data. Random quadrats were assessed along transect lines in each treatment for species diversity, herbage mass and forage quality. Data was collected annually for 4 years, commencing 12 months after sowing. The application of organic soil amendments increased pasture productivity and the dominance of the tall	Due to variation within treatments, the impacts on the soils were difficult to identify. However, the application of Biosolids and AWT Compost did significantly increase soil phosphate, with the AWT Compost 2 treatment demonstrating excessive soil phosphate levels. Soil nitrate levels were also higher in the Biosolids Treatment. In summary, all four treatments demonstrated that the sowing improved pasture species on rehabilitation sites was capable of producing more productive pastures than undisturbed native and naturalised pastures on land of equivalent class and soil type.

Outcome	Lesson Learnt
subtropical grasses (i.e. Rhodes and Panic), compared to the Control. This increased dominance of the Rhodes and Green Panic also reduced pasture diversity, with the Control plot demonstrating the highest diversity of pasture species. Grazing is likely to complement the long term objectives of improving pasture species diversity and forage quality. Weeds were suppressed on all treatments by subtropical grasses, but remained substantially higher in the Control. The weed content appeared inversely proportional to nutrient inputs and the productivity/dominance of subtropical grasses. The most profound effect was the affinity of Green Panic for the Biosolids, which dominated the sward, but was nearly absent in the Compost Treatments. The Biosolids treatment also recorded significantly higher pasture mass, leaf mass, forage quality and potential stocking rates. The reason for this result is not entirely clear, but is partly attributed to the higher nitrogen availability in the biosolids.	
University of Newcastle Masters Thesis by Benedicte Lutken "The utilisation of biosolids to store carbon in mine soils" Rix's Creek Mine Study June 2018.	
This study sampled and analysed soil from two former mine soils along with soil from a ref the carbon sequestration and improve general soil health. The site rehabilitated in 1992 showed significant improvements over the site rehabilitated in 2013 in healthier pH and decreased bulk density, greater amount of humic acid which indicates increased humic matter, increased carbon content (%), nitrogen content (%) and sulfur content (%). The field experiments furthermore revealed increased soil temperature and increased CO_2-flux in the site rehabilitated in 1992.	With the results of this study, it is concluded that biosolids amendments can improve soil heath and increase carbon sequestration in former mine soils.
2017 Independent Rehabilitation Monitoring	
Ground Cover - Ground cover protection was generally excellent and the benchmark of 70% cover was met at 33 of the 35 rehabilitation monitoring sites, with 27 sites achieving >90% ground cover. Of the two monitoring sites not meeting the benchmark in 2017, one consisted of young rehabilitation (i.e. still in the vegetation establishment phase) while the other showed deficiencies in the soil/growing media which likely hindered the successful establishment of vegetation. *Land Scape Function* - Consistent with previous monitoring years, the 2017 results highlighted good landscape function performance across most of the rehabilitation monitoring sites, as follows: The soil stability benchmark was met at 34 of the 35 monitoring sites; The soil infiltration benchmark was met at 33 of the 35	This report identified weed incursion as the main issue currently impeding rehabilitation performance across the site, particularly with widespread occurrence and locally severe infestations of Galenia (*Galenia pubescens*), and more localised incursions of Prickly Pear (*Opuntia spp.*), Coolatai grass (*Hyparrhenia hirta*) and *Acacia saligna*. In total, 12 of the 35 monitoring sites supported weed infestation levels exceeding the target benchmark of 15% weed cover and will require control works to be implemented. However and assuming successful management and control of the site's weed population, the monitoring results obtained in 2017 showed that rehabilitation condition was very satisfactory across the site and, when compared to previous

Outcome	Lesson Learnt
monitoring sites; and The soil nutrient cycling benchmark was met at 32 of the 35 monitoring sites. *Pasture Performance* - Sampling and analysis of grass foliage was undertaken at a subset of monitoring sites across RCS to determine feed quality and enable calculations of indicative carrying capacities. These indicated that in their current condition, the rehabilitated pastures could support satisfactory dry stock stocking rates of between ~1.9 and 8.1 animals per hectare.	years monitoring results, generally trajecting towards achieving the ultimate rehabilitation objective of re-establishing safe and stable landforms compatible with the surrounding landscape and with a land capability suitable for grazing (i.e. class IV-V).
ACARP project C200015 Forestry Trial **"Sustainable Management of Plantations for Rehabilitation, Carbon and Wood" NSW Department of Primary Industries October 2017.**	
Following open cut coal mining operations there is a requirement for overburden to be rehabilitated. The typical land use following rehabilitation in the Upper Hunter is usually extensive grazing of pastures by livestock (namely cattle). However, in response to a request from the Upper Hunter Commercial Forests Steering Committee and the Muswellbrook Shire Council, a series of plantation forest trials were established in the late 1990s and early 2000s to investigate the potential commercial viability of growing plantation forests as an alternative to pastures post-mining. Following on from an earlier establishment trial (C10043), the focus of this research project was on the ongoing management of the dryland plantations with the objective of quantifying the benefits of an early non-commercial thinning and pruning regime. This project aims to: • Gather a Valley wide data base on most of the oldest tree plantations; • Apply thinning and pruning regimes to assess the benefit of early application in dryland plantations; • Manage existing stands via thinning to reduce risk of death and to maximise high value wood products and carbon returns; • Provide strongly-based full rotation projections (from year 15 data) on performance of species, land type and the species/land type interaction; and • Quantify the commercial costs and returns from carbon and timber from Corymbia maculate (Spotted gum) plantations established in the Upper Hunter Coalfields; and	Of the species trialled in this project, the best all round performer is *Corymbia maculata*. While it has grown well on Buffer sites, an interesting finding has been that most stands of C. maculata have performed as well or better on the Overburden as exemplified by comparative results from the un-thinned Bulga site. While in general thinning has not yet led to an increase in overall stand volume, at the majority of sites it has resulted in an increase in the mean dominant Diameter of Breast Height (DBH) and mean dominant height of trees. Visual assessments indicate that thinning is likely to result in stands of better form, potentially resulting in the growth of higher value timber products.

Outcome	Lesson Learnt
Compare investment in plantation Forestry with Grazing and Agroforestry options.	
Penny Dunstan Thesis at RCM	
Through art work, connections are enacted and a storied sense of place is drawn from the rocks, trees and grasses. History becomes, marked by the marks of artist/land interdependence and art participates in the co-constitution of place. Wayfinding enmeshes art-making and the walker; lines emerge from satellites, from graphite sticks, from kangaroo tracks, from words, connecting ancient pasts with modern futures; every footfall marking an honouring of new places emerging. In this context, the place of art is to transmute tracks into images and interactions into writings, creating an interactive way of knowing our shadowlands and making our minescapes matter. This exegesis and the artwork it describes propose a way of relating to land, of making minescapes matter. It involves reconsidering the world view where humans are outside of nature, where there is a disconnect between earth-others and humans, that allows us to turn away from areas and to illuminate the shadowlands of our modern lifestyles. It proposes an understanding that we are all part of the interactions with non-human others, and that caring about, and being accountable for, our environmental shadowlands constitute an important ethical stance. In combination with a discussion between earth science, environmental history and human geography, this research produced art works that contribute to the discourse surrounding ways of relating to terraformed environments. Informed through the use of a relational model of understanding the place of humans in the world, this research produces an empowering view of the possibility of bringing post-mining land back into the relationship with people.	This research contributes to a conversation between art and the mining industry, where each informs the other promoting discussion about legacy issues and the multiple possibilities of final landforms.

2.3 Existing Land Use

The EIS states that the Hunter is home to a significant viticulture and equine industry. Along with coal mining these industries provide the greatest contribution to the regional economy. The 'Upper Hunter Strategic Regional Land Use Plan, Upper Hunter' (DPI, 2012) (SRLUP) identifies land and resources that are important to each of these industries. There are no equine critical industry clusters within or adjoining the Project area, nor is RCS mapped either as Biophysical Strategic Agricultural (BSAL) Land or as supporting any critical industry cluster. This was confirmed with further assessment to confirm that RCS does not contain any land which could be mapped as BSAL under the SRLUP.

RCS is located in an area with a long history of coal mining activities and is immediately abutted by RCN to the north-east. Existing mining also exists to the west across the Hunter River; and north across

Bowmans Creek. Agricultural cropping is prevalent immediately along the Hunter River and Bowmans Creek. Between the Hunter River and RCS are grazing properties and a north-south running woodland. The majority of these areas are zoned RU1: Primary Production under the *Singleton Local Environment Plan 2013* (LEP).

To the east of RCS across the New England Highway is an existing rehabilitated mining area on Bloomfield owned land, with grazing and lifestyle properties located further east across the Main Northern Railway Line.

Across rehabilitation mined lands and further Bloomfield owned land, the Maison Dieu Industrial area is located to the south-east of RCS. Lifestyle and grazing properties, generally zoned RU1: Primary Production are located immediately south, over 3 km from active mining at RCS.

2.4 NSW and Local Policies and Plans

2.4.1 Upper Hunter Reginal Plan

The 'Hunter Regional Plan 2036' (DPIE, 2016) (HR Plan) is a 20-year blueprint for the future of the Hunter. It is a region-wide plan that incorporates an expansive area and includes a large area including Newcastle, suburban and regional areas.

The following provides sections relevant to the Upper Hunter mining industry and confirms how this Rehabilitation Strategy is consistent.

Goal 1 is to become the leading regional economy. *"The Upper Hunter will undergo a transition in the context of a changing industry environment, particularly in mining and power generation, and emerging trends in agribusiness."*

Direction 5 includes to "Transform the productivity of the Upper Hunter" includes "The Upper Hunter is recognised as a major supplier of coal, energy, wine and thoroughbred horses to national and global markets. These industries have driven investment in transport and energy infrastructure… and will continue to underpin the growth and diversification of the Hunter's economy and employment base."

> Bloomfield will continue to contribute to the growth of transport and energy infrastructure and continue to underpin the employment base with coal mined at RCS.

"Protecting the Upper Hunter's landscape and leveraging its established agricultural industries will help to increase its appeal as a tourist destination."

> Bloomfield's rehabilitation strategy to reinstate a comparable pre-mining land capability suited to grazing land, with stable landforms are entirely consistent with providing a final land use suitable for the continuation of agricultural industries.

Direction 11 states an action to " Review the Synoptic Plan: Integrated landscapes for coal mine rehabilitation in the Hunter Valley (1999) in conjunction with the development of the Upper Hunter Strategic Biodiversity Assessment to ensure best practice rehabilitation and visual impact management for closed mines."

> Bloomfield supports this initiative and looks forward to implementing any updated Synoptic Plan which is commensurate with the conditions of SSD6300.

Direction 13 describes planning for greater land use compatibility and includes an action to "Provide non-statutory guidance on the types of land uses that would be considered most appropriate, suitable

or sympathetic to existing land uses in the Upper Hunter and other areas where land use conflicts occur."

> Bloomfield's proposed rehabilitation strategy to reinstate a comparable pre-mining land capability suited to grazing land, along with the RU1 land zoning provides a platform for future grazing or any industries permissible with consent within RU1 after mining ceases after 2040.

2.4.2 SSC Local Strategic Planning Statement

The 'Singleton Council Local Strategic Planning Statement 2041' (SSC, 2020) (SSC Plan) is a "high-level strategic document … establishes the 20 year vision for how the Singleton LGA will be in the future in terms of its land uses, activities, land forms and built forms." It further "… helps implement directions and actions from the Hunter Regional Plan at the local level …" and is a "… mechanism for showing the region how the Singleton LGA will continue to establish itself in the region".

The following provides sections relevant to the RCS and confirms how this Rehabilitation Strategy is consistent.

It describes the opportunities for growth and innovation including:

"Delivery of leading practice outcomes for post-mined land, which would involve collaborative pre-planning and investigation."

> SSC has been consulted and comments addressed in the preparation for this Rehabilitation Strategy.

The local profile states:

"By far, the largest employer in the Singleton LGA is the mining industry, which employs people from across the Hunter region as well as outside of the region.

In order to minimise impacts on employment rates from downturns in the mining industry; as well as to plan for the eventual winding down of coal mining activities in the LGA, steps need to be taken during the life of this plan to grow other industries in the LGA, so as to better balance the local industry base.

Consideration will also need to be given to the skills base left from mining sector and the importance of the Singleton LGA for providing employment regionally."

> Bloomfield has developed a Social Impact Management Plan (SIMP) in accordance with condition B76 of SSD6300 which addresses these issues.

The Strategic Vision includes;

"Underpinning Singleton's appointment as a leader in sustainable post-mining transition, has been its focus on diverse post-mining development outcomes, protection and enhancement of agricultural productivity, growth of professional support services, and the efficient and effective re-use of rehabilitated mining land."

> Bloomfield's proposed rehabilitation strategy to reinstate a comparable pre-mining land capability suited to grazing land, along with the RU1 land zoning provides a platform for future grazing or any industries permissible with consent within RU1 after mining ceases after 2040.

Figure 4 illustrates the 'Structure Plan' .

> No features directly lie above RCS on its immediate vicinity. The major inter-regional road of the New England Highway is immediately east however will not be directly impacted by RCS.

Action 1.1.2 requires SSC "For housing close to operating mines, rail infrastructure and major industry areas, complete a review of the extent of affectation by adverse environmental impacts and identify any opportunities to avoid or minimise such impacts."

Impacts and appropriate mitigation are defined in SSD6300 to assist SSC.

Action 1.1.3 requires SSC to "Through planning controls, apply impact buffer areas around urban settlement and growth areas for the purposes of restricting the encroachment of industry into such areas and associated impacts on settlement areas, including air quality, noise and vibration."

Impacts and appropriate mitigation are defined in SSD6300 to assist SSC.

Action 2.1.4 requires that SSC "In consideration of the visual amenity impacts associated with land use, complete a land use suitability analysis of land along the major road approaches to Singleton and the surrounding villages."

Impacts and appropriate mitigation are described in the EIS and SSD6300 to assist SSC.

Planning Priority 3.4 describes land rehabilitation outcomes to meet the needs fo current and future generations. It states " In addition to being safe and stable, the community has told us that they would like to see rehabilitated mining land used for productive and beneficial purposes. … There is a need for there to be long-term strategies for post-mined land, which have sufficient flexibility to respond to changing community expectations and deliver land use planning outcomes that are consistent with the broader land use objectives for the Singleton LGA. This may include giving consideration to use of rehabilitated land for higher economic purposes, where it is deemed safe and appropriate to do so and where it is beneficial from a land use planning perspective in consideration potential alternative locations for the use." The Strategic Policy Position states:

- Alternative options to returning post-mined land to its pre-mined state should only be considered where comprehensive, detailed and defensible study information demonstrates that the alternative option is appropriate in light of environmental impacts, contextual considerations and relevant Council plans.
- Where they are not intended to be activated, the relinquishment and surrender of mining explorations permits, mineral development licenses and mining leases will be encouraged.

Bloomfield's proposed rehabilitation strategy to reinstate a comparable pre-mining land capability suited to grazing land, along with the RU1 land zoning provides a platform for future grazing or any industries permissible with consent within RU1 after mining ceases after 2040.

Action 4.4 .1 requires SSC to "In consultation with government agencies, develop and apply, through appropriate mechanisms, buffer areas around urban settlement and growth areas, establishing limits on how close extractive industries can encroach upon such areas, so as to minimise the potential for land use conflict and maintain balance between the respective land uses."

Impacts and appropriate mitigation are defined in SSD6300 to assist SSC.

Figure 16 shows the proposed concept urban buffers map. None encroach with RCS.

2.5 Rehabilitation Goals

The following rehabilitation goals underpin this Rehabilitation Strategy:

- Land will be rehabilitated in accordance with relevant requirements of the Department of Regional NSW- Resources Regulator, standards applicable at the time of rehabilitation;
- Rehabilitated land will represent a minimal source of offsite environmental impacts, such as dust emissions, water pollution, impact on visual amenity and weed spread;
- Rehabilitated land will require ongoing management inputs no greater than similar adjacent land;
- A viable drainage network will be reinstated on the site which is hydrologically stable and incorporates erosion controls and sediment collection dams which isolate effectively the rehabilitated area from adjoining area;
- Successful design and rehabilitation of landforms will be carried out to ensure structural stability, revegetation success and containment of wastes; and
- Post-mining land use will be compatible with surrounding land uses and provide optimal environmental, economic and community benefits.

Bloomfield will provide rehabilitated land that meets the objectives detailed in **Table 4**.

3 Stakeholder Consultation

Community engagement and consultation has been ongoing during the development of the land management and rehabilitation program at the Mine. This engagement has included:

- Provision of a community information phone line;
- Maintenance of a website providing up to date information on the operation; www.bloomcoll.com.au ;
- Company Newsletters to Bloomfield employees;
- Newsletters to local businesses and residents;
- Site inspections and open days; and
- Six monthly Community Consultative Committee (CCC) meetings with the committee (as at 2020) consisting of up to seven community representatives, an independent chair and a representative from Singleton Council. Other Government representatives are also invited to participate on the committee. Resources Regulator and NSW Planning, Industry and Environment (DPIE) officers have an open invitation to all meetings. The CCC provides a direct forum for the community to address environmental and operational concerns with site management and regulatory authorities.

3.1 Department of Planning Industry and Environment

Condition B72(c) of SSD 6300 requires Bloomfield to submit the Rehabilitation Strategy to the Secretary of DPIE (Planning Secretary) for approval within six months of commencing development. Development commenced on 24 February 2020.

This Rehabilitation Strategy was required to be prepared by a qualified and experienced person whose appointment has been endorsed by the Planning Secretary. (Sc,2 Cond B72 (a). A copy of this endorsement is included in Appendix B.

This Rehabilitation Strategy includes other regulatory correspondence and consultation as described in **Section** Error! Reference source not found. **and 3.3.** The final Rehabilitation Strategy was submitted to DPIE for approval on 21 August 2020.

A copy of regulatory correspondence is provided in **Appendix B**.

3.2 NSW Resources Regulator

The draft Rehabilitation Strategy was provided to the Resources Regulator on 17 June 2020 for consultation and comment. In the response dated 7 August 2020, the Resources Regulator noted that the intent of the Rehabilitation Strategy is to provide a strategic direction for detail which should be included in the MOP.

A copy of the response from the Resources Regulator is included in **Appendix B.** Table B2 lists the Resource Regulators' issues and where each has been addressed in this Rehabilitation Strategy.

3.3 Singleton Council

The draft Rehabilitation Strategy was provided to Singleton Shire Council (SSC) on 17 June 2020 for consultation and comment. In the response dated 13 August 2020, SSC provided a detailed response requesting additional clarification and detail in relation to performance criteria, mine closure and final void, social and economic impacts, and review process.

A copy of the emails requesting comments of the plan is included as evidence in **Appendix B**. Table B1 lists SSC's issues and where each has been addressed in this Rehabilitation Strategy.

3.4 Mining Operations Plan

This Rehabilitation Strategy is the overarching document which provides general strategic direction for rehabilitation at RCS. The MOP provides additional, specific detail in relation to rehabilitation over the entire Rix's Creek Mine which includes RCS and RCN. Therefore, where there are any contradictions between this Rehabilitation Strategy and the MOP, the MOP will take precedence.

This Rehabilitation Strategy is a requirement of SSD 6300 for Rix's Creek South while the Mining Operations Plan details rehabilitation requirements and the relationship between rehabilitation outcomes for both Rix's Creek South and Rix's Creek North.

Consultation specifically regarding the development of the MOP in accordance with SSD 6300 Sch 2 Condition B74 will be undertaken with:

- NSW DPIE;
- Department of Regional NSW- Mining, Exploration and Geoscience (MEG) (previously DRG) ;
- NSW DPIE – Water;
- NSW DPIE- Biodiversity Conservation Division; and
- SSC.

3.5 Stakeholder Engagement Strategy

Moving forward, and in keeping with industry best practice, the compass of stakeholder engagement will be expanded to address the stakeholder expectations in terms of mine rehabilitation and closure. The scope of the engagement will include all aspects of the engagement spectrum generally in accordance with the *Quality Assurance Standard for Community and Stakeholder Engagement* (International Assocation for Public Participation - Australasia, May 2015).

The categories of public participation goals in this Standard range from low to high influence on outcomes: inform, consult, involve, collaborate or empower. This approach recognises that the stakeholders are being/will be affected by a mine rehabilitation and closure process or outcome, as well as optimising how they may affect the mine rehabilitation and closure process and outcome.

Future engagement will be based on these principles and will include:

- inform - as per newsletters and community information line;
- consult - as per the CCC which is a direct forum for community representatives and clarification of the role of external stakeholders;

- involve - increased recognition that the process of stakeholder engagement needs to be based on two way communication as per information days and survey of employees followed by feedback and discussion forums;
- collaborate - identifying current, potential and future stakeholders via;
  - identifying opportunities for improved management and innovation via the Upper Hunter Mining Dialogue (UHMD);
  - optimising communication in context of "next land use" as the focus of the mine rehabilitation and closure process (e.g. active participation with SSC during updates of the Local Environment Plan); and
  - continued engagement throughout the life of the Mine with neighbouring mining operations (e.g. optimising synergies related to the mine rehabilitation and closure process between neighbouring mines and across mining tenures);
- empower - maintaining a register of stakeholder feedback, so that input can be tracked over time and the company responses are able to be accessed;
- Increased recognition that the mine rehabilitation and closure process aims to minimise any significant and ongoing impacts to the broader environment or socio-economic dynamics (e.g. participation in careers days at local schools, sourcing of apprentices from the local region).

Consultation specific to this rehabilitation Strategy will occur generally in accordance with the above principles and include at least the CCC, relevant near , and regulators as described in **Section 3** prior to each review of this Rehabilitation Strategy as described in **Section 8.4**.

It will also inform any required review to the Risk Assessment and final void assessments described at **Section 4.2** and **5.8**, respectively.

The SIMP as required in accordance with condition B76 of SSD 6300 also provides detail on stakeholder engagement relevant to this Rehabilitation Strategy. For inclusion in the RCS approvals documents, a range of community consultation and data reviews was conducted to identify perceived local social risks and opportunities from the Project. Section 4.1 describes local risks and opportunities identified by stakeholders including the following relevant to rehabilitation and mine closure:

- Rezoning of land to the north of Singleton to residential land and the amenity impacts the Project may have on this land;
- Final landuse, including possible geotechnical issues impacting the New England Highway;
- Clarification on final void options; and
- Need to develop a more diversified and resilient economy.

Section 5.2 of the SIMP describes regional impacts and opportunities and includes land use conflict and lack of economic diversity. Section 5.3 states that the cessation of mining at RCS after 2040 has the potential to materially affect:

- The local population where people leave to seek other employment;
- Demand for housing where employees leave or other people move to the LGA as a result of future long-term use of the site after mining; and
- Demand for social infrastructure and local business trade where there is a change in the population or demand for consumable goods and services.

In the case of RCS, the presence of other existing and potential mining operations and social trends over the life of the mine are likely to influence the social impacts of the closure of RCS. RCS is at the

start of its 21 year mine life and as a result, plans and strategies to manage social impacts during mine closure are at an early stage. Bloomfield will undertake targeted community consultation on specific closure planning to inform the update of the SIMP.

A Stakeholder Engagement Plan is summarised in Section 7 of the SIMP and describes proposed engagement with Council, CCC, personnel and contractors, near neighbours and tenants, and the wider community.

4 Risk Assessment

4.1 Environmental Risk

An integral component of resource management is the management of environmental risks. The components of an activity are assessed relative to the risk they pose. The most critical component of this section is the implementation of mitigation measures to reduce risks to acceptable levels. The methodology used for the risk assessment was generally in accordance with Rix's Creek Mine Risk Management Standard, which follows the general principles outlined in *ISO 31000:2009 Risk Management – Principles and Guidelines* (Standards Australia). The method used for the risk assessment encompassed the following key steps:

1) Establish the context for the risk assessment process;
2) Identify risks and potential impact;
3) Analyse risks;
4) Evaluate risks to determine the necessary controls for mitigation; and
5) Re-assess the risk post identification of additional controls.

The key risks associated with Rix's Creek operations have been assessed using the Risk Rating Matrix provided in **Table 6**. The key identified risks and associated risk ratings for Rix's Creek mining and rehabilitation activities are provided in **Appendix C**.

Table 6
Risk Rating Matrix

Consequence (most likely outcome of the event)		Likelihood (of the event occurring)				
		A Certain	B Probable	C Possible	D Remote	E Improbable
Rating	**Incident outcome / Potential outcome**	**Will occur**	**Likely to occur**	**Could occur**	**Unlikely to occur**	**Practically impossible**
1. Catastrophic	Multiple fatalities, toxic release with ongoing detrimental effects, huge financial loss	1 (H)	3 (H)	5 (H)	7 (H)	11 (M)
2. Major	Fatality/extensive injury, off-site release with no ongoing detrimental effects, major financial loss	2 (H)	4 (H)	8 (H)	12 (M)	16 (M)
3. Moderate	Medical treatment injury, on-site release contained with outside assistance, high financial loss	6 (H)	9 (M)	13 (M)	17 (M)	20 (L)
4. Minor	First aid injury, on-site release contained with on-site resources, medium financial loss	10 (M)	14 (M)	18 (L)	21 (L)	23 (L)

Consequence (most likely outcome of the event)		Likelihood (of the event occurring)				
		A Certain	B Probable	C Possible	D Remote	E Improbable
5. Insignificant	No injury treatment, insignificant environmental impact, low financial loss	15 (M)	19 (L)	22 (L)	24 (L)	25 (L)

4.2 Closure risk assessment

A comprehensive closure risk assessment will be undertaken during the process of updating future MOPs and management plans. The current environmental risk assessment from the current MOP is contained within **Appendix C**. Consideration has been given to premature closure and has considered and recorded:

- Identified risks/hazards and opportunity events, causes and potential consequence/impact;
- Current preventative and/or mitigative controls/management strategies;
- Whether the item identified is a risk or opportunity;
- Effectiveness or adequacy of existing controls;
- Consequence category (i.e. Health and Safety, Environment, Financial, Reputation, Legal);
- Probable consequence with current control measures in place and potential maximum consequence;
- The likelihood of the event occurring with that consequence, considering existing controls and their effectiveness; and
- Any additional controls/actions to be included in a forward works plan.

Potential issues and opportunities considered during the premature closure risk assessments include a range of key aspects. A summary of the relevant topics considered include:

- Erosion and surface water management;
- Safety and health;
- Legal and compliance requirements e.g. National Greenhouse and Energy Reporting;
- Water management (surface and ground);
- Contaminated land;
- Waste management;
- Gas drainage;
- Geology, geochemistry and geotechnical;
- Rehabilitation – landform design and earthworks;
- Effect on visual amenity;
- Rehabilitation – revegetation and biodiversity re-establishment;

- Concerns relating to future site use and management;
- Optimising future site usage including potential for recreational and community access;
- Engaging with businesses to assess investment and employment opportunities through the utilisation of the infrastructure
- Monitoring;
- Infrastructure and fixed plant;
- Mobile equipment;
- Changes in traffic movement on the New England Highway;
- Human resources;
- External relations;
- Cultural and historical heritage including opportunities to record the history of mining across the site;
- Closure costs;
- Tenure and land ownership;
- Decrease in Bloomfield'ss social investment expenditure;
- Joint Venture and commercial; and
- Interface with surrounding operations.

This risk assessment will be reconsidered as part of the feedback form the engagement activities in **Section 3.5**, if required.

4.3 Environmental risk management

Further details on the management of the identified environmental risks are provided in the current MOP. This information is updated based upon:

- Feedback received from stakeholders during events such as CCC meetings, open days and staff surveys and toolbox talks;
- Reviews to the Environmental Management System (EMS) which establishes environmental standards and procedures that are followed during construction, operation and decommissioning of its mining operations;
- Amendments to the Environmental Management Plans and site based procedures which underpin the day to day management of RCS activities;
- Site audits and inspections; and
- Environmental reporting – further details are provided in **Section 8.3**.

4.4 Updating the MOP

Changes to mine development and operational planning and environmental conditions are reported via the MOP, rather than the Rehabilitation Strategy. The reason being is that the current MOP provides a

platform for a prescriptive approach to landform and landscape design and an approach that facilitates the ability to incorporate change in context of the land use component of mine closure. In doing so opportunities are provided for optimising post mine land use in context of the environmental, social and economic perspective.

4.5 Social and economic impact

A key component to be considered in the mine rehabilitation and closure process is that of the social and economic impact to the local and wider community and other identified stakeholders. Building on the information pertaining to social and economic impact which was collated during the EA process, the stakeholder engagement processes will be used as a platform to assess, review and monitor the proposed impact of the rehabilitation and mine closure processes during the life of and post the operation of the mine.

A SIMP has been prepared in accordance with condition B76 of SSD6300 which provides detail on the social and economic impacts and opportunities relevant to RCS. Further detail on proposed closure activities as described in the draft SIMP are included at **Section 3.5**.

5 Proposed Future Use of Disturbed Areas

The aim of rehabilitation at the Mine is to reinstate the pre-mining land capability of grazing land, with stable landforms, compatible with the surrounding landscape, and allow for a range of possible post-mining land-uses.

Rehabilitation outcomes are identified and response to potential adverse outcomes are defined in the Trigger Action Response Plan (TARP) appended to the MOP. These were defined from a risk-based approach considering potential consequences and mitigation measures. Section 4.1 of the MOP summarises rehabilitation outcomes at RCM and generally include meeting requirements of existing development consent and mining tenement requirements.

The TARP is included at Section 9.2 of the MOP. The MOP should be consulted for additional detail, however the following provides a summary of key elements and 'green' conditions (i.e. where no response is required and criteria performance indicator met):

- Landform stability – slopes generally < 10 degrees, no signs of movement, no tunnel erosion, drainage in accordance with design criteria in MOP;
- Water quality – runoff from rehabilitation within EPL criteria and rehabilitation performance criteria within MOP;
- Spontaneous combustion – no evidence in rehabilitation aeras;
- Spoil/soil quality – Properties are not limiting plant establishment;
- Topsoil availability – sufficient volumes identified for rehabilitation over life of mine;
- Vegetation – vegetation groundcover developing diversity and density consistent with final criteria, weed presence within range in analogue sites and does not present a risk to rehabilitation, regional declare non drought as per DPI indicator, trees over pasture vegetation on trajectory developing adequate groundcover of tree and shrub species, pasture vegetation on timely trajectory developing grass and legumes consistent with final criteria;
- Biodiversity – monitoring indicates corridors successfully established and consistent with community required for fauna movement;
- Bushfire – fuel load assessed and managed in accordance with Bushfire Management Plan;
- Tailings – capped areas constructed in accordance with design, free draining with no ponding; and
- Groundwater – water balance and monitoring indicate void water balance correct.

To assist in defining the lands encompassed in the Mine Operations Plan and this Rehabilitation Strategy, the site has been divided into a range of differing domains based on final land use as described in the MOP. In accordance with the NSW Trade & Investment Environment Sustainability Unit -Mineral Resources – *ESG3 Mining Operations Plan Guidelines* (NSW Trade & Investment Environment Sustainability Unit - Mineral Resources, March 2013) the primary domains have been defined on the premise of land management units within the Mine site, usually with unique operational and functional purpose and therefore similar geophysical characteristics. Secondary domains are defined as land management units characterised by a similar post mining land use objective.

The primary and secondary domains are shown in **Table 7**.

Table 7
Primary and Secondary Domains

Primary Domains	Secondary Domains
Unmined land	Unmined land
Infrastructure Area	Infrastructure Area
Heritage Area	Heritage Area
Water Management Area	Water Management Area
Tailings Emplacement Area	Rehabilitated Lands – Pasture
Overburden Emplacement Area	Rehabilitated Lands – Trees over Grass
Rehabilitated Lands – Pasture	Final Void
Rehabilitated Lands – Tree over Grass	
Final Void	
Active Mining Area	

Further information on these domains and the key issues that pertain to their management is provided in the following sections. A pictorial representation of the final landform and land use is provided on **Figure 3**, recognising that the location of the Domains is subject to variation and may change in accordance with the life of the mine, as reflected in the MOP.

5.1 Active Mining Area

Active Mining Areas comprise areas where active mining activities will occur during the life of the approved mining operations. These activities include highwalls, lowwalls, active voids, spoils and ramps. This domain generally cannot be progressively rehabilitated as they are required up to the end of production for accessing coal and related infrastructure services.

Rehabilitation and closure of these areas will provide a final landform which leaves large areas rehabilitated to grassland and trees over grass and water bodies in final voids. As the majority of these areas are zoned RU1 under the LEP, upon the grant of further development consent these areas may be developed to ensure a sustainable future following the cessation of coal mining and agricultural activities (without development consent). Permissible activities with consent are listed at **Section 6**.

5.2 Heritage Area

The Heritage Area comprises the Rix's Creek Coke Ovens and associated works, which are heritage-listed items. Also considered is the Heritage value of the Granbalang Trigonometric Station. The Coke Oven and associated area is fenced, maintained and conserved in accordance with the *Rix's Creek Colliery Coke Ovens Conservation Plan* (CMP) (Rixs Creek Mine, 2007).

In accordance with Condition B59 Bloomfield has developed a Historic Heritage Management Plan (HHMP) (Hansen Bailey and Ozark, 2020) in consultation with relevant regulators. The HHMP describes how historic heritage values at RCS would be managed, with specific detail for the Coke

ovens in a detailed appendix. A revised Coke Ovens CMP will be prepared in in accordance with commitments in the HHMP for the Coke ovens.

Mitigation measures for are detailed in Section 6 and 7 of the HHMP and describe long term protection and management measures for key heritage items including:

- Permit to disturb process which identifies any historic heritage sites within proximity of proposed activities;
- Component of site inductions and training which shall cover heritage sites;
- Management of the discovery of new historic heritage objects including skeletal remains; and
- Includes a relevant Conservation Management Plan (CMP) for the Coke Ovens including archival recording, management and public access when mining commences in North Pit; and
- Table 7 summarises all roles and responsibilities of the HHMP.

Table 6 provides detailed coke oven management measures and due dates for key management measures and are currently between 2020 and 2037.

Upon rehabilitation and closure upon cessation of mining adjacent to these areas will lead to the mitigation measures in the HHMP being developed and public access to key areas. This will ensure a sustainable future for key historic heritage items, particularly the Coke Ovens.

5.3 Infrastructure Area

All surface infrastructure, where an approved post use (subject to separate environmental impact assessment and approval) cannot be identified, will be removed from the site. The following description of the decommissioning of the infrastructure areas is provided, pending alternate post mining land use for these areas. These descriptions do not account for additional material to remediate the site being sourced from areas outside the present planned operations of the Rix's Creek mine.

It is noted that following completion of the open cut mining proposed by the Project, there will remain a coal resource within the Mine Lease area that could be accessed by underground mining techniques, primarily bord and pillar mining. Any underground mining or mining beyond the life of the Project would be subject to a separate environmental impact assessment and approval process at the time. Condition B69 of SSD 6300 requires that underground mining is subject to a development application at least five years prior to cessation of mining operations, otherwise the highwall is required to be rehabilitated.

Where carbonaceous or unsuitable materials for rehabilitation is identified on hard stand areas, infrastructure areas or haul roads it will be managed in the final stages of capping of the tailings storage facility or covered in the floor of the final void. Any crossings (i.e. culverts) will, where practical, be removed and the pre-existing drainage line reinstated. All roadside markers (tyres and guideposts) and signs are also to be removed from within the area once mine closure activities have been completed.

A light vehicle access road is to be maintained to enable inspections of the site following closure of the Mine.

The proposed and existing cut and cover tunnels under the New England highway will be partially filled, allowing post mining access under the highway for domestic livestock and opportunistic movement of native fauna.

Rehabilitation and closure of these areas will either remove key infrastructure items or with further development consent utilise infrastructure for alternative industrial/commercial uses. As the majority of

these areas are zoned RU1 under the LEP, upon the grant of further development consent these areas may be developed to ensure a sustainable future following the cessation of coal mining activities.

5.3.1 Clean Coal Stockpile

The carbonaceous material on the base of the ROM and product stockpile areas will be managed as discussed previously. Where possible, the material will be considered for reprocessing before the CHPP is decommissioned. Once this has been completed, inert spoil will be placed over the tailings storage facility impoundment to maintain a cap, with a cap also placed over the former coal stockpile and infrastructure areas.

5.3.2 Coal Handling and Preparation Plant

The entire CHPP and infrastructure area will be bulldozer trimmed to facilitate the appropriate drainage of surface runoff from the site. Appropriate surface water management structures (contour banks, drains and settlement ponds) will also be constructed, where required. The final landform will allow water to flow away from the site via drainage lines.

5.3.3 Clean Coal Reclaim Aerial Stacker and Reclaim Tunnel and Train Loader Facility

The Rix's Creek Mine rail loading facility currently includes conveyors, a surge bin, train-loading bin, access roads, sediment dams, and laydown areas. During the decommissioning phase should contaminated, carbonaceous or material unsuitable for rehabilitation be identified in the areas of the Mine rail loading facility, it will be managed as discussed previously.

5.4 Water Management Areas

This domain includes components of the network of dams, pipes, pumps and drainage lines that compose the Mine water management system that is in place to control the movement of water around the site. These include sedimentation, diversion, mine water and water supply dams but exclude the tailings emplacement areas.

Figure 3 shows the configuration and drainage catchments of the final landform.

The water management system for the site during the life of the Mine requires water to be effectively sourced, captured, diverted, stored, monitored, used and reticulated across the site. This system is based on adherence to well established, best water management practices in the Australian mining industry. These principles are:

- Efficient use of water based on the concepts of 'reduce, re-use and recycle';
- Avoiding or minimising contamination of clean water streams and catchments; and
- Protecting downstream water quality and return of water to the environment and for other beneficial uses such as agriculture.

Water run-off from the rehabilitated landform is to be directed into ephemeral channels that flow into the existing drainage pattern around the Mine. The water run-off in the channels will vary in volume depending on local weather conditions and storm activity. Temporary sediment controls such as the use of gabions, geotextiles, hay bales, sediment control fencing techniques, and other techniques used

during Mine life, may be integrated with vegetation and permanent engineering strategies to achieve stability in relevant areas.

Where appropriate, water storage dams will be incorporated into the landscape with a view to supplying watering points for cattle. These dams will be revegetated with plant species (e.g. grass species and emergent reeds) suitable to ensure stability of the dam wall and batters whilst also providing potential localised habitat for native fauna.

Temporary sediment detention features may be designed into the channels during construction periods. These features will provide protection during construction to the receiving waters in terms of water quality. To achieve rapid stabilisation, particularly in high flow scenarios, quick establishing pasture species will be used. There has been extensive use of pasture species for this purpose on both the Mine and other mines, and techniques are well developed. Reconstructed drainage lines will be revegetated with species prevalent within the existing ephemeral water course. Vegetation established during rehabilitation will ensure long term channel stability.

The drainage pattern of the final landform will be designed to integrate with the surrounding catchments and will be revegetated to achieve long term stability and erosion control and also to harmonise with more general rehabilitation and revegetation strategies. Clean water diversion banks on overburden emplacements will be retained to divert water away from fill areas. Reconstructed drainage channels will be established where required in accordance with lead practice standards at the time of construction. In terms of future use, these areas will be protected from incompatible land use activities such as over grazing which may damage their integrity by strategic fencing and management of cattle grazing pressure.

In accordance with the 'RCM Water Management Plan' (WMP) at Section 2.5, any unlicensed discharges from RCM are undertaken in accordance with conditions of water licences and any EPL discharge conditions. Section 4.1.2 states that RCM does not maintain a licensed discharge point to release excess mine water via the Hunter River Salinity Trading Scheme (HRSTS).

Rehabilitation of water bodies to integrate with the landform, or the continued use of water bodies for agricultural or other purposes (with consent) will ensure a sustainable future following the cessation of coal mining for agricultural/industrial/commercial and/or biodiversity use.

5.5 Tailings Emplacement Area

Tailings disposal throughout the life of the Project will be in the form of a thickened paste disposal method. The tailings cake contains negligible free water; it is spreadable and quite easily handled. The dewatered tailings cake is disposed separately or mixed with coarse reject and disposed of in overburden emplacements using trucks.

Pit 1 tailings emplacement (tailings emplacement #4) is the only active tailings emplacement during the life of the Project. This area will be maintained for the purpose of backup for tailings management, even though co disposal will be the preferred disposal technique. The tailings emplacement areas will be allowed to dry following last disposal prior to rehabilitation. Post drying the tailings emplacement areas will be revegetated with a species mix aligned to the surrounding plant community i.e. grassland and tree over grass.

Rehabilitation and closure of tailings areas will provide a final landform which leaves large areas rehabilitated to grassland and trees over grass and water bodies in final voids generally in accordance with the approved conceptual final landform. As the majority of these areas are zoned RU1 under the LEP, upon the grant of further development consent these areas may be developed to ensure a

sustainable future following the cessation of coal mining and facilitate agricultural activities (without development consent). Permissible activities with consent are listed at **Section 6**.

5.6 Overburden Emplacement Areas

Overburden produced from the active mining area will be placed in designated out of pit emplacement areas and/ or placed within mined out sections of the open cut to create a final landform. Spoil dumping locations will be managed to maintain flexibility and productivity of the overburden haulage fleet while giving consideration to environmental conditions. In general, the dumps will be constructed in reasonably flat layers incorporating rehabilitated edges where possible. The disturbed faces of the Overburden Emplacement Areas may be temporarily vegetated via aerial seeding of fast germinating and establishing grasses.

The aim of the overburden emplacement design is to achieve:

- Overburden emplacement capacity balanced with final landform design in order to minimise areas of disturbance and create a stable landform with visual relief where possible;
- Reduced visual impacts of the existing area adjacent to the New England Highway;
- Safety considerations included to mitigate the hazards that the site may pose to unauthorised people who access the area;
- Runoff water quality similar to undisturbed lands and not degrade receiving stream channels;
- A rehabilitated landform that will support vegetation species and composition diversity aligned to plant diversity in adjacent unmined lands;
- Land that will support its designated post-mining uses; and
- A rehabilitated landform that is compatible with the surrounding landscape.

Rehabilitation and closure of these areas will provide a final landform which leaves large areas rehabilitated to grassland and trees over grass and water bodies in final voids generally in accordance with the approved conceptual final landform. . As the majority of these areas are zoned RU1 under the LEP, upon the grant of further development consent these areas may be developed to ensure a sustainable future following the cessation of coal mining and facilitate agricultural activities (without development consent). Permissible activities with consent are listed at **Section 6**.

5.7 Rehabilitated Lands

The mined lands are to be rehabilitated back to pasture and areas of trees over grass. The proposed final landform at the Mine will be consistent with the surrounding landscape. The final adopted rehabilitation and management options for this domain will largely depend on the prevailing condition in terms of landscape and optimising landuse in terms of current social and economic constraints.

Rehabilitation and closure of these areas will provide a final landform which leaves large areas rehabilitated to grassland and trees over grass and water bodies in final voids generally in accordance with the approved conceptual final landform. . As the majority of these areas are zoned RU1 under the LEP, upon the grant of further development consent these areas may be developed to ensure a sustainable future following the cessation of coal mining and facilitate agricultural activities (without development consent). Permissible activities with consent are listed at **Section 6**.

5.7.1 BSAL Verification Assessment

The Biophysical Strategic Assessment Land (BSAL) Verification Assessment for the Mine was undertaken in April 2014 by SLR Consulting (SLR Consulting, July 2014).

The assessment area was defined as the proposed Overburden Emplacement Area totalling approximately 170 ha in area, as well as the required 100m buffer, which resulted in a total 245.4 ha for the Assessment Area. Approximately 53.5 ha were greater than 10% slope and two distinct soil types were found: Subnatric Brown Sodosol (173.9 ha), Eutrophic Brown Chromosol (71.5 ha).

The Subnatric Brown Sodosol failed the fertility criteria within the BSAL protocol and was therefore considered non BSAL. The two detailed sites within the assessment area for the Eutrophic Brown Chromosol were excluded on the basis of being greater than 10% slope and depth to physical barrier < 0.75 m. However, the areas of this soil type within the 0 to 10% slope were considered to contain a deeper profile and therefore would satisfy the 12 criteria within the Interim protocol. These areas were isolated pockets of less than 20ha and therefore cannot be considered BSAL.

It has been concluded that there is no qualifying BSAL within the Assessment Area.

5.7.2 Agricultural Impact

The Agricultural Impact Assessment (Neil Nelson Agvice Pty Ltd, July 2015) that was completed for the 170 ha of land that comprises the lease extension (Mine Lease Application 487- Now ML1803) concluded the following in relation to the current and potential impact on agricultural production:

- Grazing will be continued on the land until the out of pit dump is formed. Of the 169.8ha lease extension area, 35.1 ha will be disturbed by the project and grazing excluded, while the remaining area will not be disturbed and will remain as native pasture (allowing potential continuance of grazing);
- Grazing will recommence on the sown rehabilitated land once the pastures have shown to be stable and deemed suitable for grazing;
- The economic impact from the loss of production from grazing during the period of disturbance and rehabilitation is relatively small;
- Rehabilitation of the disturbed land will re-instate the land to the same land and soil capability class as prior to disturbance; and
- Pasture will be sown on the rehabilitated land for a post mining land use of grazing. Current research undertaken examining beef cattle production on rehabilitated pastures compared to natural pastures, indicate that equivalent or higher production is possible on the rehabilitated sown pasture.

It has been acknowledged by Bloomfield that the land and soil capability scheme criteria was not designed for post mining landforms, however the aim of rehabilitation is to re-instate the slope criteria from the LSC scheme. Bloomfield is also committed to matching target agricultural productivity with non-mined analogue sites for LSC classes 4, 5 and 6. It is noted that soil depth requirements as stated in the LSC scheme are not possible on the post mining landform.

These conclusions are supported by the current land management practices at the Mine, together with the recent studies into the sustainability and profitability of grazing on mined lands in the Upper Hunter - ACARP Project No. 53259 and the Glencore grazing trials. Land management practices are detailed in the MOP which are regularly reviewed in consultation with relevant regulators to facilitate continuous improvement.

It is acknowledged that the agricultural impacts and associated consent conditions also apply retrospectively to all areas in Coal Lease 352 and Mining Lease 1432 that have not yet undergone final landform construction.

Detail in relation to criteria to determine success and relevant adaptive management measures are detailed in the MOP.

5.7.3 Land and Soil Capability

Land capability is the physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources.

A diagrammatic representation of the project area showing the existing mining operation in context of Land Capability is provided **Figure 4**. This figure is based on the Rural Land Capability Scheme (Emery, 1986), and should not be used to compare the results of any post mining Land and soil capability assessment (Office of Environment & Heritage, 2012) of rehabilitated lands. Based on the pre mining land capability, recorded slopes, soil types and their distribution across the Mine site, an assessment of the capability of the Mine was undertaken in accordance with the Office of Environment & Heritage (OEH) guideline *The Land and Soil Capability Assessment Scheme; Second approximation* (Office of Environment & Heritage, 2012) (referred to as the Land and Soil Capability Class Guideline).

Whilst it is recognised that the growing media will in part comprise shallow soils and the presence of sodic subsoils, the Mine land management program will ensure that there are no rocky outcrops to limit agricultural production. Proactive management of erosion (wind and water) will be carried out and cropping will not be included in the program. These measures together with the use of soil ameliorants including though not limited to biosolids, will enable the land to return to post mining agricultural productivity to match Land and Soil Capability Classes comparable to unmined areas nearby, and LSC slope classes that are similar to pre mining slopes.

5.7.4 Final Landform

The proposed final landform at Rix's Creek will be consistent with the surrounding natural landscape and slope classes as shown in **Figure 4**. It will have:

- A post mining landscape which will be safe and non-polluting, with a stable drainage network;
- An area of Land and Soil Capability Class 2 lands not impacted by the operation;
- The majority of the site with slopes less than or equal to 10º (18%) (Land and Soil Capability Class 4 and 5);
- Slopes between 10-18º (18 to 33%) will fulfill Land and Soil Capability Class 6, of which 80.6ha would be land below water in the final void; and
- Areas of greater than 18° (33%) slopes will include the batters of the tunnels under the highway (Land and Soil Capability Class 7).

The measures of success, monitoring and required adaptive management in relation to achieving the final landform are detailed in the MOP.

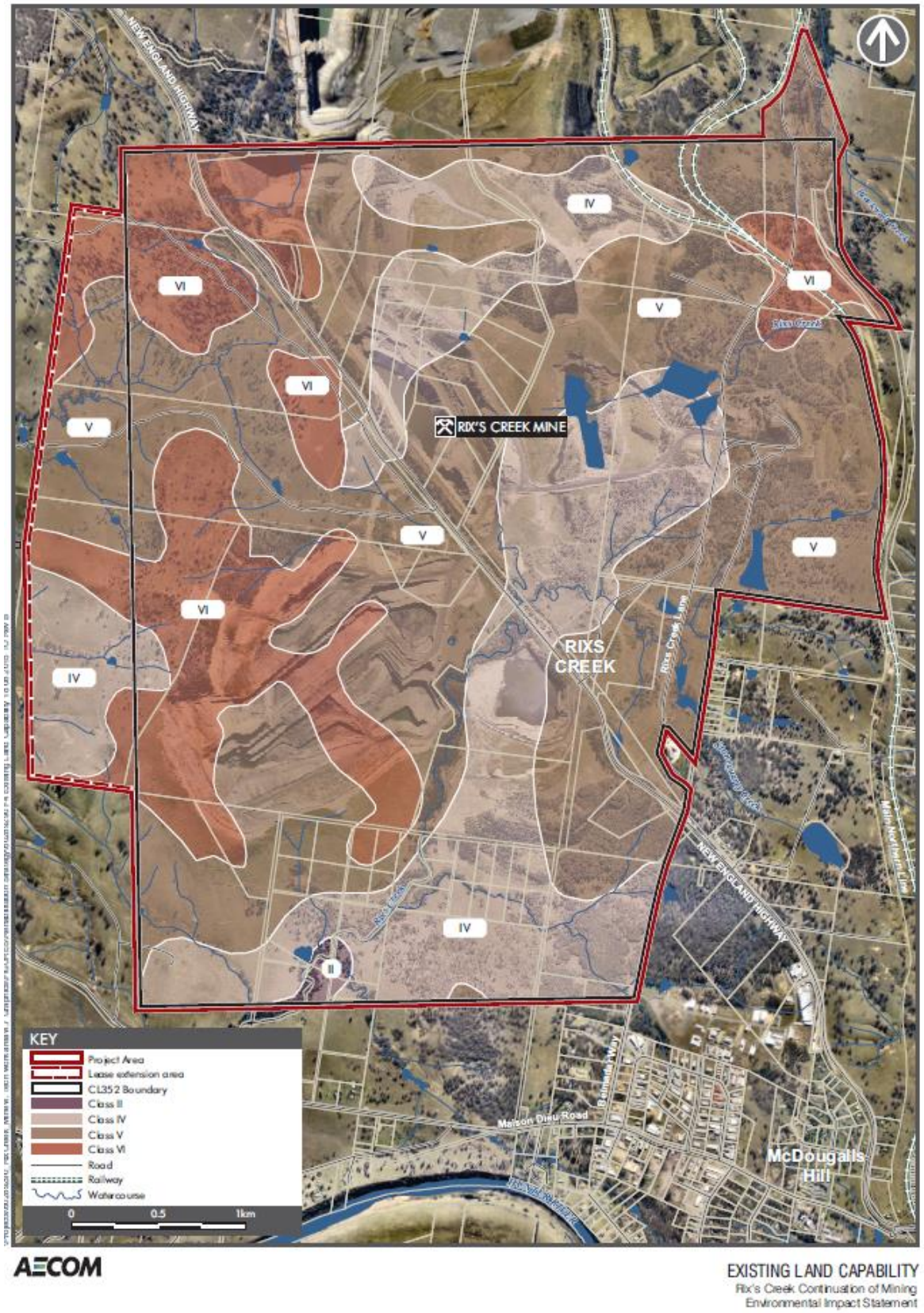


Figure 4
Existing Land Capability

5.8 Final Void

This domain includes the final highwall, void, low wall, spoil and ramps of the void, the location of which is shown on **Figure 3**. The final void, low walls and ramps cannot be rehabilitated progressively over the Mine life as coal will continue to be accessed from the final void up to the end of production. All areas of the site, with the exception of the final void and its surrounding catchments, will be free draining.

The aim is to maintain the effective catchment contribution and yield to the Hunter River following the cessation of mining. The final void will be designed as a long-term sink to prevent the release of saline water into the surrounding environment, unless a more suitable outcome is agreed.

The following key planning considerations have been incorporated into the design for this domain in context of future potential access (unauthorised and other).

- Create a final void of relatively low safety risk as the depression grades can be climbed safely by foot;
- Minimise out-of-pit dump and dump levels enhancing visual amenity; and
- Create a void depression that is not easily visible or recognisable improving the visual amenity of the Project area.

The low wall slopes and highwall slopes above the post-mining standing water level of the final void landform will be designed with an overall slope of around 18 degrees. The final void landform will be rehabilitated with vegetation species and diversity that are appropriate for the surrounding landform. The highwall will also be rehabilitated using the best reasonable and feasible rehabilitation technologies available at the time and revegetated with species that are appropriate for its steepness, aspect, and water retention capabilities.

Groundwater studies have modelled the rate of filling of the final void both in context of water quantity and quality. The key issues that have been considered in context of the rehabilitation of the voids include:

- Salinity levels in the final void which result from the intrinsically saline groundwater;
- Ecosystem health in the water body of the void;
- Selection of plant communities that can be developed and sustained on the batters of the void, which as the water levels rise will aid in the development of aquatic ecosystems; and
- The proposed final void is designed with 18 degree batters to provide safe access by foot for continued land management and grazing of the area by cattle, in doing so ensuring access and safety for site users and domesticated and native animals, If restricted access to areas of the site is required at the time of closure further landform shaping, fencing or placement of large rocks may be considered and agreed with relevant government authorities.

During the operational phase of the Project, Bloomfield is committed to undertake further investigations into the void rehabilitation options and strategies to ensure the sustainable future of the site, as practical. These may include:

- More detailed hydrological (runoff quality and quantity) and geochemical assessment aimed at more accurately predicting long term void water levels and mechanisms that may be used to enable the void to self-regulate its salinity;
- Active liaison with RR so that the regulator can more comprehensively understand the complex nature of final void issues and provide more strategic advice on its requirements for the rehabilitation outcome for residual voids;

- Review of the potential littoral, limnetic, profundal and benthic zones and associated stratification, mixing (or lack thereof) and environments of the layers which may occur in the water in the final void and the potential issues that may occur should alterations to the predicted environment occur. Issues to consider may include temperature, salinity, depth, light and the deposition and accumulation of sediments and other materials;
- Review of other open bodies of water where the layers of the water don't intermix i.e. the meromictic lakes or where mixing occurs at least once per year i.e. holomictic lakes; and
- An assessment of any potential beneficial use for the water that could be considered following closure of the mine. This assessment will build on the works undertaken by the NSW Minerals Council (NSWMC) via the UHMD "Upper Hunter Valley Voids Project". The NSWMC:
  - conducted a Stakeholder Workshop as a forum to bring industry and community together to begin discussions, visioning and concepts for the future use of closed mine voids in the region; following this
  - a literature review was commissioned, which examined national and international examples of pit void end uses; and a
  - A study of pit void lakes water quality to improve understanding of potential pit lake end uses for (UHMD) coal mining operations.

The measures of success, monitoring and required adaptive management in relation achieving the final void are detailed in the MOP.

Detail in relation to post-mining standing water level is described in the WMP. Section 4.4.3 states that modelling indicates that the void operates as a groundwater sink since groundwater inflow exceeds outflow and groundwater flux is minor compared to recharge and evaporation components. The groundwater contribution from hard-rock (HSU Zone 1 in Figure 8.29 in the GIA) to the Hunter River Alluvium is predicted to be 244 m^3/d at the end of the recovery simulation. This demonstrates a minimal groundwater contribution to the Hunter River alluvium. Although there is a small groundwater outflow from the pit, the long-term impact to off-site groundwater quality is considered minimal.

The further investigations described above will be undertaken within 10 years of closure and incorporate findings of stakeholder engagement as described in **Section 3.5**.

5.9 Unmined Land

This domain includes all unmined lands owned by the Mine, within the Mining Lease, which are not used for purposes related to mining. Land uses which surround this domain are agricultural to the northwest, west and south west, mining (Rix's Creek North Mine) to the northeast and smaller agricultural holdings to the south and south east. To the immediate south east of the Mine Lease area is the McDougall's Hill Business park which contains a number of light industrial and bulky goods business.

The unmined or buffer lands are a valuable resource, providing:

- Analogue sites for establishing baseline criteria by which the rehabilitation objectives and success can be compared;
- Areas that can be incorporated with the rehabilitated lands to enable beef cattle production; and
- A potential for future development of non-agricultural based activities aligned to optimal post mining landuse.

The buffer lands are to be managed to enhance landuse values during and after the life of the Project **Section 6.4** provides further detail on the integration of buffer land with post mining land use. The management of these lands will include:

- Corridor management in the context of grazing and biodiversity;
- Fencing and access control;
- Weed and vertebrate pest species management and control;
- Track construction and maintenance;
- Strategic grazing and stock control; and
- Bushfire management.

Release of these areas which have been managed by Bloomfield during active mining will leaves large areas of natural and regenerating grassland and woodland. As the majority of these areas are zoned RU1 under the LEP, upon the grant of further development consent these areas may be developed to ensure a sustainable future following the cessation of coal mining and facilitate agricultural activities (without development consent). Permissible activities with consent are listed at **Section 6**.

6 Phases in the Rehabilitation Strategy

Bloomfield has extensive and proven experience in achieving successful mine rehabilitation. Rehabilitated areas will continue to be established and managed in accordance with methods currently in place under the Mine EMS which includes commitments to progressive rehabilitation and monitoring.

The aim of rehabilitation at RCS and the preliminary final land use is to reinstate the pre-mining land capability suited to grazing land, with stable landforms, compatible with the surrounding landscape, and allow for a range of possible post-mining land-uses. The final landform shown in **Figure 3** has been developed with agriculture associated with grazing as its intent.

Initial post-mining land use options identified at RCS include:

- Agriculture – cattle grazing;
- Open space – retention of areas as grassed and woodland open space;
- Native vegetation – including stands of native plant species and communities and corridors of vegetation connecting to stands of native vegetation on neighbour properties;
- Recreation – passive recreation in areas - subject to appropriate safety measures being implemented;
- Residential – subdivision of varying density for rural areas;
- Industrial – buildings and factories;
- Aquaculture based ventures or water for industry from the final void; and
- Commercial – sections along the New England Highway.

As described in **Section 2.4**, the majority of the land at RCS is zoned RU1: Primary Production under the Singleton LEP which provides significant scope for alternate land use, with development consent.

The preliminary final land use of agricultural grazing provide a platform should alternate developments be proposed and relevant development consent sought following RCS's closure.

Within RU1 in the Singleton LEP includes the following activities "Permitted without consent:

> Extensive agriculture; Forestry; Home occupations; Intensive plant agriculture".

The following activities within RU1 in the Singleton LEP are "Permitted with consent

> Agriculture; Airstrips; Animal boarding or training establishments; Aquaculture; Bed and breakfast accommodation; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Dual occupancies; Dwelling houses; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Hazardous industries; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Information and education facilities; Intensive livestock agriculture; Jetties; Moorings; Offensive industries; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (outdoor); Roads; Roadside stalls; Rural industries; Rural workers' dwellings; Service stations; Sewerage systems; Truck depots; Turf farming; Veterinary hospitals; Water supply systems."

Various options were also considered for surrounding land owned by the Company. These holdings would be reviewed in unison with the strategic planning policy updates being undertaken by Singleton

Council, which will identify potential higher uses of land surrounding RCS given its proximity to Singleton and key transport and services infrastructure.

To the extent practicable, rehabilitation will be undertaken progressively during the life of the Mine. Progressive rehabilitation will minimise the area of exposed disturbance and reduce environmental impacts. Progressive rehabilitation will also enable significant economic advantages and efficiencies through better integration of equipment use during mining and rehabilitation, reduced earth moving costs and improved topsoil management. Ultimately, this practice will lead to enhanced rehabilitation outcomes.

Sufficient personnel and resources will be allocated during mining to enable progressive rehabilitation. Final rehabilitation will continue to be included in the Mine budget for the period of operation. Progressively rehabilitating mined land may also enable the progressive return of security bonds subsequent to successful rehabilitation of defined areas. Rehabilitation planning will consider the logical sequence of actions needed to achieve rehabilitation success.

Bloomfield has and will continue to be involved in research projects focusing on the rehabilitation of open-cut mines. This work continues to be carried out either by company personnel or in conjunction with organisations such as ACARP, the University of Newcastle and the NSW Minerals Council. A number of techniques have been used and further developed including the use of biosolids, weed control, plant species selection and grazing and pasture assessment.

The ultimate rehabilitation objective will be achieved through a series of conceptual phases which are shown diagrammatically in **Figure 5** and described as:

- **Phase 1**: Decommissioning – removal of hard stand areas, buildings, contaminated materials, hazardous materials;
- **Phase 2**: Landform Establishment – incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology;
- **Phase 3**: Growing Media Development – incorporates physical, chemical and biological components of the growing media and ameliorants that are used to optimise the potential of the media in terms of the preferred vegetative cover;
- **Phase 4**: Ecosystem and Landuse Establishment – incorporates revegetated lands and habitat augmentation; species selection, species presence and growth together with weed and pest animal control / management and establishment of flora;
- **Phase 5**: Ecosystem and Landuse Sustainability – incorporates components of floristic structure, nutrient cycling recruitment and recovery, community structure and function which are the key elements of a sustainable landscape; and
- **Phase 6**: Rehabilitation Complete – Landuse and landscape is deemed as suitable to be relinquished from the Mining Lease.

Table 8 shows the relevant rehabilitation phases for each domain, based on the post mining landuse and landscape, and the rehabilitation objectives to be achieved. Additional detail in relation to domains are provided in the MOP. No domains are currently in their final rehabilitation phases at RCS.

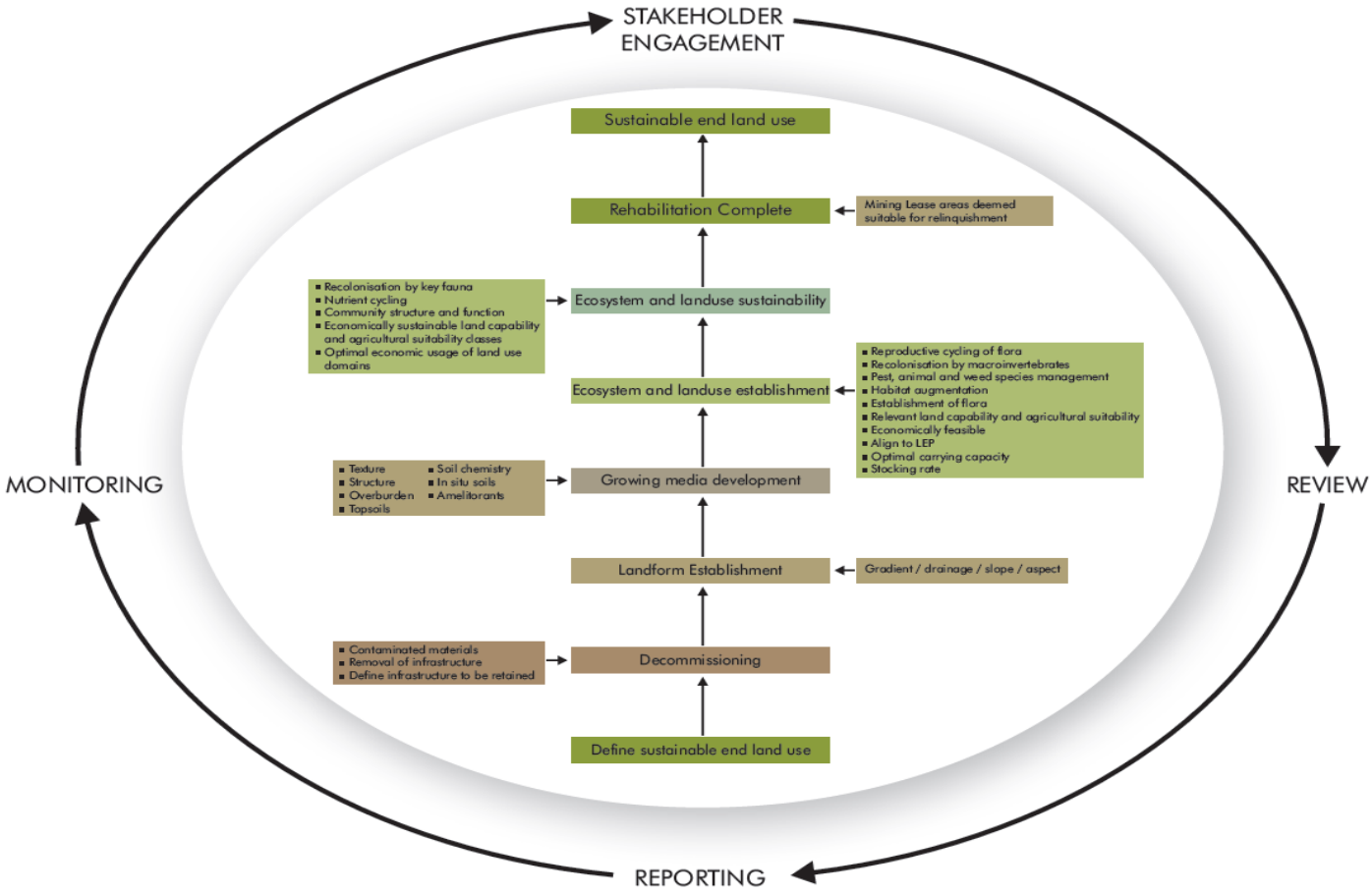


Figure 5
Conceptual Phases of Sustainable Ecosystem Development

(NSW Trade and Investment, Regional Infrastructure and Services – Division of resources and Energy, Sept 2013)

Table 8
Relevant Rehabilitation Phases for Each Domain

Rehabilitation Phase \ Domain	Active Mining	Heritage Area	Infrastructure Area	Water Management Area	Tailings Emplacement Area	Overburden Emplacement Areas	Rehabilitated lands – Pasture	Rehabilitated Lands – Tree over Grass	Final Void	Unmined Land
Stage 1 – Decommissioning	N/A	N/A	✓	✓	✓					
Stage 2 – Landform Establishment	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	
Stage 3 – Growing Media Development	N/A	N/A	✓	✓	✓		✓	✓	✓	
Stage 4 – Ecosystem and Landuse Establishment	N/A	N/A			✓		✓	✓	✓	
Stage 5 – Ecosystem and Landuse Sustainability	N/A	N/A			✓		✓	✓	✓	✓
Stage 6 – Rehabilitation Complete	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	

The current rehabilitation progress for each rehabilitation domain is presented in the most recent MOP (Bloomfield, 2019). **Figure 6** to **Figure 8** provide indicative scheduling for rehabilitation domains at five-year intervals from approximately 2025. The proposed final landform at approximately 2042 is provided in **Figure 3**.

Rehabilitation will be undertaken as soon as reasonably practical after the the final landform has been shaped , in accordance with the MOP.

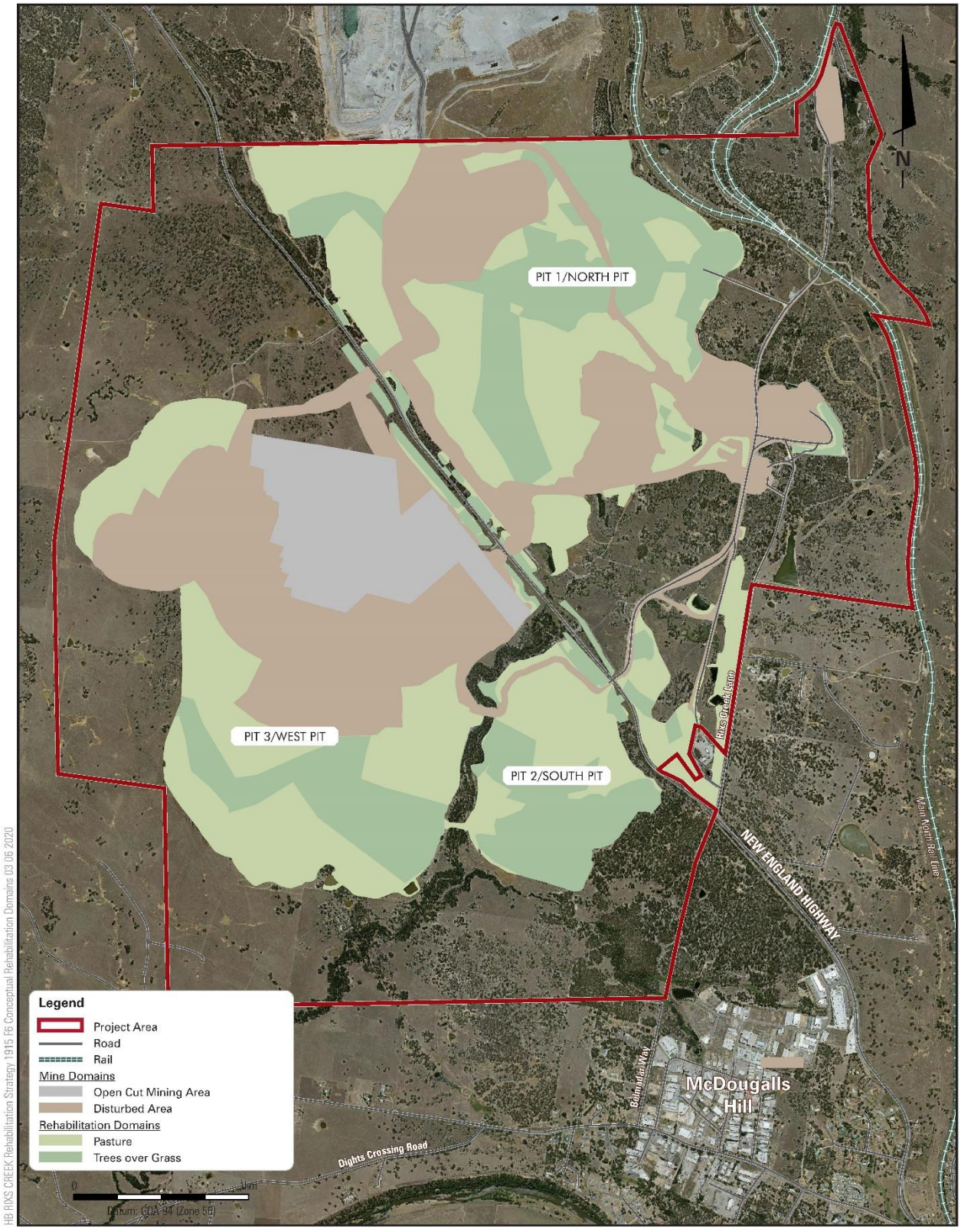


Figure 6
Conceptual Rehabilitation Domains 2025

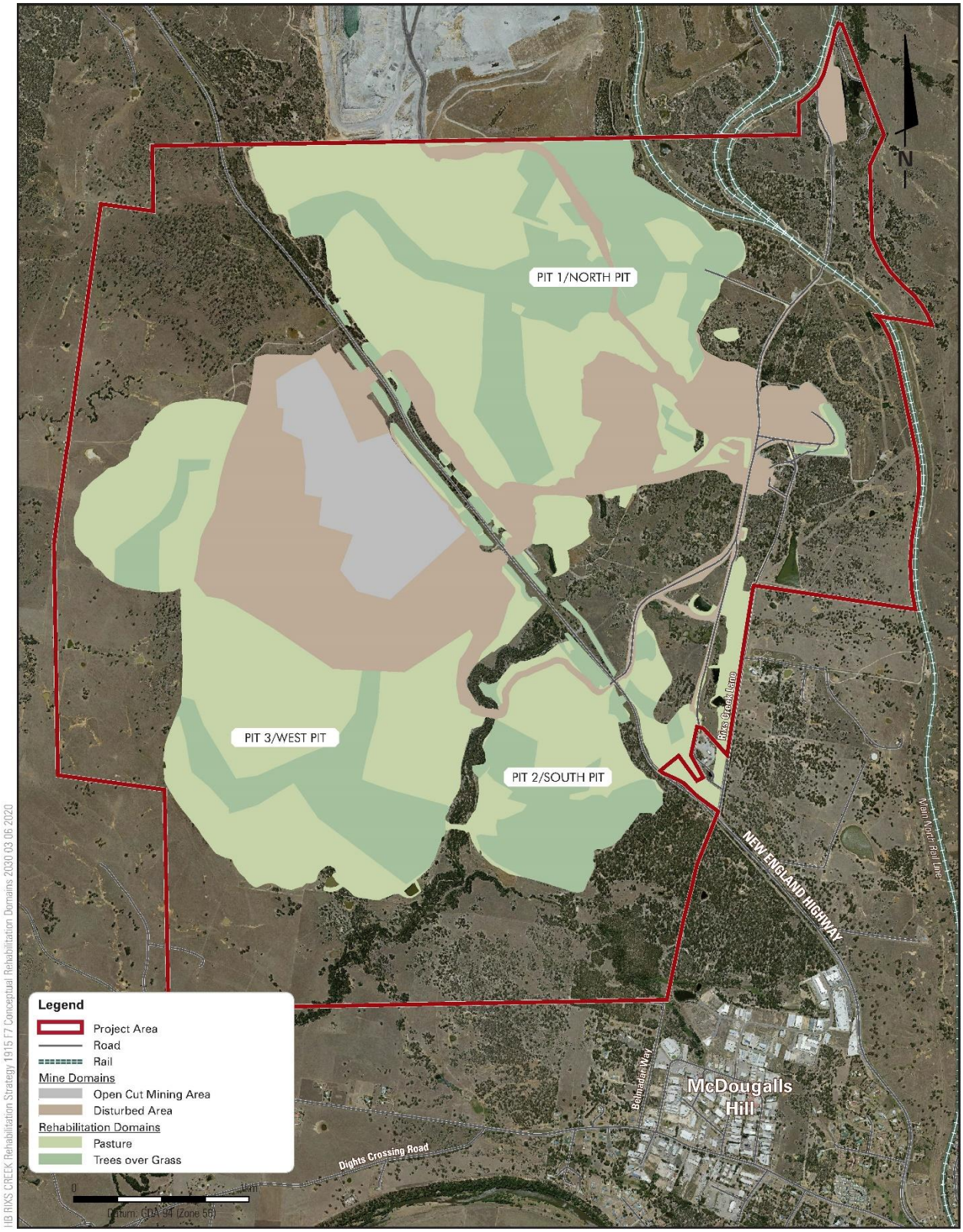


Figure 7
Conceptual Rehabilitation Domains 2030

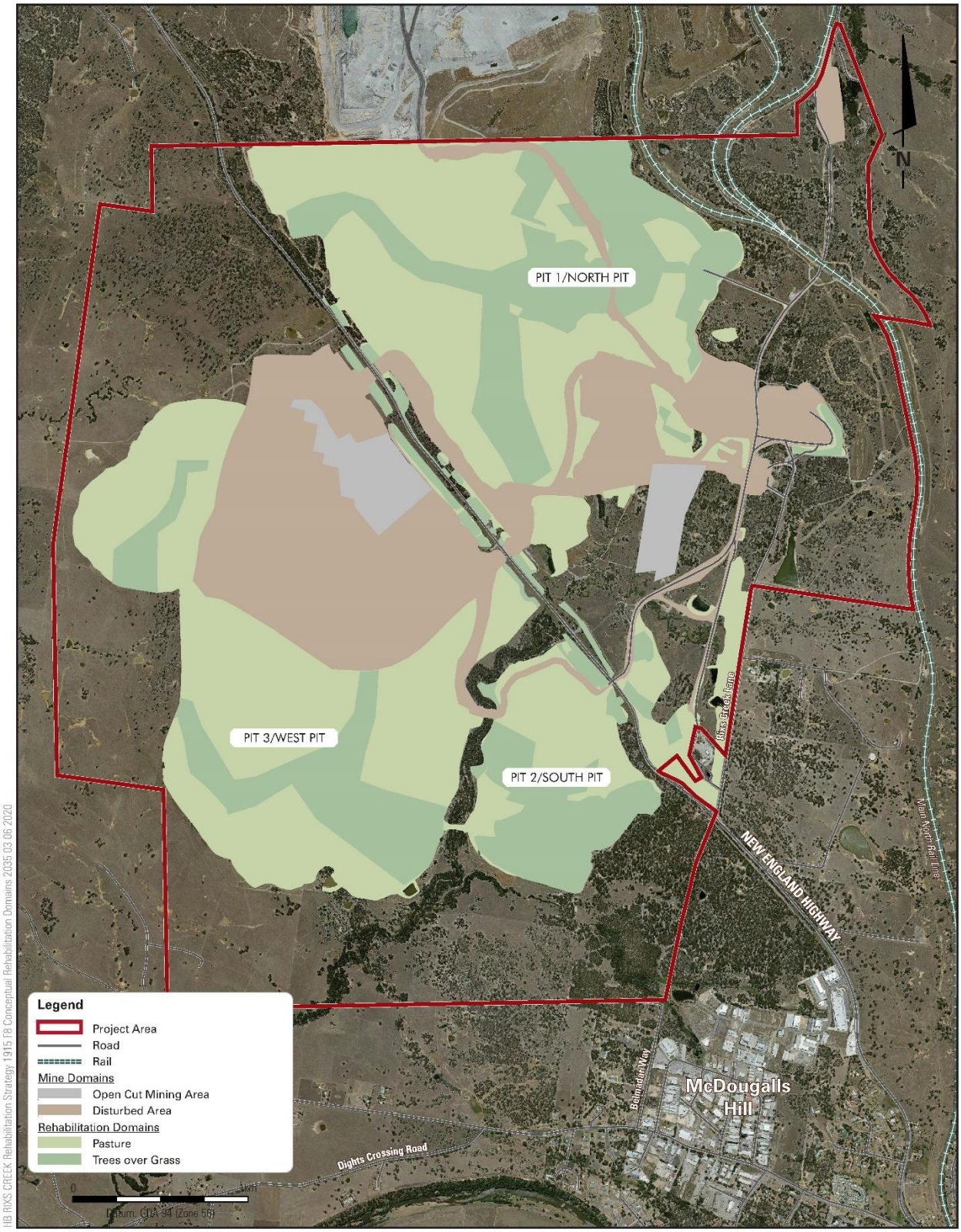


Figure 8
Conceptual Rehabilitation Domains 2035

6.1 Phase 1 Decommissioning

Phase 1 provides for the removal of hard stand areas, buildings, contaminated materials and hazardous materials.

The only decommissioning activities scheduled for the life of the current MOP (Rix's Creek Mining Operations Plan 2019) are the works associated with the tailings emplacement area #3 located in Pit 2 and covering an area of 19 ha. All decommissioning works will be undertaken in accordance with a Section 101 or High Risk Activity Approval once obtained from Resources Regulator.

The objectives, criteria and performance indicators for Rix's Creek rehabilitation domains for the Decommissioning phase are provided in **Table 9**.

6.2 Phase 2 Landform Establishment

6.2.1 Surface Shaping

Reshaping principally involves re-contouring overburden emplacement areas into the designed shape for final rehabilitation. The bulk final movement of overburden will usually be undertaken using bulldozers. Ideally, reshaping will result in a stable landform with slopes and drainage patterns which blend in with the surrounding natural topography. Slope stability is integral to rehabilitation design and slopes in excess of 10 degrees are not favoured. However, slopes steeper than 10 degrees may be necessary in some locations to ensure rehabilitation merges seamlessly with adjacent undisturbed land.

As required under Condition B69 of SSD 6300, the final landform will, as far as practicable, incorporate micro relief designs that mimic natural topography and drainage and minimise erosion. This detail will be presented in the MOP. Areas specified for agriculture will be designed to augment the land use and minimise restrictions on machinery, fencing, and other stock management activities.

The final landform may change over time with the advent of new technologies or changes to the planning development framework for Singleton. Given the proximity of the Mine to Singleton, higher order land uses may be more appropriate for sections of the Lease area by the end of the Project life.

Any changes to the final landform which may evolve to accommodate a range of potential future land uses would be subject to modifications to the Project Approval.

6.2.2 Deep Ripping and Rock Raking / Removal

Once bulk reshaping is completed, the landform is deep-ripped and the final trim/rock raking is undertaken. The ripping loosens up any near surface strata within the landform that have been compacted during placement, aiding root penetration during vegetation establishment. The final trim smooths out any wash-outs and gullies, rough edges, temporary access tracks, local steep slopes and prepares the surface for revegetation.

Rock-raking is the final stage of reshaping and removes or buries exposed surface rock greater than 500 mm in diameter. Rocks are either buried within the spoil structure or may be left in groups on the surface as fauna habitat. This raking is usually done along the contour, leaving a cultivated surface that minimises the risk of erosion until vegetation can be established.

6.2.3 Drainage Establishment

Suitable drainage will be integrated into the rehabilitation design, to ensure the final landform can safely shed surface runoff without giving rise to erosion. Long or steep slopes are to be divided by the construction of contour banks to collect and divert water moving across the slopes. Contour banks would direct the surface water at a drop of no greater than 1 in 100 into a drainage line (via a sediment dam) or into some form of protected drop structure that will direct the water down the gradient in a controlled or protected manner.

6.3 Phase 3 Growing Media Development

Growing media development involves processes to achieve a soil which is capable of supporting a sustainable plant community. It includes consideration of the chemical, physical and biological properties of the media and takes into account issues such as specialist requirements (e.g. soil ameliorants) aligned to the revegetation of the disturbed areas, whilst also incorporating consideration of landuse both for grazing and biodiversity that may deviate from the traditional post mining landuse.

6.3.1 Overburden Characterisation

Overburden material varies in physical and geochemical properties, in accordance with the geology of the area and the extent of exposure to weathering. Chemical analyses of the spoil materials indicate that, in general, the overburden is slightly sodic and alkaline, but within acceptable ranges for use as a plant growth medium.

In order to fully understand the selective handling of materials, assessment of the characteristics of soil and overburden material will continue to be undertaken throughout the life of the Mine as per the parameters listed in **Table 9**.

Overburden characterisation is important to:

- Identify material for use in the root zone which is capable of supporting sustainable vegetation establishment;
- Identify materials which limit plant growth or which may contaminate surface or ground water, and hence may require special handling, treatment or disposal; and
- Identify any propensity for spontaneous combustion.

Soil studies undertaken for the 2015 EIS (SLR Consulting Australia Pty Ltd, June 2015) mapped the soils, determined stripping depths and rehabilitation suitability. The specialist study defined two main soil types occurring across the Project area – Subnatric Brown Sodosols and Eutrophic Brown Chromosols. The Sodosols dominated the Project area and were located on the creeklines, flats, lower slopes, midslopes and on the ridgeline in the north. These soils varied in topsoil depth from 0.1m to 0.3m, with an abrupt clear boundary to the clay subsoil. The Chromosols dominated the upper slopes and ridges. All soils have been assessed as suitable for stripping and reuse on the rehabilitated lands in accordance with the following considerations.

6.3.2 Topsoil and Subsoil Characterisation

During the life of the Project topsoil and subsoil characterisation will continue to be undertaken in order to:

- Identify any physical or chemical deficiencies or limiting factors (particularly alkalinity, salinity and sodicity and soil dispersion) which may affect such things as vegetation establishment and landform stability; and
- Develop selective placement strategies and/or develop suitable amelioration techniques.

6.3.3 Soil Stripping

Topsoil is suitable for stripping across the assessment site, from a minimum depth of 0.10 m to a maximum depth of 0.40 m. For the majority of the land, topsoils can be used without treatment. Subsoils can also be widely stripped, including to a maximum depth of 1.10 m at locations at the base of slopes where material has accumulated.

6.3.4 Soil Stockpile Management

The following soil stockpile management practices will be used to increase the long term viability of the soil resources in stockpiles:

- Topsoil stockpiles will be located outside of proposed mining areas and away from slopes and drainage lines where possible;
- Stockpiles will be constructed with a "rough" surface condition to reduce the risk of erosion, improve drainage and promote revegetation;
- Stockpiles will be no higher than three metres in order to minimise issues with anaerobic conditions;
- Stockpiles will be fertilised and seeded to maintain soil structure, organic matter and microbial activity, whilst areas which are to be inactive for extended periods may be seeded with the final species mix;
- Stockpiles will be located to prevent runoff leaving the site;
- Where necessary soil ameliorants will be applied to dispersive soil stockpiles, at a rate commensurate with the findings of the soil assessment pertaining to sodicity and dispersion; and
- Weed control strategies will be implemented particularly for any noxious weeds. Immediate revegetation will provide vegetative competition to assist with control of undesirable plant species.

6.3.5 Soil Amelioration

Soil/spoil ameliorants will be spread and integrated into the surface layer to address soil sodicity and assist with soil structural properties. As the majority of subsoils are potentially sodic they are usually treated with ameliorants including gypsum at a rate of up to 200kg/ha, with these materials being ploughed into the top 30cm of the profile. In addition, sodic subsoils where exposed, will be managed with appropriate erosion and sediment control structures in place (contour banks, sediment retention ponds, rock armouring etc.).

6.3.6 Topdressing

Topsoil stripped ahead of mining will be is applied to the reshaped surface in an even layer generally not less than 100mm. Depending on the quality of the topdressing material, ameliorants may be integrated with topsoil at this stage. Topsoil will be used as a first priority but where topsoil has not been available in sufficient volumes, biosolids and biosolids/mulch mix have been successfully used to improve soil structure and act as a source of nutrients, improving establishment of vegetation especially in those areas returning to pasture. Biosolids are generally applied at a rate no greater than 100 t/ha (wet weight), using a tractor towed spreader trailer. A biosolids/mulch mix (1:1 ratio) has been shown to be a very successful topsoil supplement and is usually applied at a rate of 200 – 250 t/ha.

6.3.7 Integration

Once the material has been top-dressed, the surface will be contour disc or chisel ploughed to integrate the topdressing material. This assists in binding the topdressing material with the underlying spoil and is a requirement of the EPA guidelines Use and Disposal of Biosolids Products (NSW Environment Protection Authority, 2000). The area will then be contour cultivated to create seed entrapments and microclimates prior to sowing.

6.3.8 Land Management Practices

Land management practices that are implemented at the Mine relating to the handling of growing media include:

- Progressive rehabilitation of final landforms as soon as practicable after completion of mine-related disturbance activities;
- Weed management prior to stripping the area to be cleared (following a clearing permit) will be completed, alternatively after timber is cleared, if present, to allow access;
- Stripping of topsoil and subsoil material that is deemed as not requiring treatment to address issues such as sodicity using a bulldozer or grader – (preserving the top 50-100mm in tree areas to optimise the management of the topsoil seed bank) and removal using a front end loader and trucks. When the situation allows, this material will be placed directly onto final shaped overburden or stored in stockpiles not > 3m in height;
- Adding soil ameliorants (gypsum/lime) to subsoil material requiring treatment prior to stripping. Use of a bulldozer to strip subsoil material and a front end loader and trucks to move soil before being stored in stockpiles not > 3m in height;
- Seeding of all stockpiled materials with a seasonal dependant cover crop incorporating a mix of fast germinating and growing sterile species, together with a mix of pasture grass and legume species;
- Shaping of post mined lands to a landform as defined in **Figure 3**;
- Assessing stockpiled material prior to spreading of growing media on the post mined lands, in terms of suitability as a growing media and if required soils ameliorants (gypsum, lime, organic matter) will be added. Stockpiled material will also be assessed in terms of weed infestation and managed via the use of registered herbicides and / or scalping of weed infested material. Stockpiled material will be managed for weeds on a regular basis;

- Maintaining an inventory of available soil to ensure adequate topsoil materials are available for planned rehabilitation activities; and
- Restricting vehicular traffic on the soils to be stripped. Traffic will be excluded from soils that are sensitive to structural degradation.

6.3.9 Erosion and Sedimentation

Prior to the disturbance of land associated with any construction activities at the site, appropriate erosion and sediment controls are established and approved by the Environmental Officer. All erosion and sediment management and related control structures are consistent with the specifications contained in Managing urban stormwater – soils and construction, Volume 1, 4th edition (Landcom, 2004) and particularly Volume 2E Mines and Quarries (DECC, 2008).

Where practicable, runoff from undisturbed catchments is diverted around the construction activities via diversion drains and banks which direct water into the natural watercourses. Runoff from disturbed areas is retained on site in sediment dams and allowed to settle prior to passive release into the natural system. Drains, diversion banks and channels are compacted and stabilised as they are constructed.

General measures in place at the Mine to minimise erosion and sediment mobilisation during operation include:

- Installing erosion and sediment controls prior to the disturbance of any land;
- Minimising the extent of disturbance to the extent that is practical;
- Reducing the rate of water flow across the ground (e.g. through the use of rock check dams and flow capture and arrest devices) particularly on exposed surfaces and in areas where water concentrates;
- Progressively rehabilitating disturbed land and constructing drainage controls to improve stability of rehabilitated land;
- Ripping of rehabilitation areas to promote infiltration;
- Use of fast germinating and establishing plant species to assist in surface stabilisation;
- Protecting natural drainage lines and watercourses by constructing erosion control devices which include sediment retention dams and diversion banks and channels. Steep gradients will require the installation of a rock riprap, geotextile fabric sediment filters or other suitable measures; and
- Restricting access to rehabilitated areas.

Erosion control on reshaped and rehabilitated areas is achieved by minimising the time taken to establish vegetation. Suitable drainage densities will be established with sediment detention basins being constructed in the flow lines. Sediment detention basins will be used along haul roads and around areas of disturbance. These structures will be de-silted as necessary.

6.4 Phase 4 Ecosystem and Landuse Establishment

A *Biodiversity Management Plan* (Hansen Bailey, 2020) (BMP) has been developed in accordance with Condition B50 of SSD 6300 to manage the biodiversity within and around the approved disturbance areas (buffer land). The BMP includes management measures which would apply to both rehabilitation land and non-mining land including:

- Salvage of cleared vegetation for reuse on rehabilitation or to enhance non-mining land;
- Weed and feral animal management;
- Using habitat features such as nest boxes and salvaged tree hollows to promote the use of land by threatened fauna species;
- Collection of seed from local areas for rehabilitation or to enhance non-mining land;
- Management of grazing on pasture lands; and
- Bushfire management.

The BMP includes the integration of biodiversity and rehabilitation in mine planning. Section 6.2 of the BMP includes the rehabilitation objectives in the BMP. It references the management strategies of existing native vegetation, creation of corridors of trees over pasture, monitoring, vegetation enhancement utilising locally sourced seed where practical , fauna relocation where required, and habitat augmentation. Section 6.2 describes access and induction requirements, bushfire, grazing and agriculture as well as vegetation enhancement and pest management.

Additional references to consideration of this Plan in the BMP includes "Activities outlined in this section integrate with the rehabilitation activities described in the *Rehabilitation Strategy* (Bloomfield, 2020a) and the *Mining Operations Plan* (Bloomfield, 2020b) (MOP). "

6.4.1 Clearing and Reuse of Vegetation

This will be achieved by:

- Limiting the cleared width to that required to effectively operate the mine; and
- Programming the works so that only the areas which are scheduled for mining activities are cleared.

The proposed use of felled vegetation will follow current best practice and may include the collection of timber for fencing; incorporating ground cover, understorey species and saplings into stripped topsoil; and respreading large woody debris onto re-contoured land. Stag trees will be installed on to the post mining landscape as part of the rehabilitation program to optimise future potential habitat for arboreal and avian fauna including Squirrel Gliders.

6.4.2 Fencing and Signage

Planning and design of the layout will be undertaken during this phase and will include consideration of fencing (materials and construction), delineation of paddocks, access to watering points, stock handling facilities and stock refuge areas.

6.4.3 Revegetation

Bloomfield proposes to build on established revegetation techniques as the basis for the rehabilitation program. Review of the program will focus on:

- Potential variables impacting on rehabilitation programs and causes of failure;
- Suggested rehabilitation strategies for the successful reinstatement of pasture based plant communities on the site, including:
  - Establishing appropriate soil substrate: direct application of topsoil; stockpiled native topsoil; raw spoil plus addition of biosolids/organic growth medium; addition of other organic material;
  - Establishing a grassy understorey: grass species suitable for mine rehabilitation; low and high photosynthetic pathway species; establishing herbs and forbs;
  - Establishing the overstorey;
  - Seeding of areas of scattered mid and overstorey native plant species will be seeded throughout the areas returning to pasture and in areas defined for shelterbelts/ habitat corridors;
  - Supplementing vegetation in areas which have been seeded with tubestock of mid and over storey native plant species; and
  - Distributing seed by various methods: hand-broadcasting; hydro-mulching; direct seeding; air seeding.

Onsite management measures designed to ameliorate the predicted visual, airborne dust and noise impacts using the overburden emplacement include:

- The integration of tree corridors on the overburden emplacement area as progressive rehabilitation occurs;
- Establishing visual and ecological planting patterns of native trees to achieve landscape patterns that complement the existing spatial distribution of tree and grass cover in a grazing landscape; and
- Minimising exposure of work areas to sensitive receivers where possible.

The main revegetation steps may include:

- Species selection;
- Sowing rates and species proportions;
- Consideration of habitat augmentation;
- Seed pre-treatment requirements;
- Seed spreading and planting techniques;
- Soil amelioration and fertilizer requirements;
- Use of temporary cover crops to assist soil stabilisation;
- Protection from vertebrate pest species, domesticated stock and unauthorised access; and
- Maintenance requirements.

6.4.4 Sowing / Fertilising

The area will be sown and fertilised with the selected grass and/or tree seed mixes shortly after spreading the topsoil to avoid loss in activity of pre-existing micro flora. It also minimises the loss of topsoil due to wind and rain action. Fertiliser is not usually required where biosolids have been applied. Tubestock are planted in areas to provide visual screens.

A typical species list sown, in approximate kilograms per hectare, for the establishment of pastures for a post-mining grazing landuse include:

- Rhodes grass (1kg/ha), Couch grass (2kg/ha), Rye grass (4kg/ha), two sub. Clover (6kg/ha) varieties, Haifa white clover (2kg/ha), Woolly Pod Vetch (4kg/ha), green panic (5kg/ha), Sirosa phalaris (4kg/ha), Sephi Barrel Medic (4kg/ha), Lucerne (4kg/ha) and Kikuyu (1kg/ha).

The focus of this mix is to establish a vegetation cover that ensures surface stability, reduction in the risk of soil erosion whilst also providing a plant community suitable for sustaining beef cattle. During this phase of the rehabilitation program, cattle may be introduced, under a carefully managed program, to the rehabilitated lands with a purpose of enhancing nutrient cycling via consumption of grown feed and production of manure and the trampling and incorporation of plant material (green and dead) into the surface soil layer

A typical list of native species used in the revegetation program under direct seeding, all of which align to the tree species characteristic of the pre mining and surrounding plant communities include:

- *Angophora floribunda, E. crebra, E. moluccana, E. sideroxylon, E. tereticornis, E. albens, Corymbia maculata, Acacia concurrens, A. decora, A. decurrens, A. falcata, A. filicifolia, A. implexa, A. paradoxa, A. salicina, Hardenbergia violacea*.

A seed collection program aims to provide 75% of the seed as local provenance material, where available.

A typical list of native species, all of which align to the tree species characteristic of the pre mining and surrounding plant communities, used in the revegetation program under tubestock planting for visual screens and on bunds include:

- *Angophora floribunda, E.crebra, , E. moluccana, E. sideroxylon, E. tereticornis, E. albens, Corymbia maculata, Acacia concurrens, A. decora, A. decurrens, A. falcata, A. filicifolia, A. implexa, A. paradoxa, A. salicina, Allocasuarina leuhmannii, Casuarina glauca*.

6.4.5 Weed Management and Control

All noxious weeds will be managed and controlled as per the requirements of the *Noxious Weeds Act 1993*. Control of weeds will be undertaken in direct consultation with the Local Land Services, Singleton Council and Upper Hunter Weeds Authority staff using a combination of mechanical, biological and chemical controls.

Particular attention will be paid to the control of African Olive (*Olea europaea* subsp *cuspidate*) across the site as the invasion of this species is listed as a potential key threatening process to the Central Hunter Grey Box- Ironbark Woodland and the Hunter Lowlands Redgum Forest both of which are listed under the Threatened Species Conservation Act 1995.

6.4.6 Vertebrate Pest Animal Management and Control

The Mine has in place an annual feral animal management and control program that will also be carried out for the life of the Mine. All work will be implemented in close liaison with the staff of the Local Land Services and in close communication with adjoining land users to ensure a coordinated approach to pest management.

6.4.7 Nesting Boxes

Nesting boxes for a range of arboreal and avian species will be established in older areas of rehabilitated lands once tree heights are adequate to support them and provide primary habitat for these species, as they recolonise these areas.

6.4.8 Carrying Capacity and/or Stocking Rates

The Agricultural Impact Assessment (Neil Nelson Agvice Pty Ltd, July 2015) states that the current stocking rate is 5 Dry Sheep Equivalent (DSE) per hectare on the areas of existing pasture, though with good seasonal conditions and increased fertiliser application and seed sowings, this could increase to 7 D.S.E. per hectare for unmined lands. This is comparable to the carrying capacities estimated by NSW DPI for similar pasture types within the Hunter Region (NSW Dept. of Primary Industries, 2006).

The direct seeding species mix and land management practices that are currently used for the post mined lands returning to grazing at the Mine are similar to those used on other mines across the Hunter. Based on the assessment of the following parameters;

- Pasture quality (digestibility, crude protein and metabolisable energy;
- Cattle weight;
- Cattle health; and
- Carcass comparison.

As demonstrated in ACARP report C23053 (2017), tropical pastures which are synonymous with rehabilitated lands generally have a higher feed quality and are more readily grazed that native grasses, resulting in enhanced cattle productivity performance.

This is further supported by recent unpublished studies undertaken by mine environment staff to assess pasture growth on post mined lands where the growing media that has been treated with biosolids (current practice at the Mine) and two compost treatments used as post mined lands soil ameliorants. This study determined that the areas that had been treated with biosolids offered the highest potential stocking rates at 7.3DSE/ha at March 2015.

6.5 Phase 5 Ecosystem and Landuse Sustainability

Ecosystem and Landuse Sustainability involves the:

- Development of landuse and land capability which is consistent with the surrounding areas;
- Development of landuse options that provide optimal and sustainable social and economic benefit to the local community;
- Selection of species to achieve species diversity and abundance for both flora and fauna;

- Development of profiles in the growing media; and
- Use of vegetation communities capable of withstanding catastrophic events e.g. bushfire and extensive drought.

6.5.1 Maintenance revegetation works

As with all successful grazing based systems, maintenance works are required in terms of fertiliser and vegetation enhancement to ensure successful growth of cattle. Maintenance works to be implemented at this phase of the rehabilitation program may include:

- Soil sampling for the purpose of defining fertiliser and seeding regimes;
- Application of defined fertiliser – in terms of rates and mix; and
- Over sowing of pasture with legumes – species may include, sub. Clover (6kg/ha) varieties, Haifa white clover (2kg/ha), Woolly Pod Vetch (4kg/ha), green panic (5kg/ha), Sirosa phalaris (4kg/ha), Sephi Barrel Medic (4kg/ha) and Lucerne (4kg/ha).

6.5.2 Bushfire Management

A Bushfire Management Plan has been developed in consultation with the Rural Fire Service. The Rural Fire Service conduct hazard reduction activities on Bloomfield managed lands surrounding the mining operation.

Bushfire risk is managed through ameliorative actions as well as management safeguards.

Ameliorative actions:

- Ensuring mining activities that have the potential to cause ignition such as sparks from vehicles, metal grinding, welding etc. are managed;
- Ensuring vegetation does not interfere with power lines;
- Creating firebreaks to ensure that bushfire does not spread from surrounding lands; and
- Grazing on older established rehabilitation areas if required to reduce fuel loads.

Management safeguards:

- The provision of firefighting equipment;
- Fire training for staff and on site fire-fighting team;
- Suppression of any bushfire outbreaks;
- Effective communication strategies to ensure all employees, contractors and service providers are aware of fire emergency policies and procedures as well as any NSW Rural Fire Services Fire Bans;
- Maintenance of appropriate fire breaks and perimeter trails; and
- Hazard reduction burns conducted when required by the local Darlington Bushfire Brigade.

6.6 Phase 6 Rehabilitation Complete

By this stage ongoing monitoring and implementation of maintenance works will demonstrate that the rehabilitation process has been successful.

Once a rehabilitated area is deemed to be potentially suitable for sign-off, a Sign-off Report will be submitted to the regulators. This report will include the following information for the proposed sign-off area:

- Survey Plan clearly showing the proposed area;
- Area size, disturbance and rehabilitation history;
- Monitoring data compared against rehabilitation aims, objectives and completion criteria;
- Final maintenance inspection findings;
- Photographs of the proposed area; and
- Analysis of rehabilitation development and sustainability.

At the completion of rehabilitation:

- The site would be safe, stable and non-polluting;
- With the exception of inputs related to the operation of a grazing property (e.g. fertiliser on areas of pasture) the site would be self-sustainable;
- The rehabilitation program would have been signed off by all parties;
- The Mine Lease (or a portion of a greater lease) would be relinquished, and the security bond returned; and
- The mine would have no further responsibility for these areas and the relevant Mine Operations Plan would provide details of relevant agency reviews and sign-offs.

Folllowing the successful completion of Phase 6, these areas will provide a flexible landform which provides large areas rehabilitated to grassland and trees over grass. These areas will be suitable for ongoing cattle grazing and other activities allowable without development approval and may be suitable for a significant number of developments as facilitated by the RU1 zoning (following the grant of further development consent) and would be dictated by market conditions, community needs and emerging industries which will be sought in around 20 years' time following the cessation of mining.

6.7 Potential for Integrating this Strategy with Adjacent Mines

Where practical the post mining landform will be developed to align with that of the adjoining RCN and consistent with the landscape of the surrounding area.

The revegetation program will review the rehabilitation planning framework of RCN as defined in its MOP and recent ARs in the context of the location of biodiversity areas, pathways to optimise pasture for beef cattle grazing and water storage features. The Statement of Commitments in the Rix's Creek North Project Approval, states that "*The majority of the post-mine landform will be revegetated with a combination of native and improved pasture species with scattered tree lots and tree corridors linking the surrounding rehabilitated areas, proposed tree planting corridors and surrounding existing native vegetation*", which is in accordance with the rehabilitation objectives of RCN.

7 Performance Criteria, Measures and Indicators

In accordance with the DRE Mine Operations Plan Guidelines (NSW Trade and Investment, Regional Infrastructure and Services – Division of Resources and Energy, Sept 2013) the performance criteria, measure and indicators have been defined for each domain in the context of the phase of the rehabilitation program. This includes the following:

- Nomination and justification of **performance measures**. Performance measures are used to quantify the rehabilitation and land management programme in terms of efficiency or effectiveness and establish the indicative timeframes for completion, and the standards of completion;
- Identification of **performance indicators** of the biophysical environment or where applicable; the built environment that can be reliably measured and audited over time using accepted scientific techniques and standards i.e. Australian Standards to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completions criteria; and
- Establishment of the **performance/completion criteria** for each indicator which quantitatively demonstrates rehabilitation. These are objective target levels or values and are usually in a numerical value.

The criteria, measures and indicators which provide the framework for this Strategy are those that have been developed for the MOP and are underpinned by a range of documents which relate to land management and site rehabilitation. These include industry standards and Rix's Creek Mine Standards and Procedures. The ongoing development of these documents will provide the basis for the periodic review of the MOP with resultant amendments being recorded in the AR.

There is an element of risk attached to the development of performance criteria, in that it is impossible to predict all of the variables that might influence the recovery or otherwise of those lands which are rehabilitated. Many variables operate at catchment or regional scales, such as river flows and pest outbreaks. Other factors that operate at continental or even global level, include climatic influences (including droughts or floods brought about by La Niña and El Niño events). These factors may significantly influence the long-term sustainability of the vegetated lands a RCS. To this end, the performance criteria and measures have been designed to provide an appropriate benchmark or guide against which to assess the management of Project lands and the resulting improvements.

The objectives, measures, performance indicators and criteria are designed to form the basis of the performance measure and provide the ability to track the development of sustainable ecosystems through the conceptual phases in **Figure 9.**

RR will require further refinement of the completion criteria in **Table 9** under the requirements of the *Mining Act 1992* (currently the MOP process) to ensure that they are more specific and measurable. However, the completion criteria as developed through the MOP process will need to reflect and not be inconsistent with the rehabilitation objectives and the conceptual approved final landform as shown in **Figure 3**.

The AR will provide regular updates of progress against completion criteria as detailed in the MOP.

This information is provided for all defined rehabilitation domains in **Table 9** and aligned to a pictorial representation in **Figure 5**.

The objectives, measures, adaptive management responses, performance indicators and criteria relating to the phases of Rehabilitation are defined in the MOP. Water quality objectives are described separately in the WMP. These elements are completed with input and agreement from relevant external parties, such as landowners and regulators as described in **Section 3**. A flowchart of the rehabilitation process is presented in **Figure 9**.

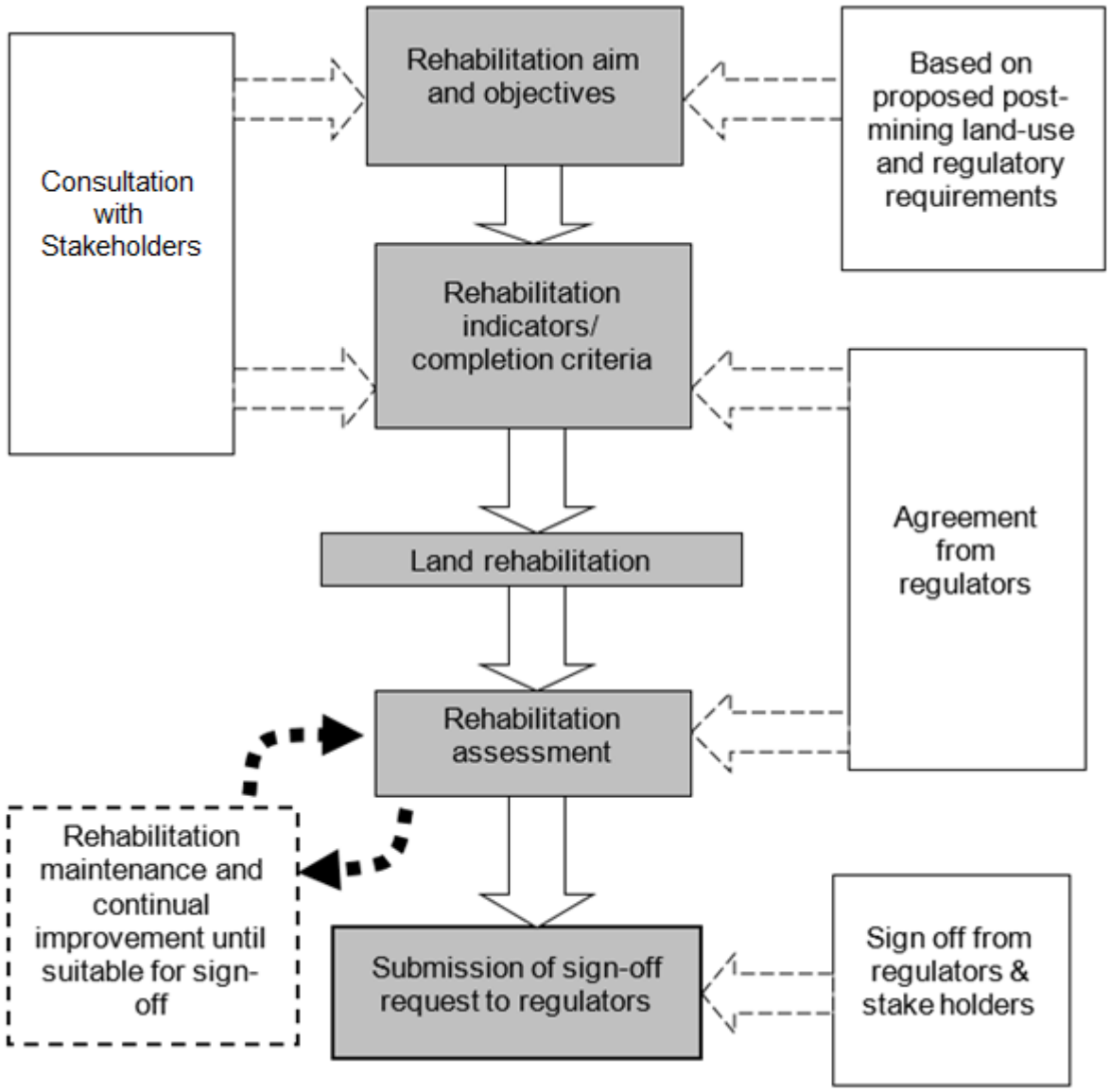


Figure 9
Bloomfield Rehabilitation Management Process

Table 9
Rehabilitation Objectives, Performance Indicators and Measures and Criteria

Objective	Performance Indicator	Performance Measure	Completion Criteria	Justification / Source
Phase 1 – Decommissioning				
Domain – Tailings Emplacement Area				
Removal of tailings infrastructure associated with tailings emplacement area	Removal of pipelines and pumps and related tailings infrastructure	Audit showing safe removal of all tailings infrastructure	**Section 101** from Resources Regulator (RR)	RR Requirements
Successful capping of tailings emplacement area to ensure no contamination from buried tailings materials	Cover of inert material	• Engineering inspections / Tailings emplacements audits; and • Acceptable cover material for capping design documentation.	Third party audits and site inspections reports confirm successful achievement of final land use	RR Requirements
Phase 2 – Landform Establishment				
All Domains except Final Void				
Rehabilitated land will: • Be safe and stable; • Be compatible with the surrounding natural landscape; and	• Year 1: Rehabilitated areas of greater than 10° slopes will be minimised during re-contouring; • Year 1: Appropriately designed water/sediment management structures (contour banks, drains and drop structures)	• Third party audit against safety regulations; • Slopes surveyed and reconciled against approved final slopes in the Final Mine Closure Plan; and	• No rehabilitated areas of greater than 18° slopes; • No evidence of failed sediment control structures (dams, drains and drops structures); • Surface tailings emplacement areas will be capped with 2m of overburden and rehabilitated; and	(DECC, 2008)

Objective	Performance Indicator	Performance Measure	Completion Criteria	Justification / Source
• Incorporate a stable drainage network	incorporated into landform design and constructed during re-contouring; • Year 3: No evidence of slumping, settling or subsiding landform; • Year 3: Erosion rills stabilising, compared to Year 1 results; and • Year 5: No evidence of failed water management structures.	• Rehabilitation monitoring results – rill surveys.	• Erosion rills remaining stable. No significant increases in number and/or size of rills since last monitoring.	
Phase 3 – Growing Media Development				
Domain – Rehabilitated Lands				
A sustainable vegetation cover will be established on rehabilitated land (soils)	• Year 3: pH, ECe and nutrient levels moving towards completion criteria; and • Year 5: pH, ECe and EAT at or near completion criteria. Nutrient levels acceptable.	Tests assessing the growing media's chemical properties – pH, EC, nutrient levels	Soils in the root zone should meet the following criteria: • ECe <4 dS/m; • $pH_{(Water)}$ between 4.5 and 9; • EAT Class 3 – 8; and • Nutrient levels acceptable for pasture establishment.	MOP
Rehabilitated land will be topsoiled, fertilised and sown with grass and/or native vegetation species	Year 1: Biosolids applied in accordance with Environmental Guidelines: Use and Disposal of Biosolids Products ((NSW Environment Protection Authority, 2000))	GIS data sets with records of areas and application rates for biosolids use	Rehabilitation documented, indicating the required works completed	MOP

Objective	Performance Indicator	Performance Measure	Completion Criteria	Justification / Source
Phase 4 – Ecosystem and Landuse Establishment				
Domain – Rehabilitated Lands				
Land will be rehabilitated in accordance with relevant DRE standards applicable at the time of rehabilitation	Relinquishment reports and associated monitoring data	DRE rehabilitation audits	DPI-MR sign-off on land submitted for relinquishment	MOP
Land and soil capability slope classes will be returned to a class similar to that existing prior to the commencement of mining (generally Classes IV, V and VI)	Land and soil capability slope classes indicators met	• Rehabilitation monitoring results; and • GIS mapping of land and soil capability slope classes with relevant data collected during rehabilitation monitoring.	• Land meets land and soil capability slope classes as per final landuse design; and • Land and soils capability slope classes mapped on relinquishment plan.	(NSW Office of Environment & Heritage, Oct 2012)
Rehabilitated land will be topsoiled, fertilised and sown with pasture and/or native vegetation species	Year 3: 70 % vegetation cover, with evidence of tree establishment in tree lots	Rehabilitation monitoring results	Rehabilitation documented, indicating the required works completed	MOP
Property layout will be planned and designed for optimal use in terms of cattle management	Planning, design and layout undertaken including fencing (materials and construction), delineation of paddocks, access to watering points, stock handling facilities and stock refuge areas	• GIS data on fences, gates, access tracks and paddock layout; • Routine inspections of fences; and • Access tracks are inspected and maintained.	• GIS data sets; • All fences are intact and contain/ control cattle movement; and • Access tracks are accessible and fit for purpose.	MOP

Objective	Performance Indicator	Performance Measure	Completion Criteria	Justification / Source
A sustainable vegetation cover will be established on rehabilitated land	• Year 3: Evidence of litter layer developing; • Year 3: Tree plots indicating good tree growth; and • Year 5: Tree species displaying successful recruitment.	Rehabilitation monitoring results	• Achieve a vegetation cover of 70%, or combined live and litter cover of 70% in established tree belt areas; • Tree belts or plots established, with evidence of continued recruitment; and • Surface litter layer present at 75% of sites	MOP
	• Weed and pest animal control is implemented.	• GIS data on control programs; • GIS data on weed distribution and density; and • Records on implemented work including pesticide usage.	• Noxious weeds and pest animal species are controlled in accordance with legislative requirements.	MOP
Bushfire preparedness and risk mitigation.	Vegetation is managed to control fire	• Implementation of ameliorative actions and management safeguards; and • GIS data on areas where bushfires impact.	• Any bushfires starting on site are controlled; and • GIS data on bushfire footprint.	Rural Fires Act 1997

Objective	Performance Indicator	Performance Measure	Completion Criteria	Justification / Source
Phase 5 – Ecosystem and Landuse Sustainability				
Rehabilitated land will: • Represent a minimal source of offsite environmental impacts; • Require ongoing management inputs no greater than similar adjacent land; and • Be compatible with the proposed post-mining land-use.	All progress indicators regarding landform stability and vegetation cover met	Rehabilitation monitoring results	All completion criteria regarding landform stability and vegetation cover met	MOP
	Carrying capacity and stocking rates are comparable to that of surrounding lands	• Assessment of herbage mass and herbage composition; • Assessment of feed quality and potential carrying capacity; • Assessment of soil nutrient; and • Assessment of cattle weight.	Average weight gain for 350kg yearlings is >1.0kg/day	(NSW Dept. of Primary Industries, 2006)
	Weeds reported and treated during monitoring program	• Annual weed surveys; and • GIS records of weeds infestations and treatment areas.	No significant infestations of declared weeds	Noxious Weeds Act 1993 TSC Act – Key Threatening Processes Australian and NSW Weed Strategies
	Water monitoring results within limits of the current Environment Protection Licence (EPL)	Ongoing monitoring and inspection of water management structures by appropriately qualified person	Water leaving site must meet current EPL criteria	EPL 3391

8 Rehabilitation Monitoring and Reporting

8.1 Inspection

All rehabilitated areas will be inspected by site environment staff (or specialist consultants) to note any problem areas (such as bare patches, failed vegetation, drainage structure failure, significant erosion or significant weed infestation) requiring maintenance or further treatment. Remedial works will then be scheduled to address these areas. The assessment program is designed to collect sufficient data to compare the results of rehabilitation against the agreed completion criteria. The assessment program consists of three components:

- Annual maintenance inspections;
- Scheduled rehabilitation monitoring; and
- Review of inspection/measurement data over time to assess rehabilitation performance.

In the event that the inspection finds there are issues with the rehabilitation, further investigations should be undertaken to determine the possible causes and identify an appropriate remediation strategy. Factors to consider include:

- Nutrient levels;
- Soil limitations such as depth, pH, salinity;
- Insect attack, weeds or other pests;
- Species mix in revegetation programs;
- Drought or storm damage; and
- Excessive grazing.

Where appropriate, the rehabilitation procedures will be amended to improve the standard of rehabilitation.

8.2 Monitoring Sites

The monitoring sites will be permanently marked using steel pickets or similar. Representative monitoring sites will be established in newly rehabilitated areas at an average of one site per 20 ha of newly rehabilitated land, with monitoring plots being based on a 50m transect, positioned along the contour of the slope, and permanently marked using steel pickets. Each site will be monitored within 12 months of establishment and then every two years after. This will provide three sets of monitoring data in the first five years following rehabilitation.

The monitoring program may be updated in consultation with the RR and is described in the MOP.

The parameters to be assessed include:

- Landform:
  - average slop gradient; and
  - Steepest slope gradient.

- Drainage:
  - Contour bank design – number interval and gradient;
  - Contour banks discharge point; and
  - Other drainage structures – dams, drop structures, diversions.
- Surface preparation:
  - Topsoil used – source, depth;
  - Ameliorants or supplements used – rate / ha; and
  - Ripping – depth / type.
- Vegetation establishment:
  - Method – direct seeding or tubestock;
  - Seed mix – species, rate, source;
  - Tubestock – species, density, source; and
  - Fertiliser – type, rate.
- Carrying capacity and stocking rates:
  - Assessment of herbage mass and herbage composition;
  - Assessment of feed quality and potential carrying capacity;
  - Assessment of soil nutrient; and
  - Assessment of cattle weight.
- Weeds – distribution, density and species;
- Fauna recolonising the area – in terms of species recorded and their indicators e.g. scats, tracks, nests;
- Vegetation – groundcover as percentage, groundcover species; species diversity; evidence of recruitment; plant health;
- Nutrient recycling – depth of litter; presence of cryptograms;
- Soils/surface condition;
- Land and soil capability;
- Erosion and stability; and
- A photo showing the general rehabilitation condition.

A standard monitoring plot design as shown in **Figure 10** will be used.

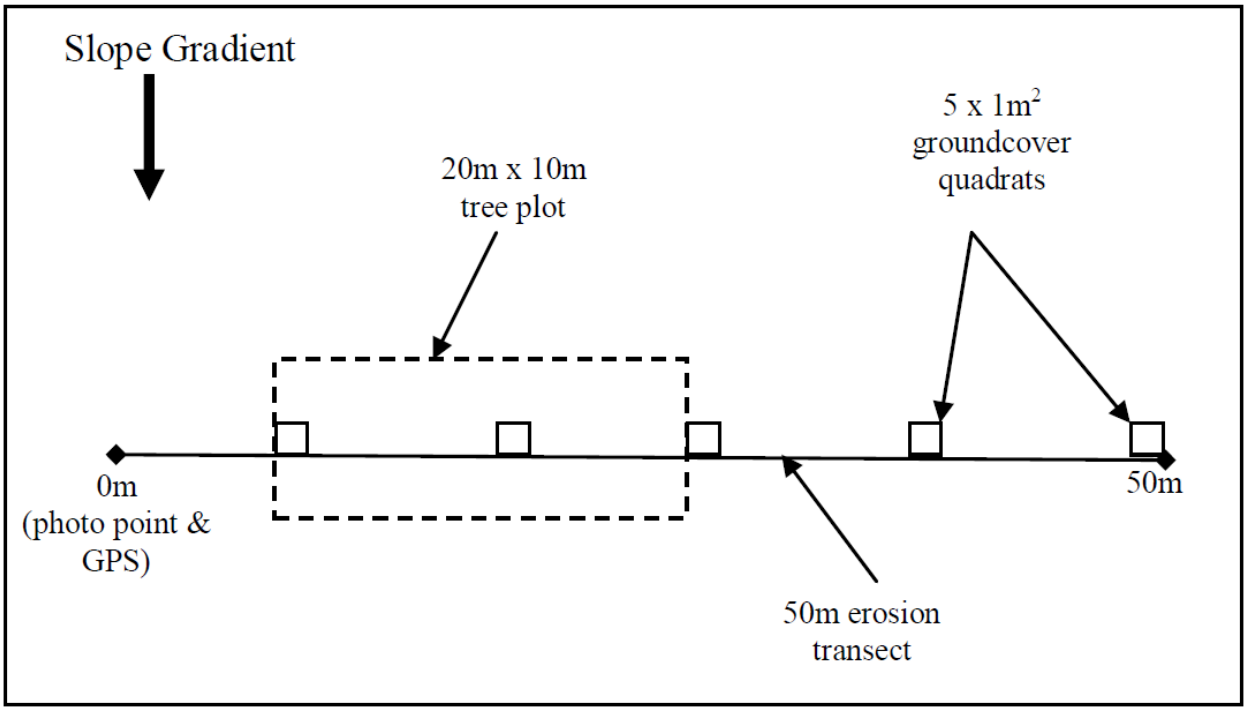


Figure 10
Standard Layout of Rehabilitation Monitoring Plot

8.2.1 Soil Analysis

Soil analysis will be undertaken to confirm that growth media is not likely to inhibit the sustainable development of a vegetative cover. As well as field observations and tests made during monitoring, soils analysis will consist of:

- Collecting representative root zone soil samples during field monitoring;
- Sampling prior to application of biosolids to define the application rates that can be used as per the EPA guidelines (NSW Environment Protection Authority, 2000); and
- Testing for pH, EC and Emerson Aggregate Test (indication of erosion potential).

8.2.2 Pasture Productivity Assessment

In areas with a post mining landuse aligned to pasture, pasture sampling will be undertaken in accordance with the collection technique guidelines – *Form Collect1-Version No.2-01/11/07 supplied by the NSW Department of Primary Industries* (DPI) (NSW Department of Primary Industries, 2007). Samples are to be sent to an accredited laboratory for analysis to determine the quality of feed available. Based on the testing results on the feed quality, pasture productivity will be calculated aligned to stocking rates and farm size assessment tools relevant for beef cattle in the Hunter Valley, which in turn determine sustainable carrying capacities.

8.2.3 Land and Soil Capability Slope Class Assessment

As for disturbance monitoring, the survey area for this component of the monitoring program will not be limited to the transect/plot area, but rather will include the broader surrounding area containing the nominated transects/plots. The land and soil capability scheme slope criteria is applied to the survey area in accordance with the guidelines *The Land and Soil Capability Assessment Scheme* (NSW Office of Environment & Heritage, Oct 2012).

Data will be collected on a range of hazards that are assessed to determine the land and soil capability of the land. These will include climate, soils, erosion and landform.

8.2.4 Photographic Monitoring

Photos will be taken from the permanent star pickets located at the start and end of the monitoring transect/plot, looking in the direction of the transect line. A ground to sky ratio of 5:1 is used where possible. Once the 50 m tape has been laid between the two star pickets, three digital photographs are to be taken as follows:

- A photograph is to be taken to the left of the tape (with the tape just in the frame in the far right);
- A photograph is to be taken with the tape (and star picket) in the centre of the frame; and
- A photograph is to be taken to the right of the tape (with the tape just in the frame in the far left).

Alternatively, and depending on the capability of the digital camera being used, a panoramic shot can be taken centred around the star picket.

8.3 Reporting

Figure 11 diagrammatically shows the rehabilitation process feedback loop and shows how the Rehabilitation Strategy relates with the rehabilitation monitoring, annual reporting, other site plans, MOPs, and conceptual mine closure plans.

8.3.1 Mine Operations Plan

Under the *Mining Act 1992*, environmental protection and rehabilitation are regulated by conditions in all mining leases, including requirements for the submission of a MOP.

The Rix's Creek Mining Operations Plan (2019)) was prepared for the owner/operator of Rix's Creek - Bloomfield Collieries Pty Limited (BCL) for the specific purpose of satisfying the requirements of Mining Lease 1432 (ML 1432 – Clause 2) and Coal Lease 352 (CL352 – Clause 3). It was also prepared in accordance with requirements of the DRE Draft Mining Operations Plan Guidelines (NSW Trade & Investment Environment Sustainability Unit - Mineral Resources, March 2013) for Level 1 mines.

8.3.2 Environmental Management System

The ongoing effectiveness and efficiency of the site Management System is monitored as part of the operation's day-to-day management. Feedback from this and other more formal reviews and/ or following special occurrences, form the basis for System improvement and re-design.

In general, Management Systems are reviewed and up-dated as follows:

- Every three years; or
- Whenever there is a significant change to relevant legislation; or
- If required to do so by the Regulations; or
- Whenever there is a significant change to the operations; or
- If required (in writing) to do so by the Chief Inspector; or
- Whenever control measures are found to be ineffective either through:
- Changes to the working environment; or
- Changes to operating systems; or
- Subsequent risk assessments; or
- The findings of an audit; or
- Following a fatality or dangerous incident that could reasonably have been expected to result in a fatality; or
- Following an assessment of a related safety alert.

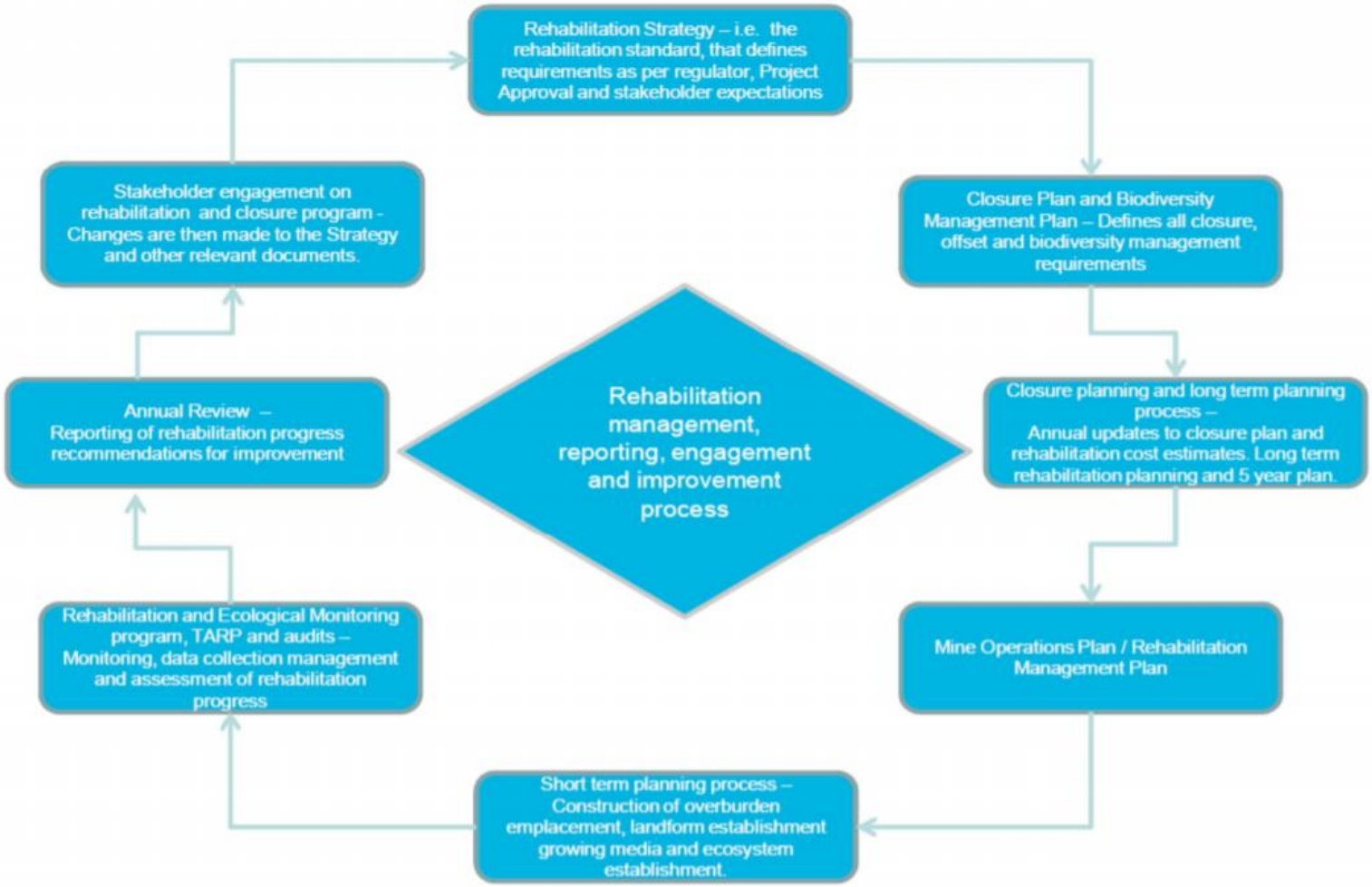


Figure 11
Rehabilitation Process Feedback Loop

8.3.2.1 Continual Improvement

Operational activities will be subject to regular review to ensure conformance with commitments made in the EMS and subordinate plans and strategies.

8.3.2.2 Document Management

Copies of this document will be managed under the Group Document Management System. This document and other relevant documents are kept on site and are available to all employees.

Bloomfield company directors will be responsible for the overall rehabilitation and environmental performance of the Mine. Senior Operational managers have direct responsibility for the rehabilitation process. The Environmental Manager provides direction and advice to ensure site environmental compliance is maintained. The Environmental Advisor is responsible for the implementation of the works for the Mine. This involves ensuring all aspects of the rehabilitation processes are followed and carried out.

8.3.2.3 Annual Review

Bloomfield prepares an AR in accordance with the Integrated Mining Policy, Mining Lease Requirements and Development Consent Conditions.

8.3.3 Rehabilitation Objectives review

As required under Condition B72(p), every three years Bloomfield will review the final landform and final void outcomes in Section 1.3.2 to ensure consistency with the relevant Rehabilitation Objectives in **Table 4**.

The review will be undertaken in consultation with the Resources Regulator and SSC. The outcomes against objectives at **Section 8.3.2.3** will be documented in the Annual Review.

Where changes are required, the outcomes of this review will be incorporated into a revised version MOP. The first review will be conducted in 2023.

8.3.4 Relinquishment Reporting

Prior to submission of a sign-off proposal, the land proposed for signoff will be subjected to a final maintenance inspection. This inspection will cover the whole area proposed for sign-off. The outcome of the inspection will be a documented description and photographic record of the general condition of rehabilitation, highlighting any areas of potential concern. This report will be included in the submission to the Resources Regulator.

Once a rehabilitated area is deemed to be potentially suitable for sign-off, a Sign-off Report will be submitted to the regulators. This report will include the following information for the proposed sign-off area:

- Survey Plan clearly showing the area proposed for relinquishment;
- Area size, disturbance and rehabilitation history;
- Monitoring data compared against rehabilitation aim, objectives and completion criteria;

- Final maintenance inspection findings;
- Photographs of the proposed area; and
- Monitoring data that demonstrates that the proposed area has reached the objectives, measures, performance indicators and criteria for Rehabilitation Complete as described in the MOP.

8.3.5 Incident Reporting

Condition E7 of SSD 6300 requires Bloomfield to immediately report any incidents to DPIE and any other relevant agencies. An incident is defined in the Development Consent as:

> "*An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance*."

In accordance with Condition E7 of SSD 6300, the Incident Report would include:

- Identification of the development (including development application number and name); and
- Location and nature of the incident.

Bloomfield is required to report any non-compliances to DPIE in writing within seven (7) days of becoming aware of the non-compliance under Condition E8 of SSD 6300. A non-compliance is defined as:

> "*An occurrence, set of circumstances or development that is a breach of this consent.*"

In accordance with Condition E8 of SSD 6300, a non-compliance report includes:

- Identification of the development (including development application number and name);
- Set out the condition of this approval that the development is non-compliant with;
- The way in which it does not comply and the reasons for the non-compliance (if known)
- What actions have been, or will be, undertaken to address the non-compliance.

8.4 Strategy Review and Auditing

Condition E5 of SSD 6300 requires that, within three months of the submission of the following documents, Bloomfield will review, and if necessary, revise the Rehabilitation Strategy to the satisfaction of the Planning Secretary:

- Annual Review in accordance with Condition E9;
- Incident report under Condition E7;
- Audit report under Condition E10; or
- Modification to the conditions of SSD 6300 (unless the conditions require otherwise).

Condition E6 of SSD 6300 states:

> *"If necessary, to either improve the environmental performance of the development or cater for a modification, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary."*

Where revisions are required, the revised document will be submitted to the Planning Secretary for approval within six weeks of review.

Under Condition E10 of SSD 6300, an independent environmental audit of RCS operations will be conducted within one year of commencing development under the consent and every three years and the results reported to the Secretary DPIE and made available on the website.

Actions and recommendations are communicated to senior management and actioned as necessary. Actions are tracked through the action management database.

The revision to this Rehabilitation Strategy will include stakeholder engagement described in **Section 3**.

Not withstanding the above, this Rehabilitation Strategy will be reviewed at less than 5 yearly intervals.

8.5 Premature Closure

Premature closure could occur through:

- a short-term care and maintenance (C&M) phase lasting one to two years which could be due to price or weather issues for example, but have a foreseeable resolution date;
- longer term C&M lasting more than one to two years, which could be triggered by large scale technical failures or financial bankruptcy of the owner, but there is a foreseeable solution enabling future operations; and
- Unplanned early closure, where future operations are not foreseeable under any plausible circumstances.

These scenarios could also occur at various times throughout the operation of RCS. This makes it impractical to have a detailed plan for all possible scenarios.

8.5.1 C&M Scenarios

However, the following provides an example of a preliminary framework that could be utilised for contingency plans for a C&M scenario:

- open cut:
  - close unnecessary ramps
  - shape benches for drainage control
  - establish monitoring requirements and resources.
- overburden emplacement areas;
  - ensure sumps and sediment management infrastructure are operational;
  - undertake temporary rehabilitation of exposed areas;
- water storages:
  - all dams would remain under this situation, although pump and pipe infrastructure may be altered to meet the requirements of the revised water balance
- tailings storage:
  - Update the site procedures and train the relevant personnel in the details;
- Infrastructure:
  - Undertake shutdown procedure including isolating and tagging out equipment;

- secure chemical storages;
- run down stocks, send to other sites or return to suppliers as required;
- remove contaminated wastes;
- review the magazine and blasting agents compound stocks; run down stocks, send to other sites or return to suppliers, as required; and
- Secure any infrastructure that will not be active through the C&M period.

8.5.2 Unplanned Permanent Early Closure

The following provides an example of a preliminary framework that could be utilised for contingency plans for an unplanned early closure.

Note that in this unlikely scenario, a Mine Closure MOP would be prepared in consultation with relevant regulators and that detailed direction would override any information provided herein:

- open cut:
  - close ramps
  - shape benches for drainage control
  - establish monitoring requirements and resources;
  - final void treatment as per relevant regulatory guidelines;
  - final rehabilitation completed as per approved final landform;
- overburden emplacement areas;
  - final rehabilitation completed as per approved final landform;
- water storages:
  - dams would remain or be filled in accordance with approved final landform;
- tailings storage:
  - final rehabilitation completed as per approved final landform;
- infrastructure:
  - Identification of all, and removal and/or reuse of infrastructure as per the approved MOP;
  - Radiation sources disposed of in accordance with relevant legislation;
- personnel:
  - Consultation with workforce and suppliers on cessation of work and development of a relevant plan;
  - Assessment of impacts and measures to address impacts on the local community (as part of the SIMP); and
- regulations:
  - Licensing and approvals relinquished in accordance with legislation; and
  - Relevant plans and strategies updated and/or relinquished.

The reporting as detailed in **Section 8.3** highlights the fact that such reports contain up-to-date information of the disturbed areas and the progressive rehabilitation status.

9 Roles and Responsibilities

Relevant roles and responsibilities associated with this Rehabilitation Strategy are presented in **Table 100**.

Table 10
Roles and Responsibilities

Role	Responsibilities	Section
Mine Manager	• Provide adequate resources for the implementation of this Rehabilitation Strategy.	8.3.1
Environment Manager (or delegate)	• Implement management and mitigation measures to meet the plan objectives.	1.3.2
	• Incorporate lessons learnt into MOP reviews and implementation of rehabilitation.	12.2
	• Development of the SIMP will consider relevant social and economic issues from contemporary SSC strategies and plans.	2.4.2
	• Ensure rehabilitation goals incorporated and refined in the MOP.	2.5
	• Undertake stakeholder consultation relevant to rehabilitation and closure as described in this Rehabilitation Strategy.	3.5
	• Review the risk assessment as described in this Rehabilitation Strategy.	4.2
	• Continue to refine future use of disturbed areas in the MOP utilising the conceptual principles in this plan.	5
	• Refine the final void in the MOP utilising the conceptual principles in this plan. Further investigations described will be undertaken within 10 years of closure and incorporate stakeholder engagement.	5.8 and 3.5
	• Refine the management of unmined land in the MOP to integrate with post mining land use strategies (grazing).	5.9
	• In revisions to this Plan, consider if any changes to post-mining landuse options are appropriate in consideration of regulatory policy.	6
	• Continue to be involved in research projects focusing on rehabilitation of open cut mines.	6 6

Role	Responsibilities	Section
	• Refine rehabilitation phases and domains in the MOP. • Integrate post mining landform to align with that of the adjoining RCN and consistent with the landscape of the surrounding area. • Review and develop the performance criteria, measures and indicators in consultation with the RR and include in the MOP. • Undertaken rehabilitation monitoring and reporting, as refined in the MOP to ensure continual improvement. • Review the final landform and final void outcomes to ensure consistency with the relevant rehabilitation objectives each three years (from 2023) in consultation with the RR in accordance with condition 72(p). • Conduct relinquishment reporting in accordance with the requirements of the RR and in accordance with the MOP. • Report incidents, conduct auditing and reporting in accordance with conditions of SSD6300.	6.7 7 8 8.3.3 8.3.4 8.3.5 and 8.4
ll employees and contractors	• Comply with the management requirements and commitments contained within this management plan relevant to their roles. • Report all non-compliances with this plan as per Bloomfield reporting procedures.	7 8.3.5

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11 Acronyms

Acronym	Description
ACARP	Australian Coal Association Research Program
AR	Annual Review
BCD	DPIE Biodiversity Conservation Division
BCL	Bloomfield Collieries Pty Limited
BSAL	Biophysical Strategic Assessment Land
CCC	Community Consultative Committee
CHPP	Coal Handling Preparation Plant
DGRs	Director–General's Requirements
DPIE	NSW Department of Planning, Industry and Environment
DPI	NSW Department of Primary Industries
EA	Environmental Assessment
EC	Electrical Conductivity
EMP	Environmental Management Plans
EMS	Environmental Management System
EPA	NSW Environmental Protection Agency
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environmental Protection Licence
ESCP	Erosion and Sediment Control Plan
GIS	Geographical Information System
ha	Hectare
IPCN	Independent Planning Commission of New South Wales
ML	Mining Lease
Mtpa	Million tonnes per annum
NSWMC	New South Wales Minerals Council
OEH	Office of Environment and Heritage
ROM	Run of Mine
RR	NSW - Department of Regional NSW- Resources Regulator (previously DRE and DRG)
TEA	Tailings emplacement areas
UHMD	Upper Hunter Mining Dialogue
WMP	Water Management Plan

Appendix A – Development Consent Requirements

Table A2
SSD 6300 Consent Conditions

Ref	Legal Requirement	Section
Condition E5	**Revision of Strategies, Plans & Programs** Within 3 months of: (a) the submission of an incident report under condition E7; (b) the submission of an annual review under condition E9; (c) the submission of an Independent Environmental Audit under condition E10, or (d) the modification of the conditions of this consent (unless the conditions require otherwise), The suitability of existing strategies, plans, and programs required under this consent must be reviewed by the Applicant.	**8.4**
Condition E6	**Revision of Strategies, Plans & Programs** If necessary, to either improve the environmental performance of the development or cater for a modification, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within 6 weeks of the review. *Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development*.	**8.4**
Condition E7	**Incident Notification** The Applicant must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing to compliance@planning.nsw.gov.au and identify the development (including the development application number and name) and set out the location and nature of the incident.	**8.3.5**
Condition E8	**Non-compliance Notification** Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing to compliance@planning.nsw.gov.au and identify the development (including the development application number and name), set out the condition of this approval that the development is non-compliant with, the way in which it does not comply and the reasons for the noncompliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.	**8.3.5**

Ref	Legal Requirement	Section
	Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.	
Condition E9	**Annual Review** By the end of March each year, after the commencement of development, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department reviewing the environmental performance of the development to the satisfaction of the Planning Secretary. This review must: (e) describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year; (f) report on the progress of biodiversity credits retirements and the associated actual versus proposed surface disturbance of each stage; (g) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the: (i) relevant statutory requirements, limits or performance measures/criteria; (ii) requirements of any plan or program required under this consent; (iii) monitoring results of previous years; and (iv) relevant predictions in the document/s listed in condition A2(c); (h) identify any non-compliance or incident over the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reccurence; (i) evaluate and report on: (i) The effectiveness of the noise and air quality management systems; and (ii) compliance with the performance measures, criteria and operating conditions of this consent; (j) identify any trends in the monitoring data over the life of the development; (k) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	**8.3.2.3**

Ref	Legal Requirement	Section
	describe what measure will be implemented over the current calendar year to improve the environmental performance of the development.	
Condition E10	**INDEPENDENT ENVIRONMENTAL AUDIT** Within one year of commencing development under this consent, and every 3 years thereafter, unless the Planning Secretary directs otherwise, the Proponent must commission and pay the full cost of an Independent Environmental Audit of the project. This audit must: (l) be led by a suitably qualified, experienced and independent auditor whose appointment has been endorsed by the Secretary; (m) be led and conducted by a suitably qualified, experienced and independent team of experts (including any expert in field/s specified by the Planning Secretary) whose appointment has been endorsed by the Planning Secretary; (n) be carried out in consultation with the relevant agencies and the CCC; (o) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent, water licences and mining leases for the development (including any assessment, strategy, plan or program required under these approvals); (p) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals and this consent; (q) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, strategy, plan or program required under the abovementioned approvals and this consent; and be conducted and reported to the satisfaction of the Secretary.	**8.4**

Appendix B – Regulatory Correspondence

Table B1
Key Singleton Shire Council Comments and Where Addressed

Issue	Where Addressed
In general, the Rehabilitation Strategy lacks clarity on the relationship between this Strategy and other plans/strategies/outcomes required as conditions of approval. Specifically, further clarity is required on: - The relationship between the Rehabilitation Management Plan and the overarching Rehabilitation Strategy; - The relationship between the Rehabilitation Strategy required under SSD 6300 and those approved under DA08_0102; and - There is a general lack of clarity around the established (or existing approved) final land use, the rehabilitation outcomes (ecological and agricultural) and the yet to be determined post closure land use(s).	3.4
The Rehabilitation Strategy does not provide detail on how these relationships will be achieved. The Strategy lacks discussion on the existing surrounding land uses, or the future proposed land uses of surrounding operations and surrounding landowners, and how the final landform proposed in the Strategy will accommodate and/or synergise with those uses, including co-existence of uses. Specifically, the Strategy does not review the requirements set out in Singleton Council's adopted Local Strategic Planning Statement and the Hunter Regional Plan. This review would go some way towards a discussion on how the land uses for the site (including the final void) align with regional and local strategic land use planning objectives and outcomes and support a sustainable future for the local community. This is a requirement of condition B72.	2.2 and 2.4
The Strategy does not include a program to review and refine the final landform and final void outcomes to meet the relevant Rehabilitation Objectives in Table 6, in consultation with the Resources Regulator and the Council every three years.	8.3.3
Section 3 includes a description of the Stakeholder Engagement Strategy for mine rehabilitation and closure. A list of engagement activities that includes inform, consult, involve, collaborate, empower and recognition are included in this section. However, the section does not include details of what aspects of rehabilitation and mine closure would be addressed under each engagement strategy. This section includes broad principles of engagement, with no detail on what engagement will occur, when it will occur and with whom. It is also unclear the circumstances that would lead to engagement taking place, and whether engagement activities would change as a result of review/changes to mine planning/results of management action.	3.5
Section 4.2 summarises the mine closure risk assessment. It is not clear whether this risk assessment incorporates rehabilitation activities (both during and post mining), unplanned closure and care and maintenance risks. It is not clear whether the risk assessment has been (or will be) reviewed following feedback from the engagement activities listed in section 3. It is also not clear how the risks identified in the assessment will be managed and whether they reflect concerns raised through consultation and engagement.	4.2
Condition 72(o) requires the Strategy to investigate ways to minimise adverse socio-economic effects. Section 4.5 provides limited information on the social and economic	4.5

Issue	Where Addressed
impacts and opportunities relevant to the Rehabilitation Strategy and mine closure and does not include ways to minimise socio-economic effects of closure.	
Section 5.2 identifies Heritage Areas as a specific domain for the purposes of rehabilitation and mine closure. This section replicates condition B59 of SSD 6300 and provides little detail as to how heritage will be managed during rehabilitation and mine closure activities. There are no details regarding the post mining outcomes for heritage located on site.	5.2
Section 5.7.2 discusses the agricultural effects of the mining operation and the post mining land use of grazing. Reference is made to land capability assessments relevant to the mining environment. It is not clear how the proposed land capabilities for the post mining landform will be achieved, the criteria that would be used to determine success and what adaptive management measures would be taken should monitoring identify objectives are not being met. Reference is also made to *proven current land management practices*, it is not clear what these practices are or the criteria that has been used to determine success.	5.7.2
Section 5.7.4 discusses the key elements of the final landform. This section does not include how these elements will be achieved, the measures of success and the adaptive management actions that would be taken should monitoring demonstrate a trajectory away from success.	5.7.4
Section 5.8 includes planning considerations that have been incorporated into the design of the final void. These include a void with low safety risk, minimal out of pit dumping and creating a void that is not visible. It is not clear how these factors will be met. The post-mining standing water level is not provided, making it difficult to determine whether the planning considerations are achievable. Reference is made to a *final design alternative*; it is not clear what this means. The company is committed to undertaking additional investigation into final void rehabilitation options. It is not clear how the outcomes of these investigations will be incorporated into the Rehabilitation Strategy and communicated as per the engagement strategy. There is no timeline provided in the Strategy for the completion of these investigations.	5.8
Section 5.8 includes the statement *the design contained in the Rehabilitation Strategy does not account for additional material to remediate the final pit void that may be sourced from areas outside the present planning operations of the Mine*. Further clarification regarding the intent of this statement should be included in the Strategy.	5.8
Section 5.9 provides information on the potential future uses of unmined land, or buffer land. Further clarification regarding the integration of buffer land with post mining land uses, surrounding land uses and future potential land uses should be included in the Strategy.	5.9 and 2.3

Issue	Where Addressed
Section 6 lists initial post mining land uses including agriculture, open space, native vegetation, recreation, residential, industrial, aquaculture and commercial. Very little detail is provided on the permissibility, suitability, sustainability or viability of these options, including where on the mine or buffer land these land uses could occur. It is also not clear how these options align to regional and local strategic land use planning outcomes.	6
Section 6 includes reference to the conceptual phases of sustainable ecosystem development. An important element missing from these phases is the final land use. Without a defined final land use that marries to the landform, Phase 2 will not succeed. The Strategy should include the landform establishment elements required to meet the post mining land use options identified, and if the landform cannot meet these options, what other alternatives are there that provide a sustainable future for the local community that minimise adverse socio-economic effects associated with rehabilitation and mine closure.	6
Table 8 includes the current rehabilitation progress for each rehabilitation domain, suggesting that a number of domains are at rehabilitation completion stage. This appears to contradict the Strategy in section 5. Where domains are in final rehabilitation phases, a final land use option should be defined, mapped and assessed for sustainability. The Strategy does not include this level of analysis.	6
Section 7 includes the performance criteria, measures and indicators for rehabilitation and mine closure. This section should include the adaptive management responses that would be implemented in the event these measures and criteria are not met. The section also identifies that rehabilitation aims and objectives are set with agreement from various stakeholders. These stakeholders are not defined. The rehabilitation aims and objectives are also, in Figure 9, based on proposed post-mining land use and regulatory requirements. This is not the case as the aims and objectives are based on the Phases of Rehabilitation described in section 6 and Figure 5. Council agrees that the aims and objectives should be based on a defined post mining land use.	7
Figure 9 includes a reference to rehabilitation maintenance and continual improvement loop until sign off is achievable. The Strategy should include how this continual improvement loop will occur and the triggers for its implementation. Further details regarding how sign off would be achieved from stakeholders other than the regulatory should also be included in the Strategy.	6
Table 9 provides a comprehensive analysis of the objectives, indicators, measures and criteria. However, the relationship between objective, indicator, measure and criteria is not clear. For example, under Phase 2, the objective is for rehabilitated land to be compatible with the surrounding natural landscape. There are no performance indicators, measures or criteria to determine how this objective will be met. In addition, Phase 2 references a stable drainage network, however, does not include any water quality criteria. It's not clear whether Table 9 includes the final void, and Table 9 does not include any water quality objectives, indicators, measures or criteria.	6

Issue	Where Addressed
Section 8.4 should include an adaptive management strategy and response, including how stakeholders will be consulted on outcomes and changes to the Strategy as a result of an annual review, incident report, audit report or consent modification.	8.4
Section 8.5 includes consideration of premature closure or care and maintenance. The Strategy states that it is impractical to have a detailed plan for premature closure or care and maintenance. Planning for closure should take place at all stages of mine life, including operations and further detail should be included in the Strategy to determine how closure planning will occur under these scenarios. The Strategy should include a *description of how the rehabilitation will be integrated with the mine planning process, including a plan to address premature mine closure* [condition 72(g)]. At a minimum the need to review any rehabilitation and closure plan should take place annually to ensure adequate resources are available to support minimal impacts to the environment and community, in the event these scenarios occur.	8.5
Additionally, further clarification is required on the adaptive management strategies that will be implemented if, during operations and/or review of the Strategy, the Rehabilitation Objectives in Table 6 of the approval are not being met.	

Table B1
Key Resources Regulator Comments and Where Addressed

Issue	Where Addressed
• Noting that the intent of the Rehabilitation Strategy is to set the strategic direction and outcomes for rehabilitation of the mine, it is the Regulator's view that Section 6.0 (Phases in the Rehabilitation Strategy) and Section 8.0 (Rehabilitation Monitoring & Reporting) are too prescriptive and duplicative of the requirements for the content of a Mining Operations Plan (MOP) required under the conditions of the mining lease. Approval of the Rehabilitation Strategy may cause unnecessary regulatory burden where subsequent modifications to both the Rehabilitation Strategy and MOP may be required to accommodate for changes to rehabilitation procedures or the adoption of new and innovative practices. As such, it is the Regulator's preference that this detail is captured as per requirements under the *Mining Act 1992* (e.g. currently the MOP process).	1.3.2.1
• In relation to Section 7.0 of the Rehabilitation Strategy (Performance Criteria, Measures and Indicators), the Regulator will require further refinement of the completion criteria under the requirements of the *Mining Act 1992* (currently the MOP process) to ensure that they are more specific and measurable. However, the completion criteria as developed through the MOP process will need to reflect and not be inconsistent with the rehabilitation objectives and the conceptual approved final landform (Figure 3) as outlined in the Rehabilitation Strategy document.	7
• In relation to Figures 6 to 8, which provide an indicative 5 yearly progressive rehabilitation schedule from 2025 to 2035, the Regulator's expectation will be that	6

Issue	Where Addressed
rehabilitation is undertaken as soon as reasonably practical after the disturbance occurs.	

Planning, Industry & Environment

Mr Chris Knight
Environment Manager
The Bloomfield Group
PO Box 4
East Maitland NSW 2323

17/02/2020

Dear Mr Knight

Rix's Creek South Continuation Project (SSD 6300)
Endorsement of Experts – Rehabilitation Strategy

I refer to your request for the Secretary's endorsement of suitably qualified persons to prepare a Rehabilitation Strategy for the Rix's Creek South Continuation Project (SSD 6300).

The Department has reviewed the nominations and information you have provided and is satisfied that this expert is suitably qualified and experienced. Consequently, I can advise that the Secretary endorses the appointment of Mr Clayton Richards of MineSoils to prepare the Rehabilitation Strategy, assisted by Ms Dianne Munro of Hansen Bailey.

If you wish to discuss the matter further, please contact Melanie Hollis on 8217 2043.

Yours sincerely

Matthew Sprott
A/Director
Resource Assessments (Coal & Quarries)

As nominee of the Planning Secretary

NSW GOVERNMENT

Resources Regulator

FORM:EAMS generic v1.3

Our ref: MAAG0007433
LETT0004785

BLOOMFIELD COLLIERIES PTY LTD
P.O. BOX 4
EAST MAITLAND NSW 2323
Attn: Chris Knight

Dear Chris Knight

RE: Rix's Creek South Rehabilitation Strategy

In accordance with Condition B72 of SSD-6300-PA-18 (Rix's Creek Coal Mine Extension), the Bloomfield Group has submitted the Rehabilitation Strategy for consultation with the Resources Regulator (Regulator). Based on its review of the Rehabilitation Strategy, the Regulator provides the advice as outlined below.

- Noting that the intent of the Rehabilitation Strategy is to set the strategic direction and outcomes for rehabilitation of the mine, it is the Regulator's view that Section 6.0 (Phases in the Rehabilitation Strategy) and Section 8.0 (Rehabilitation Monitoring & Reporting) are too prescriptive and duplicative of the requirements for the content of a Mining Operations Plan (MOP) required under the conditions of the mining lease. Approval of the Rehabilitation Strategy may cause unnecessary regulatory burden where subsequent modifications to both the Rehabilitation Strategy and MOP may be required to accommodate for changes to rehabilitation procedures or the adoption of new and innovative practices. As such, it is the Regulator's preference that this detail is captured as per requirements under the *Mining Act 1992* (e.g. currently the MOP process).
- In relation to Section 7.0 of the Rehabilitation Strategy (Performance Criteria, Measures and Indicators), the Regulator will require further refinement of the completion criteria under the requirements of the *Mining Act 1992* (currently the MOP process) to ensure that they are more specific and measurable. However, the completion criteria as developed through the MOP process will need to reflect and not be inconsistent with the rehabilitation objectives and the conceptual approved final landform (Figure 3) as outlined in the Rehabilitation Strategy document.
- In relation to Figures 6 to 8, which provide an indicative 5 yearly progressive rehabilitation schedule from 2025 to 2035, the Regulator's expectation will be that rehabilitation is undertaken as soon as reasonably practical after after the disturbance occurs.

In addition to the above, it should be noted that under the conditions of the mining authority granted under the *Mining Act 1992*, the Regulator requires an authority holder to adopt a risk-based approach to achieving the required rehabilitation outcomes. The applicability of the controls to achieve effective and sustainable rehabilitation is to be determined based on site specific risk assessments conducted by the authority holder. An authority holder may also be directed by the Regulator to implement further risk control measures that may be required to achieve effective rehabilitation outcomes.

If you require additional information, please contact the Resources Regulator on 1300 814 609 (Option 2, then 5), or via email at nswresourcesregulator@service-now.com.

Yours sincerely,

Resources Regulator
516 High Street MAITLAND NSW 2320 Australia | PO Box 344 HRMC NSW 2310 Australia
Tel: 1300 814 609

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Matthew Newton
Principal Inspector Environment & Rehab
Mining Act Inspectorate
Resources Regulator

7 August 2020

SINGLETON COUNCIL

13 August 2020

Chris Knight
Environment Manager
The Bloomfield Group
P O Box 4
EAST MAITLAND NSW 2323

Dear Chris

RE: Request for comment: Rehabilitation Strategy

I refer to your request via the Major Projects Planning Portal to Singleton Council requesting comment from Council on the Rehabilitation Strategy for the Rix's Creek South Mine. This letter forms Council's comments in relation to that request.

The Rehabilitation Strategy (**Strategy**) prepared by Rix's Creek details the proposed rehabilitation strategy that would be applied to meet compliance with the requirements of SSD6300, and specifically conditions B69, B70, B71, B72 and B73.

Condition B72 specifically requires the preparation of a Rehabilitation Strategy that includes, amongst other things:

- A description of the overall rehabilitation outcomes for the site, addressing all aspects of rehabilitation including mine closure, final landform (including final voids), post-mining land use/s and water management;
- A description of how the rehabilitation will be integrated with the mine planning process, including a plan to address premature mine closure
- An investigation of opportunities to refine and improve the final landform and final void outcomes over time;
- A risks and opportunities assessment and risk register that includes risks associated with unplanned closure or care and maintenance;
- Including a post mining land use strategy to investigate and facilitate beneficial land uses for the site (including the final void) that:
    - Align with regional and local strategic land use planning objectives and outcomes;
    - Support a sustainable future for the local community;
    - Utilise existing mining infrastructure, where practicable; and
    - Avoids disturbance of self-sustaining native ecosystems, where practicable
- Includes a stakeholder engagement plan to guide rehabilitation and mine closure planning processes and outcomes;
- Investigates ways to minimise adverse socio-economic effects associated with rehabilitation and mine closure; and
- Includes a program to review and refine the final landform and final void outcomes to meet the relevant Rehabilitation Objectives in Table 6, in consultation with the Resources Regulator and the Council every three years.

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Table 6 of the approved development includes a list of Rehabilitation Objectives, which must be met at mine closure. These include objectives related to rehabilitation areas used as native ecosystem re-establishment, agricultural land, final landform, final voids, highwall access to underground coal resources, surface infrastructure, water quality and community.

General Comments

In general, the Rehabilitation Strategy lacks clarity on the relationship between this Strategy and other plans/strategies/outcomes required as conditions of approval. Specifically, further clarity is required on:

- The relationship between the Rehabilitation Management Plan and the overarching Rehabilitation Strategy;
- The relationship between the Rehabilitation Strategy required under SSD 6300 and those approved under DA08_0102; and
- There is a general lack of clarity around the established (or existing approved) final land use, the rehabilitation outcomes (ecological and agricultural) and the yet to be determined post closure land use(s).

The Rehabilitation Strategy does not provide detail on how these relationships will be achieved. The Strategy lacks discussion on the existing surrounding land uses, or the future proposed land uses of surrounding operations and surrounding landowners, and how the final landform proposed in the Strategy will accommodate and/or synergise with those uses, including co-existence of uses. Specifically, the Strategy does not review the requirements set out in Singleton Council's adopted Local Strategic Planning Statement and the Hunter Regional Plan. This review would go some way towards a discussion on how the land uses for the site (including the final void) align with regional and local strategic land use planning objectives and outcomes and support a sustainable future for the local community. This is a requirement of condition B72.

The Strategy does not include a program to review and refine the final landform and final void outcomes to meet the relevant Rehabilitation Objectives in Table 6, in consultation with the Resources Regulator and the Council every three years.

Specific Comments

Section 3 includes a description of the Stakeholder Engagement Strategy for mine rehabilitation and closure. A list of engagement activities that includes inform, consult, involve, collaborate, empower and recognition are included in this section. However, the section does not include details of what aspects of rehabilitation and mine closure would be addressed under each engagement strategy. This section includes broad principles of engagement, with no detail on what engagement will occur, when it will occur and with whom. It is also unclear the circumstances that would lead to engagement taking place, and whether engagement activities would change as a result of review/changes to mine planning/results of management action.

Section 4.2 summarises the mine closure risk assessment. It is not clear whether this risk assessment incorporates rehabilitation activities (both during and post mining), unplanned closure and care and maintenance risks. It is not clear whether the risk assessment has been (or will be) reviewed following feedback from the engagement activities listed in section 3. It is also not clear how the risks identified in the assessment will be managed and whether they reflect concerns raised through consultation and engagement.

Condition 72(o) requires the Strategy to investigate ways to minimise adverse socio-economic effects. Section 4.5 provides limited information on the social and economic impacts and opportunities relevant to the Rehabilitation Strategy and mine closure and does not include ways to minimise socio-economic effects of closure.

Section 5.2 identifies Heritage Areas as a specific domain for the purposes of rehabilitation and mine closure. This section replicates condition B59 of SSD 6300 and provides little detail as to how heritage will be managed during rehabilitation and mine closure activities. There are no details regarding the post mining outcomes for heritage located on site.

Section 5.7.2 discusses the agricultural effects of the mining operation and the post mining land use of grazing. Reference is made to land capability assessments relevant to the mining environment. It is not clear how the proposed land capabilities for the post mining landform will be achieved, the criteria that would be used to determine success and what adaptive management measures would be taken should monitoring identify objectives are not being met. Reference is also made to *proven current land management practices*, it is not clear what these practices are or the criteria that has been used to determine success.

Section 5.7.4 discusses the key elements of the final landform. This section does not include how these elements will be achieved, the measures of success and the adaptive management actions that would be taken should monitoring demonstrate a trajectory away from success.

Section 5.8 includes planning considerations that have been incorporated into the design of the final void. These include a void with low safety risk, minimal out of pit dumping and creating a void that is not visible. It is not clear how these factors will be met. The post-mining standing water level is not provided, making it difficult to determine whether the planning considerations are achievable. Reference is made to a *final design alternative*; it is not clear what this means. The company is committed to undertaking additional investigation into final void rehabilitation options. It is not clear how the outcomes of these investigations will be incorporated into the Rehabilitation Strategy and communicated as per the engagement strategy. There is no timeline provided in the Strategy for the completion of these investigations.

Section 5.8 includes the statement *the design contained in the Rehabilitation Strategy does not account for additional material to remediate the final pit void that may be sourced from areas outside the present planning operations of the Mine*. Further clarification regarding the intent of this statement should be included in the Strategy.

Section 5.9 provides information on the potential future uses of unmined land, or buffer land. Further clarification regarding the integration of buffer land with post mining land uses, surrounding land uses and future potential land uses should be included in the Strategy.

Section 6 lists initial post mining land uses including agriculture, open space, native vegetation, recreation, residential, industrial, aquaculture and commercial. Very little detail is provided on the permissibility, suitability, sustainability or viability of these options, including where on the mine or buffer land these land uses could occur. It is also not clear how these options align to regional and local strategic land use planning outcomes.

Section 6 includes reference to the conceptual phases of sustainable ecosystem development. An important element missing from these phases is the final land use. Without a defined final land use that marries to the landform, Phase 2 will not succeed. The Strategy should include the landform establishment elements required to meet the post mining land use options identified, and if the landform cannot meet these options, what other alternatives are there that provide a sustainable future for the local community that minimise adverse socio-economic effects associated with rehabilitation and mine closure.

Table 8 includes the current rehabilitation progress for each rehabilitation domain, suggesting that a number of domains are at rehabilitation completion stage. This appears to contradict the Strategy in section 5. Where domains are in final rehabilitation phases, a final land use option should be defined, mapped and assessed for sustainability. The Strategy does not include this level of analysis.

Section 7 includes the performance criteria, measures and indicators for rehabilitation and mine closure. This section should include the adaptive management responses that would be implemented in the event these measures and criteria are not met. The section also identifies that rehabilitation aims and objectives are set with agreement from various stakeholders. These stakeholders are not defined. The rehabilitation aims and objectives are also, in Figure 9, based on proposed post-mining land use and regulatory requirements. This is not the case as the aims and objectives are based on the Phases of Rehabilitation described in section 6 and Figure 5. Council agrees that the aims and objectives should be based on a defined post mining land use.

Figure 9 includes a reference to rehabilitation maintenance and continual improvement loop until sign off is achievable. The Strategy should include how this continual improvement loop will occur and the triggers for its implementation. Further details regarding how sign off would be achieved from stakeholders other than the regulatory should also be included in the Strategy.

Table 9 provides a comprehensive analysis of the objectives, indicators, measures and criteria. However, the relationship between objective, indicator, measure and criteria is not clear. For example, under Phase 2, the objective is for rehabilitated land to be compatible with the surrounding natural landscape. There are no performance indicators, measures or criteria to determine how this objective will be met. In addition, Phase 2 references a stable drainage network, however, does not include any water

quality criteria. It's not clear whether Table 9 includes the final void, and Table 9 does not include any water quality objectives, indicators, measures or criteria.

Section 8.4 should include an adaptive management strategy and response, including how stakeholders will be consulted on outcomes and changes to the Strategy as a result of an annual review, incident report, audit report or consent modification.

Section 8.5 includes consideration of premature closure or care and maintenance. The Strategy states that it is impractical to have a detailed plan for premature closure or care and maintenance. Planning for closure should take place at all stages of mine life, including operations and further detail should be included in the Strategy to determine how closure planning will occur under these scenarios. The Strategy should include a *description of how the rehabilitation will be integrated with the mine planning process, including a plan to address premature mine closure* [condition 72(g)]. At a minimum the need to review any rehabilitation and closure plan should take place annually to ensure adequate resources are available to support minimal impacts to the environment and community, in the event these scenarios occur.

Additionally, further clarification is required on the adaptive management strategies that will be implemented if, during operations and/or review of the Strategy, the Rehabilitation Objectives in Table 6 of the approval are not being met.

Closing Comments

Overall, whilst the Strategy aligns with satisfying the conditions of approval, and provides a foundation for the rehabilitation of the project post-closure, the lack of clarity around the post-closure land uses, adaptive management and relationship between various documents, makes it difficult to establish whether the criteria set out in Table 6 of the approval can be met.

I would like to thank the Project for the opportunity to provide comment on the Rehabilitation Strategy. Should you have any questions or comments, please contact Mary-Anne Crawford, Manager Development and Environmental Services on 02 6578 7290.

Yours faithfully

Mary-Anne Crawford
Manager Development and Environmental Services

Planning, Industry & Environment

Christopher Knight
Environment Manager
Four Mile Creek Road
Ashtonfield NSW 2323

16/11/2020

Dear Christopher

Rix's Creek (SSD-6300-PA-18)
Rehabilitation Strategy- Request for Additional Information

I refer to the Rehabilitation Strategy submitted to the Department as required under the conditions of Conditions of Consent for the Rix's Creek. After careful consideration, the Department is requesting that you provide additional information.

You are requested to submit the following additional information as per the table of comments attached.

You are requested to provide the information, or notification that the information will not be provided, to the Department by Friday 04 December 2020. If you are unable to provide the requested information within this timeframe, you are required to provide, and commit to, a timeframe detailing the provision of this information.

If you have any questions, please contact Charissa Pillay, who can be contacted on / at Charissa.Pillay@planning.nsw.gov.au.

Yours sincerely

Matthew Sprott
Director
Resource Assessments (Coal & Quarries)

Rix's Creek SSD-6300-PA-18
Post Approval Review

Planning, Industry & Environment

Document: Rehabilitation Strategy
Revision: Version 1.1 June 2020
Reviewed: Charissa Pillay on "October 2020"

Rehabilitation Strategy, Condition B72, Schedule 2	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
B72(d). *building on the Rehabilitation Objectives in Table 6 ..and water management*	No	Section 5 on Water Management does not include information how water discharge will be managed, or criteria used.	Address the Rehabilitation Objective Table 6 "Water Quality"	Updated Section 5.4
B72(d) Rehabilitation Objective in Table 6	No	The Strategy is to be prepared building on the Rehabilitation Objectives in Table 6.	Describe the overall rehabilitation outcomes for the site and address all aspects of rehabilitation. Section 5 to be updated showing how each of these objectives are achieved	5
B72 (O)	`Partial	The socio-economic impacts and opportunities associated with rehabilitation and mine closure are to be investigated and minimised	Revise the Strategy to include a summary on socio-economic impacts and opportunities associated with rehabilitation and mine closure in section 4.5	3.5
B72 (the document)	Partial	Figure 9, section 3, throughout the document does not address the condition.	Include a summary of the stakeholder engagement strategy in the plan and reference the SIMP	3.5
B72 (e) Align with strategic rehabilitation and mine closure objectives and address the principles	No	Table 2 and Table 3 refers to section 4.5 and section 5.8. These sections are not aligned with strategic rehabilitation and mine closure objectives or address the principles of *Strategic Framework for Mine closure (ANZMEC and MCA, 2000)*	include an effective stakeholder consultation and targeted communication strategy	3.5
B72(f) section 6.4	Partial	Section 6.4 refers to the Biodiversity Management Plan but does not address the condition.	Include a description how rehabilitation will be integrated with the measures in the Biodiversity Management Plan in Section 6.4	6.4

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Rix's Creek SSD-6300-PA-18
Post Approval Review

Planning, Industry & Environment

Document: Rehabilitation Strategy
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B72(g)	Partial	Section 8.5 discusses more on care and maintenance not a premature closure plan	Update the plan to include a structured premature mine closure plan not a care and maintenance plan	8.5
B72(h) identify and describe all rehabilitation domains and **define completion criteria for each**	Partial	Section 5.2 is the condition (h) reproduced. Section 5.5 has only been identified and described.	Update section 5 to include completion criteria for all domains a summarise how historic heritage values (e.g Coke Ovens) at RCS would be managed and reference in other plans.	5.2
B72(i)	Partial	Table 8: Heritage Domain indicates that a mine plan and schedule rehabilitation is not applicable. .	Revise plan to include heritage rehabilitation (or preservation) will be included into the mine plan Update the plan to demonstrate indicative timeframes for when rehabilitation will begin	5.2
B72(m)	Partial	Section 5 discusses the domains but no discussion on the local community impacts.	Include details how rehabilitation and mine closure will support a sustainable future for the local community at each domain	5.1 - 5.9
B72(n) include **a stakeholder engagement plan** to guide rehabilitation and mine closure planning processes and outcomes	Partial	Section 3 provides info on a strategy and not a plan to be implemented.	Revise the Strategy to include a plan Include a plan of the stakeholder engagement strategy that will be acceptable (community) and achievable.	3.5
B72(0)	Partial	Section 4.5 discusses that the socio-economic impact will be considered during the process.	Include investigative ways to identify and minimise socio-economic effects associated with	3.5 and 4.5

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			rehabilitation and mine closure in Section 4.5.	
B72(p)	Partial	Section 8.3.3 states a commitment to review and consult with the Resource Regulator and Council every three years	Include a program how the commitment will be implemented, and objectives met.	8.3.3
General Comment			**Action Required**	**Company Response**
Other Agency Comments			**Action Required**	**Company Response**
IPC				
R8: Partially addressed in section 3.1 and section 6.7			closed	
R11 (d) *consider sudden unplanned closure and temporary closure (care and maintenance)*			closed	
R11 (e) *include a detailed commitment register*			closed	
R11(F) *Identify and consult with stakeholders to explore closure risks and opportunities further*			closed	
Singleton Council				
Section 3: *includes a description of the Stakeholder Engagement Strategy for mine rehabilitation and closure. A list of engagement activities that includes inform, consult, involve, collaborate, empower and recognition are included in this section. However, the section does not include details of what aspects of rehabilitation and mine closure would be addressed under each engagement strategy. This section includes broad principles of engagement, with no detail on what engagement will occur, when it will occur and with whom. It is also unclear the circumstances that would lead to engagement taking place, and whether engagement activities would change as a result of review/changes to mine planning/results of management action.*			Update the strategy to include specific details of engagement and management action	closed
Section 4.2: *summarises the mine closure risk assessment. It is not clear whether this risk assessment incorporates rehabilitation activities (both during and post mining), unplanned closure and care and maintenance risks. It is not clear whether the risk assessment has been (or will be) reviewed following feedback from the engagement activities listed in section 3. It is also not clear how the risks identified in the*			Revise risk assessment accordingly	closed

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Rix's Creek SSD-6300-PA-18
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assessment will be managed and whether they reflect concerns raised through consultation and engagement.		
Condition 72(o) requires the Strategy to investigate ways to minimise adverse socio-economic effects. Section 4.5 provides limited information on the social and economic impacts and opportunities relevant to the Rehabilitation Strategy and mine closure and does not include ways to minimise socio-economic effects of closure.	Update the plan to address the socio-economic effects and opportunities relevant to rehabilitation and mine closure	closed
Section 5.2 identifies Heritage Areas as a specific domain for the purposes of rehabilitation and mine closure. This section replicates condition B59 of SSD 6300 and provides little detail as to how heritage will be managed during rehabilitation and mine closure activities. There are no details regarding the post mining outcomes for heritage located on site.	Revise plan to detail how heritage will be managed during rehabilitation and mine closure activities.	closed
Section 5.7.4 discusses the key elements of the final landform. This section does not include how these elements will be achieved, the measures of success and the adaptive management actions that would be taken should monitoring demonstrate a trajectory away from success.	Include a summary of the MOP	5.7.4
Section 5.8 includes planning considerations that have been incorporated into the design of the final void. These include a void with low safety risk, minimal out of pit dumping and creating a void that is not visible. It is not clear how these factors will be met. The post-mining standing water level is not provided, making it difficult to determine whether the planning considerations are achievable. Reference is made to a final design alternative; it is not clear what this means. The company is committed to undertaking additional investigation into final void rehabilitation options. It is not clear how the outcomes of these investigations will be incorporated into the Rehabilitation Strategy and communicated as per the engagement strategy. There is no timeline provided in the Strategy for the completion of these investigations	Include a summary of the water level described in the WMP and reference	5.8
Section 5.8 includes the statement the design contained in the Rehabilitation Strategy does not account for additional material to remediate the final pit void that may be sourced from areas outside the present planning operations of the Mine. Further clarification regarding the intent of this statement should be included in the Strategy.	closed	
Section 5.9 provides information on the potential future uses of unmined land, or buffer land. Further clarification regarding the integration of buffer land with post mining land uses, surrounding land uses and future potential land uses should be included in the Strategy. Section 5.9 provides information on the potential future uses of unmined land, or buffer land. Further clarification regarding the integration of buffer	Revise strategy to include the integration of buffer land with post miming land uses and future potential land uses	5.9

Rix's Creek SSD-6300-PA-18
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land with post mining land uses, surrounding land uses and future potential land uses should be included in the Strategy.		
Section 6 lists initial post mining land uses including agriculture, open space, native vegetation, recreation, residential, industrial, aquaculture and commercial. Very little detail is provided on the permissibility, suitability, sustainability or viability of these options, including where on the mine or buffer land these land uses could occur. It is also not clear how these options align to regional and local strategic land use planning outcomes.	closed	
Section 6 includes reference to the conceptual phases of sustainable ecosystem development. An important element missing from these phases is the final land use. Without a defined final land use that marries to the landform, Phase 2 will not succeed. The Strategy should include the landform establishment elements required to meet the post mining land use options identified, and if the landform cannot meet these options, what other alternatives are there that provide a sustainable future for the local community that minimise adverse socio-economic effects associated with rehabilitation and mine closure	What alternatives will be investigated to *provide a sustainable future for the local community that minimise adverse socio-economic effects associated with rehabilitation and mine closure*	6.6
Table 8 includes the current rehabilitation progress for each rehabilitation domain, suggesting that a number of domains are at rehabilitation completion stage. This appears to contradict the Strategy in section 5. Where domains are in final rehabilitation phases, a final land use option should be defined, mapped and assessed for sustainability. The Strategy does not include this level of analysis	Closed	
Section 7 includes the performance criteria, measures and indicators for rehabilitation and mine closure. This section should include the adaptive management responses that would be implemented in the event these measures and criteria are not met. The section also identifies that rehabilitation aims and objectives are set with agreement from various stakeholders. These stakeholders are not defined. The rehabilitation aims and objectives are also, in Figure 9, based on proposed post-mining land use and regulatory requirements. This is not the case as the aims and objectives are based on the Phases of Rehabilitation described in section 6 and Figure 5. Council agrees that the aims and objectives should be based on a defined post mining land use.	Closed	
Section 8.5 includes consideration of premature closure or care and maintenance. The Strategy states that it is impractical to have a detailed plan for premature closure or care and maintenance. Planning for closure should take place at all stages of mine life, including operations and further detail should be included in the Strategy to determine how closure planning will occur under these scenarios. The Strategy should include a description of how the rehabilitation will be integrated with the mine planning process, including a plan to	Include a description a premature closure plan that includes assessment of impacts and measures to address impacts on the local community	8.5

5

Rix's Creek SSD-6300-PA-18
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Planning, Industry & Environment

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address premature mine closure [condition 72(g)]. At a minimum the need to review any rehabilitation and closure plan should take place annually to ensure adequate resources are available to support minimal impacts to the environment and community, in the event these scenarios occur.		

Mr Christopher Knight
Environment Manager
Four Mile Creek Road
Ashtonfield, NSW, 2323

29/01/2021

Dear Mr Knight

Rix's Creek Coal Extension (SSD- 6300-PA-18)
Rehabilitation Strategy

I refer to the Rehabilitation Strategy which was submitted in accordance with Condition B72 of Schedule 2 of the Condition of Consent for the Rix's Creek Coal Extension (SSD- 6300-PA-18).

The Department has carefully reviewed the document and is satisfied that it generally meets the condition.

Accordingly, the Planning Secretary has approved the Rehabilitation Strategy (Revision 2.2 January 2021). Please ensure that the approved plan is placed on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Charissa Pillay on 02 99955944.

Yours sincerely

Matthew Sprott
Director
Resource Assessments (Coal & Quarries)
As nominee of the Planning Secretary

Appendix C – Key Risks Associated with Rix's Creek Operation

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
Exploration	Survey of the drill locations	Damage to vegetation	❑ Induction System ❑ Experienced people ❑ Use of existing tracks where possible ❑ Escort for contractors ❑ Contractor Management Plan	5	d	24				
		Disturbance of Aboriginal heritage	❑ Inductions System ❑ Surveys completed to identify sites and assess significance ❑ Aboriginal Groups have been consulted ❑ All known artefacts have been fenced off ❑ The sites will be salvaged with the Aboriginal Community prior to the area being disturbed by mining ❑ Heritage Management Plan	3	d	17				
		Disturbance of European heritage	❑ Induction System ❑ Surveys completed to identify sites and assess significance ❑ Heritage items have been identified	3	d	17				
		Wheel track erosion	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Contractor Management Plan ❑ Sediment Control Dams where required ❑ Use existing	4	e	23				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			tracks where possible							
		Fire hazard	❑ Induction System ❑ Hazard reduction program ❑ Training and Competency Management System ❑ Bushfire Management Plan ❑ Onsite fire fighting capabilities ❑ Smoking Onsite Management System ❑ Contractor Management Plan ❑ Supervisor Audits/ Inspections	4	d	21		4	d	21
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Air Quality and GHG Management Plan	5	e	25	❑	5	e	25
		Potential for spills of hydrocarbons from vehicle accident	❑ Mine Transport Management Plan ❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan ❑ SDS Database							
	Clearing of drill lines, site establishment and digging pits	Injury to or loss of threatened flora and fauna (note work area mostly cleared)	❑ Mine Transport Management Plan ❑ Induction System ❑ Daylight operations ❑ Permit to Disturb	4	d	21				
		Sediment leaving the site	❑ Use existing tracks where possible ❑ Water Management Plan ❑ Scheduled Environmental Inspections ❑ EPL ❑ Induction System ❑ Supervisor Audits/ Inspections ❑ Sediment Control Dams ❑ Mine Inspection System ❑ External Audits (including Government) ❑ Use existing tracks where possible	4	d	21		4	d	21
		Disturbance of Aboriginal heritage	❑ Inductions System ❑ Surveys completed to identify sites and assess significance ❑ Aboriginal Groups have been	3	d	17				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			consulted ❑ All known artefacts have been fenced off ❑ The sites will be salvaged with the Aboriginal Community prior to the area being disturbed by mining ❑ Aboriginal Heritage Management System ❑ Land Disturbance Management Procedure ❑ Permit to Disturb							
		Disturbance of European heritage	❑ Induction System ❑ Surveys completed to identify sites and assess significance ❑ Heritage items have been identified ❑ Land Disturbance Management Procedure ❑ Permit to Disturb	3	d	17		5	e	25
		Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan	4	e	23				
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart	4	c	18		4	c	18

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Supervisor Audits/ Inspections							
		Fire hazard	❑ Induction System ❑ Hazard reduction program ❑ Training and Competency Management System ❑ Bushfire Management Plan ❑ Onsite fire fighting capabilities ❑ Smoking Onsite Management System ❑ Contractor Management Plan ❑ Supervisor Audits/ Inspections	4	d	21		4	d	21
		Hydraulic hose oil spill	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			Management Plan ❑ Bushfire Management Plan ❑ SDS Database							
	Establish drill rig and drilling (including demobilisation)	Erosion with sediment leaving site (wheel tracks)	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Use existing tracks where possible	5	d	24		5	d	25
		Hydrocarbon spill	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan ❑ SDS Database	4	d	21				
		Potential to introduce weeds	❑ Vehicle wash at entrance ❑ Induction System	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Scheduled Environmental Inspections ❑ Weed Control Contractor ❑ Supervisor Audits/ Inspections							
		Injury to or loss of threatened flora and fauna	❑ 1. Mine Transport Management Plan ❑ 2. Employee Inductions ❑ 3. Daylight operations ❑ Ground Disturbance permit	5	e	25				
		Spillage of hydrocarbons	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan ❑ SDS Database	4	d	21				
		Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol	4	c	18				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections							
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Contractor Management Plan	4	c	18	❑ Review Airborne Dust Management Plan	4	c	18
		Fire hazard	❑ Induction System ❑ Hazard reduction program ❑ Training and Competency Management System ❑ Bushfire Management Plan ❑ Onsite fire fighting capabilities ❑ Smoking Onsite Management System ❑ Contractor Management Plan ❑ Supervisor Audits/ Inspections	4	d	21		4	d	21
		Waste management e.g. oily rags, empty drums	❑ Contractor Management Plan ❑ Induction System ❑ Onsite waste bins ❑ Supervisor Audits/ Inspections ❑ Waste Management System	5	d	24				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
	Traffic movement e.g. water cart, geologist, driller, logger	Potential to introduce weeds	❑ Vehicle wash at entrance ❑ Induction System ❑ Scheduled Environmental Inspections ❑ Weed Control Contractor ❑ Supervisor Audits/ Inspections	5	d	24				
		Wheel track erosion	❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Use existing tracks where possible	4	d	21				
		Fire hazard	❑ Induction System ❑ Hazard reduction program ❑ Training and Competency Management System ❑ Bushfire Management Plan ❑ Onsite fire fighting capabilities ❑ Smoking Onsite Management System ❑ Contractor Management Plan ❑ Supervisor Audits/ Inspections	4	d	21		4	d	21
		Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections							
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan	4	d	21		4	d	21
		Potential for spills of hydrocarbons	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan ❑ SDS Database	4	e	23				
		Loss of radiation source	❑ Contractor Management Plan ❑ Induction System	4	e	23				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Use of NATA approved contractor							
	Open holes and pits after drilling	Injury to or loss of threatened flora and fauna	❑ Fill in pits and cap holes ❑ DPI guidelines ❑ Mining Lease Conditions	5	e	25				
		Aquifer contamination	❑ Dry area ❑ Capping holes ❑ Deep hard rock aquifer ❑ No alluvial aquifers involved ❑ Poor water quality	5	e	25				
	Rehabilitation	Potential to introduce weeds	❑ Vehicle wash at entrance ❑ Employee inductions ❑ Scheduled Environmental Inspections ❑ Weed Control Contractors	4	d	21				
		Erosion with sediment leaving site	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Use existing tracks where possible	5	d	24				
		Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan	4	e	23				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Noise Management Plan ❑ Supervisor Audits/ Inspections							
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan	5	e	25	❑	5	e	25
		Hydrocarbon spillage	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ Spill kits ❑ Induction System ❑ Consultation Representation and Participation Management System ❑ Incident Notification and Reporting Procedure	5	d	24				
		Fire hazard	❑ Induction System ❑ Hazard reduction program ❑ Training and Competency Management System ❑ Bushfire Management Plan ❑ Onsite fire fighting capabilities ❑ Smoking Onsite Management System ❑ Contractor Management Plan	4	d	21		4	d	21

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Supervisor Audits/ Inspections							
Pre-stripping	Clearing of vegetation	Injury to or loss of threatened flora and fauna	❑ Ground Disturbance Permit ❑ Assessment has been made on the presence / absence of threatened species	3	d	17				
		Disturbance of Aboriginal heritage sites	❑ Inductions System ❑ Surveys completed to identify sites and assess significance ❑ Aboriginal Groups have been consulted ❑ All known artefacts have been fenced off ❑ The sites will be salvaged with the Aboriginal Community prior to the area being disturbed by mining ❑ Aboriginal Heritage Management System ❑ Land Disturbance Management Procedure ❑ Permit to Disturb	3	d	17				
		Disturbance of European heritage sites	❑ Induction System ❑ Surveys completed to identify sites and assess significance ❑ No heritage items have been identified in disturbance area	5	e	25				
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart	4	d	21		4	d	21

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Airborne Dust Management Plan ❑ Land Disturbance Management Procedures ❑ Supervisor Audits/ Inspections							
		Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections	4	e	23				
		Erosion with sediment leaving site	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Use existing tracks where possible ❑ Mine Inspection System ❑ Internal drainage	4	d	21		4	d	21

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
		Potential to introduce weeds	❑ Weed Control Contractor ❑ Scheduled Environmental Inspections ❑ Vehicle wash at entrance ❑ Induction System ❑ Consultation Representation and Participation Management System ❑ Supervisor Audits/ Inspections ❑ Contractor Management Plan	5	d	24				
		Disposal of cleared timber (potential loss of habitat)	❑ Land Management Plan (Rehab Management) ❑ Ground Disturbance Permit	4	e	23				
		Spillage of hydrocarbon	❑ Engineering (Maintenance) Management System ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management System ❑ Incident Notification and Reporting Procedure ❑ Mobile equipment ❑ Training and Competency Management System ❑ Environmental Incident Emergency Response Management System	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
	Stripping of Top-dressing Material	Loss of top dressing material	❑ Mining Operations Plan includes topsoil suitability study ❑ Worker awareness and supervision ❑ Consultation Representation and Participation Management System ❑ Scheduled Environmental Inspections ❑ Training and Competency Management System	4	d	21		4	d	21
		Quality of top dressing material reduced through damage to soil structure	❑ Direct placement wherever possible ❑ Top dressing material stockpile management ❑ Mining Operations Plan ❑ Worker awareness and supervision ❑ Consultation Representation and Participation Management System ❑ Scheduled Environmental Inspections ❑ Training and Competency Management System	4	e	23				
	Overburden drilling	Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan	3	c	13				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise							
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Dust Extraction Systems ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections	3	c	13	❑ Review Airborne Dust Management Plan	3	c	13
		Spillage of hydrocarbons	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan ❑ SDS Database							
	Blasting	Noise/ overpressure	❑ Explosives Management Plan ❑ Blast Fume Management Strategy ❑ 2. Competent, experienced employees ❑ 3. Drill and Blast Supervisor ❑ 4. Access to external specialist input ❑ Induction System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Air Quality Operational procedures ❑ EPL	3	c	13				
		Vibration	❑ Explosives Management Plan ❑ Blast Fume Management Strategy ❑ Competent, experienced employees ❑ Drill and Blast Supervisor ❑ Access to external specialist input ❑ Supervisor Audits/ Inspections ❑ Complaints Protocol ❑ Air Quality Operational Procedures	3	c	13				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ EPL							
		Dust/ Fume	❑ Explosives Management Plan ❑ Blast Fume Management Strategy ❑ Competent/ experienced workers ❑ Drill and Blast Supervisor ❑ Access to external specialist input ❑ Supervisor Audits/ Inspections ❑ Complaints Protocol ❑ Air Quality Operational Procedures ❑ Airborne Dust Management Plan ❑ EPL	3	c	13	❑ Review Airborne Dust Management Plan	3	c	13
	Excavation of overburden (using the excavator)	Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise	3	c	13				
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol	3	c	13	❑ Review Airborne Dust Management Plan	3	c	13

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections							
		Visual	❑ Progressive/ Temporary Rehabilitation ❑ Mine Planning ❑ Visual Bund and screens ❑ Health and Safety Overview Document ❑ Community Consultation ❑ Complaints Protocol ❑ Supervisor Inspection/ Audits	4	d	21				
		Spillage of hydocarbon	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ SDS Database							
		Waste Management (during service days)	❑ Environmental Protection Licence ❑ Onsite Waste bins ❑ Use of Licensed Contractor for waste removal ❑ Contractor Management Plan ❑ Induction System ❑ Supervisor Audits/ Inspections ❑ Engineering (Maintenance) Management System	5	d	24				
		Major shut downs (contractor)	❑ Environmental Protection Licence ❑ Onsite Waste bins ❑ Use of Licensed Contractor for waste removal ❑ Contractor Management Plan ❑ Induction System ❑ Supervisor Audits/ Inspections ❑ Engineering (Maintenance) Management System	5	d	24				
	Mining of coal	Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g.	3	d	17				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			night time) to reduce noise							
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections ❑ Land Disturbance Management Procedure	4	d	21		4	d	21
		Spillage of hydrocarbons	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ SDS Database							
	Hauling with rear dump trucks	Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise	3	d	17				
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections ❑ Land Disturbance Management Procedure	4	d	21		4	d	21
		Spillage of hydrocarbons	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan ❑ SDS Database							
	Overburden dumping area (includes tipping with trucks)	Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections ❑ Land Disturbance Management Procedure	4	d	21		4	d	21
		Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol	3	d	17				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise							
		Lighting of the dumps being directed into the residents houses resulting in visual impact issues	❑ Direction of lights are changed so that they are not pointed towards the residents ❑ Opportunity to enable dumping in an alternative dump or location on the dump after dark ❑ Visual Bund and screens ❑ Health and Safety Overview Document ❑ Community Consultation ❑ Complaints Protocol ❑ Supervisor Inspection/ Audits	4	d	21				
	Mining of coal	Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise	3	d	17				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections ❑ Land Disturbance Management Procedure	4	d	21		4	d	21
		Spillage of hydrocarbons	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan ❑ SDS Database	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
		Taking coal (sponcom)	❑ Burial of oxidised coal material ❑ Supervisor Audits/ Inspections ❑ Mining Operation Plan ❑ Mine Inspection Management System ❑ Trained and Competent Operators ❑ Consultation Representation and Participation Management System	5	e	25				
	Hauling with rear dump trucks	Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise	3	d	17				
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering	4	d	21		4	d	21

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			(Maintenance) Management System ❑ Supervisor Audits/ Inspections ❑ Land Disturbance Management Procedure							
		Visual	❑ Progressive Rehabilitation ❑ Mine Planning ❑ Visual Bund and screens ❑ Health and Safety Overview Document ❑ Community Consultation ❑ Complaints Protocol ❑ Supervisor Inspection/ Audits	3	d	17				
		Spillage of Hydrocarbons when transferring from Service Truck	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan ❑ SDS Database	4	d	21				
	In pit water	Broken	❑ Engineering (Maintenance)	4	d	21		4	d	2

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
	management	leaking pipes (on surface)	Management System ❑ Scheduled Environmental Inspections ❑ Inspection Management System ❑ Supervisor Audits/ Inspections ❑ Engineering principles applied to design ❑ Incident Reporting Procedure ❑ Dedicated experienced person ❑ Water Management Plan							1
		Failure of clean water segregation	❑ Scheduled Environmental Inspections ❑ Mine Inspection Management System ❑ Supervisor Audits/ Inspections ❑ Engineering principles applied to design ❑ Incidents Reporting Procedure ❑ Nominated Experienced person ❑ Water Management Plan	3	d	17				
	Bulk fuel storage	Bulk fuel storage leak	❑ Supervisor Audits/ Inspections ❑ Scheduled Environmental Inspections ❑ Engineering (Maintenance) Management System ❑ Dangerous Goods Licence ❑ Emergency Management System	3	d	17				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
		Spillage from the fuel fill point during filling of equipment	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Toolbox Talks ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Emergency Management System	4	d	21				
	Sewerage treatment plant	Contamination of water ways	❑ Engineering (Maintenance) Management System ❑ Environmental Incident Emergency Response Management System ❑ Scheduled Environmental Inspections ❑ Council Approved System	4	d	21				
Rehabilitation	Reshaping (Overburden dumps)	Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering (Maintenance) Management System ❑ Supervisor	4	d	21		4	d	21

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			Audits/ Inspections ❑ Land Disturbance Management Procedure ❑ Training and Competence Management System ❑ Toolbox Talks							
		Noise	❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Toolbox Talks	3	d	17				
		Spillage of Hydrocarbons when transferring from Service Truck	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ SDS Database							
		Erosion and sediment control	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Mine Inspection System ❑ Internal drainage ❑ External Audits (including Government)	4	c	18				
	Top dressing material spreading and contour ripping	Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections ❑ Land Disturbance Management Procedure ❑ Training and Competence Management System ❑ Toolbox Talks	4	d	21		4	d	21
		Noise	❑ Daylight activity ❑ Induction	3	d	17				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise							
		Spillage of Hydrocarbons when transferring from Service Truck	❑ Engineering (Maintenance) Management System ❑ Emergency Spill Response ❑ On-site Spill Kits ❑ Induction System ❑ Consultation Representation and Participation Management Systems ❑ Incident Notification and Reporting Procedure ❑ Supervisor Audits/ Inspections ❑ Mobile equipment ❑ Contractor Management Plan ❑ Bushfire Management Plan ❑ SDS Database	4	d	21				
		Erosion and sediment control	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor	4	c	18				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Mine Inspection System ❑ Internal drainage ❑ External Audits (including Government)							
		Lime and gypsum dust	❑ Control moisture levels of lime	5	d	24				
		Biosolids / runoff (including odour)	❑ Use of DECC guidelines ❑ Bunded storage areas ❑ Use of low odour material ❑ Mixing with topsoil prior to spreading	3	d	17				
	Revegetation	Erosion with sediment leaving site	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Mine Inspection System ❑ Internal drainage ❑ External Audits (including Government)	4	d	21				
		Potential to introduce weeds	❑ Buy certified seed from reputable supplier ❑ Vehicle wash at entrance	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Induction Systems ❑ Scheduled Environmental Inspections ❑ Weed Control Contractor							
		Failure of seed to germinate and establishment	❑ Buy certified seed from reputable supplier ❑ Contractor Management Plan	5	d	24				
		Bush fire hazard burning revegetated areas	❑ Induction System ❑ Hazard reduction program ❑ Training and Competency Management System ❑ Bushfire Management Plan ❑ Onsite fire fighting capabilities ❑ Smoking Onsite Management System ❑ Contractor Management Plan ❑ Supervisor Audits/ Inspections	4	d	21		4	d	21
		Sponcom in rehabilitated areas (odour)	❑ Burial of oxidised coal material ❑ Supervisor Audits/ Inspections ❑ Mining Operation Plan ❑ Mine Inspection Management System ❑ Trained and Competent Operators ❑ Consultation Representation and Participation Management System	5	e	25				
		Drought	❑ Plant cover Crop	3	C	17	Seek Approval to	3	E	20

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Delay Final pasture / tree seeding with approval from Resources Regulator ❑ Increase Erosion and Sediment Control to minimise topsoil loss when drought breaks.				Delay Rehab. Compile drought recovery rehabilitation schedule to support catch up works when drought subsides.			
Maintenance / Open Cut Workshop	Waste Management	General Refuse (including oily rags)	❑ Licensed Recycling Contractor ❑ Contractor Management Plan ❑ Induction System ❑ Environmental Protection Licence ❑ Toolbox Talks ❑ Scheduled Environmental Inspections ❑ Waste Management System	5	d	24				
		Scrap steel	❑ Licensed Recycling Contractor ❑ Contractor Management Plan ❑ Induction System ❑ Environmental Protection Licence ❑ Toolbox Talks ❑ Scheduled Environmental Inspections ❑ Waste Management System	5	e	25				
		Contaminated Wastes	❑ Licensed Recycling Contractor ❑ Contractor Management Plan ❑ Induction System ❑ Environmental Protection Licence	5	d	24				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Incident Reporting Procedure ❑ Toolbox Talks ❑ Scheduled Environmental Inspections ❑ Waste Management System							
		Oil spills on ground	❑ On-site Spill Kits ❑ Induction System ❑ Consultation, Representation and Participation Management System Systems ❑ Environmental Incident Emergency Response Management System ❑ Incident Reporting Procedure ❑ Toolbox Talks ❑ Scheduled Environmental Inspections ❑ Waste Management System	5	d	24				
		Tyres	❑ Disposed of in the pit at depth and record location	5	d	24				
	Bulk fuel storage area (fuel farm)	Spills and leaks	❑ AS1940 approved area ❑ Work Cover notified ❑ On-site Spill Kits ❑ Induction System ❑ Toolbox Talks ❑ Environmental Incident Emergency Response Management System ❑ Incident Reporting	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			Procedure ❑ Engineering (Maintenance) Management System							
		Damage to above ground pipes (fuel and oil)	❑ AS1940 approved area ❑ Work Cover notified ❑ Incident Reporting Procedure ❑ Environmental Incident Emergency Response Management System ❑ Scheduled Environmental Inspections ❑ Toolbox Talks ❑ Engineering (Maintenance) Management System	4	d	21				
		Bunded area filling with storm water reducing containment and resulting in bund breach during major spill	❑ AS1940 approved area ❑ Work Cover notified ❑ Bilge Pump system in place in bunded areas ❑ Incident Reporting Procedure ❑ Environmental Incident Emergency Response Management System ❑ Scheduled Environmental Inspections ❑ Toolbox Talks ❑ Engineering (Maintenance) Management System ❑ Oil water separator	5	d	24				
	Transformers	Release of PCB's in	❑ PCB Disposal Procedure ❑ Transformers in	5	e	25	❑ Check site for potential	5	e	25

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
		transformer oil	bunded areas				PCB's on site			
		Oil spills	❑ Recycled ❑ On-site Spill Kits ❑ Induction System ❑ Transformers in bunded areas ❑ Environmental Incident Emergency Response Management System ❑ Scheduled Environmental Inspections ❑ Engineering (Maintenance) Management System	5	d	24				
	Parts washer	Failure and release degreasers/ contaminants to the environment	❑ Serviced by licensed contractor ❑ Contractor Management Plan ❑ On-site Spill Kits ❑ Induction System ❑ Environmental Incident Emergency Response Management System	5	d	24				
	Oil water separator	Failure and release of oil	❑ Waste oil tank with overflow monitor ❑ Scheduled Environmental Inspections ❑ Serviced by licensed contractor ❑ Contractor Management Plan ❑ On-site Spill Kits ❑ Induction System ❑ Environmental Incident Emergency Response Management System	5	d	24		5	d	24

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
	Workshop	Noise	❑ Isolated location ❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections	4	e	23				
	Field Maintenance 1. Scheduled shut downs 2. breakdowns/ running repairs	Noise	❑ Where ever possible maintenance conducted off site ❑ Daylight activity ❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise	3	e	20				
		Contaminated Waste Material	❑ Licensed Waste Contractor ❑ Contractor Management Plan ❑ Induction System ❑ EPL ❑ Toolbox Talks ❑ Engineering (Maintenance) Management System	5	d	24				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Supervisor Audits/ Inspections							
		Spills and leaks	❑ AS1940 approved area ❑ WorkCover notified ❑ On-site Spill Kits ❑ Induction System ❑ Toolbox Talks ❑ Environmental Incident Emergency Response Management System ❑ Incident Notification and Reporting Procedure ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections	5	d	24				
		Transfer of diesel and lubes around site in service truck (accident - rollover)	❑ Mine Transport Management Plan ❑ Induction System ❑ Purpose designed service truck ❑ Compartmentalised tank ❑ Competency Standard for service truck ❑ Environmental Incident Emergency Response Management System ❑ Bushfire Management Plan ❑ Incident Notification and Reporting Procedure	4	d	21				
Supply	Transfer of fuel from	Spillage of fuel during delivery of	❑ Fuel & Bulk Oil Delivery Procedures ❑ Contractor Management Plan	3	d	17				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
	road transport	bulk fuel and oil	❑ Contained delivery point ❑ Use of competent delivery contractor ❑ System audits ❑ Incident Notification and Reporting Procedure ❑ Scheduled Environmental Inspections ❑ Environmental Incident Emergency Response Management System							
		Damage to transport vehicle on site at refuelling point (e.g. Light vehicle running into fuel truck)	❑ Engineering separation from earthwork equipment ❑ Delivery trucks have segregated tanks ❑ Environmental Incident Emergency Response Management System ❑ Tanks located away from traffic areas	4	e	23				
		Release of fuel to the environment as a result of a vehicle involved in accident on site	❑ Mine Transport Management Plan ❑ Fuel & Bulk Oil Delivery Procedures ❑ Contractor Management Plan ❑ Toolbox Talks ❑ Training and Competency Management System ❑ Emergency Management System ❑ Environmental Incident Emergency Response Management System	4	d	21				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
		Fuel transfer truck driving away from fill point without disconnecting fuel supply hose	❑ Contractor has cut-off system whereby they cannot start the vehicle if a hose is still connected ❑ Use of competent contractor ❑ Contractor Management Plan ❑ Bunded Area (AS1940) ❑ Environmental Incident Emergency Response Management System ❑ Fuel & Bulk Oil Delivery Procedures	5	e	25				
CHPP and Train Loader	ROM Stockpile	Noise	❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise	3	d	17				
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan	4	d	21		4	d	21

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections ❑ Land Disturbance Management Procedure ❑ Training and Competence Management System ❑ Toolbox Talks							
		Erosion and sediment control	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Mine Inspection System ❑ Internal drainage ❑ External Audits (including Government) ❑ Use existing tracks where possible	4	c	18				
	CHPP	Noise	❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections	3	d	17				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			❑ Altered operating conditions at set times (e.g. night time) to reduce noise							
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections ❑ Land Disturbance Management Procedure ❑ Training and Competence Management System ❑ Toolbox Talks	4	d	21		4	d	21
		Erosion and sediment control	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Mine Inspection System ❑ Internal drainage ❑ External Audits	4	c	18				

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			(including Government) ❑ Use existing tracks where possible							
	Clean Coal Stockpile/ Train Loading	Noise	❑ Induction System ❑ Engineering (Maintenance) Management System ❑ Complaints Protocol ❑ Contractor Management Plan ❑ Noise Management Plan ❑ Supervisor Audits/ Inspections ❑ Altered operating conditions at set times (e.g. night time) to reduce noise	3	d	17				
		Dust	❑ Induction System ❑ Air Quality Operational Procedures ❑ Water Cart availability ❑ Complaints Protocol ❑ Mindful of weather (wind) conditions ❑ Airborne Dust Management Plan ❑ Engineering (Maintenance) Management System ❑ Supervisor Audits/ Inspections ❑ Land Disturbance Management Procedure ❑ Training and Competence Management System ❑ Toolbox Talks	4	d	21		4	d	21

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
		Erosion and sediment control	❑ Induction System ❑ Water Management Plan ❑ Environmental Inspections ❑ Supervisor Audits/ Inspections ❑ Environmental Protection Licence ❑ Contractor Management Plan ❑ Sediment Control Dams ❑ Mine Inspection System ❑ Internal drainage ❑ External Audits (including Government) ❑ Use existing tracks where possible	4	c	18				
Tailings emplacement	Tailing storage	Failure of dam	❑ Authorised section 100 approval tailings emplacement area ❑ Health and Safety Management System ❑ Environmental Inspections ❑ Mine Inspection System ❑ Supervisor Audits/ Inspections ❑ Emergency Management System	1	e	11				
Mine Water Storage	Possum Skin Dam	Failure of Dam/ Overflow of Dam	❑ Prescribed Dam, as per Dam Safety Committee ❑ Health and Safety Management System ❑ Environmental Inspections ❑ Mine Inspection System ❑ Supervisor Audits/ Inspections ❑ Emergency	1	e	11	Pumping in pit water section	1	e	11

Process Area	Activity	Hazard/ Risk	Existing Controls	Risk Rank			Proposed Controls	Risk Rank		
				C	L	R		C	L	R
			Management System ❑ Water Management Plan							