Coal & Allied Operations Pty Ltd
07 May 2012

Biodiversity and Rehabilitation Management Plan

Mount Pleasant Project

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Mount Pleasant Project

Prepared for

Coal & Allied Operations Pty Ltd

Prepared by

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A	01-Dec-11	Draft for Client Comment	Dee Murdoch Associate Director	
B	16-Dec-2011	Final Report	Dee Murdoch Associate Director	
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Table of Contents

List of Tables

List of Figures

1.0 Introduction

This Biodiversity and Rehabilitation Management Plan (B&RMP) has been developed to address the commitments of the Mount Pleasant Project approvals that pertain to biodiversity and rehabilitation for the construction and operation of the mine and associated infrastructure.

These commitments include the requirements of the *Mining Act* 1992, whereby it is a condition of a Mining Lease that a titleholder submit and comply with an approved Rehabilitation and Environmental Management Plan (REMP). Accordingly the B&RMP has been developed based on the *Draft Rehabilitation and Environmental Management Plan Guidelines* (I&I, June 2010).

In addition, Project Approval DA 92/97 (Notice of Modification), dated 19 September 2011, has several conditions relating to biodiversity and rehabilitation. This Project Approval was issued to Coal & Allied Operations Pty Limited (Coal & Allied) by the NSW Department of Planning and Infrastructure (DP&I) for the construction and operation of the Mount Pleasant open cut coal mine and associated infrastructure. Schedule 3 of the Project Approval requires the preparation and, where relevant, the implementation of the following Objectives, Strategies and/or Plans which relate to biodiversity and rehabilitation[1]:

- Offset Strategy – Schedule 3 Condition 29[2];
- Biodiversity Management Plan – Schedule 3 Condition 32;
- Rehabilitation Objectives – Schedule 3 Condition 53;
- Rehabilitation Strategy – Schedule 3 Condition 54;
- Progressive Rehabilitation – Schedule 3 Condition 55; and
- Rehabilitation Management Plan – Schedule 3 Condition 56.

In addition to fulfilling the requirements of a REMP, this document also addresses Schedule 3 Conditions 32 and 56 – Biodiversity Management Plan and Rehabilitation Management Plan.

Appendix A provides a guide to the relevant section of this B&RMP that addresses each requirement of the DP&I Project Approval Conditions that pertain to the B&RMP.

1.1 Rehabilitation Strategy

The Rehabilitation Strategy (AECOM, 2011) provides the “why and what for” aspects of decision making in terms of landscape and land use for Mount Pleasant, whilst this B&RMP and other relevant management plans provide the “when and where”. The “how” is provided in the operationally based Standards and Procedures.

This B&RMP has been developed to ensure that the post mining landscape of the site is designed to:

- Ensure structural stability, revegetation success and containment of wastes; and
- Post-mining land use compatible with surrounding land uses that provides optimal environmental and community benefits.

1.2 Project Background

An application for development consent for the Mount Pleasant Project was made in 1997 and supported by an Environmental Impact Statement (EIS) (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent DA 92/97 to Coal & Allied under Part 4 of the *Environmental Planning and Assessment Act 1979* for the “construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities” at Mount Pleasant. Development commenced in 2004 with the construction of Environmental Dam 1.

[1] Rehabilitation is defined by the *Mining Act 1992* as the treatment or management of disturbed land or water for the purpose of establishing a safe and stable environment.
[2] The Offset Strategy is only required if the Applicant carries out any development in the conveyor/service corridor. Note: The Offset Strategy may be combined with any similar offset strategy required for the development under Commonwealth legislation, or the Aboriginal cultural heritage conservation area/s described in Condition 33, subject to suitably offsetting the impacts of the conveyor/service corridor.

During 2010, Coal & Allied reviewed the Mount Pleasant Project as part of its normal investment decision making process, to determine the design and cost of constructing the project to deliver coal to port by 2014. During this process, minor modifications to the approved project were identified, and an application for a modification to DA 92/97 was submitted in 2010 (EMGA Mitchell McLennan, 2010). This modification was approved on 19 September 2011.

The initial development consent approved mining for 21 years, until 2020, and this date has not been varied under the modification. Currently, the approval allows for construction and six years of mining, and the B&RMP has been developed to cover this time frame. Coal & Allied propose to submit a new project application to allow operations to extend for another 21 year period, at which time this management plan will be reviewed and updated to cover the extended operational period.

1.3 Project Area

The Mount Pleasant Project area is located approximately three kilometres to the north-west of Muswellbrook. The site is situated directly north of the existing Bengalla Mine, with Mt Arthur Mine further south. Dartbrook Mine and the village of Kayuga are situated beyond the northern boundary of the site, with the township of Aberdeen further north again. Agricultural land and the township of Muswellbrook are located to the east of the site. Land to the west of the site is generally used for grazing with some agricultural activities undertaken. These local features are shown on Figure 1. Figure 2 details the pre-mining vegetation communities across the site.

1.4 B&RMP Layout

This B&RMP defines how Coal & Allied is going to meet a range of performance criteria, and provides performance measures and indicators against which these performance criteria are to be assessed (Section 2.0 of this B&RMP). These performance criteria, performance measures and indicators are provided as a guide to aid the direction of rehabilitation and biodiversity management across the site. These criteria also guide the rehabilitation and biodiversity enhancement measures to form a framework for the purpose of monitoring of the project lands.

This B&RMP includes:

- Reference to the detailed baseline data which is contained in the various project environmental assessments and is referenced accordingly;
- A description of:
    - The relevant statutory requirements, including any relevant approval, licence or lease conditions;
    - Any relevant limits or performance measures/indicators; and
    - The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures.
- A description of the measures that will be implemented to comply with the relevant statutory requirements, limits, and criteria;
- A program to monitor and report on the:
    - Impacts and environmental performance of the project; and
    - Effectiveness of any management measures.
- A range of contingency issues which have been designed to manage any unpredicted impacts and their consequences;
- A program to investigate and implement ways to improve the environmental performance of the project over time; and
- A protocol for periodic review of the Strategy.

1.5 Principles of this B&RMP

This B&RMP also incorporates the following strategic objectives:

- Rehabilitation is consistent with the *Mount Pleasant Mine EIS* (ERM Mitchell McCotter, 1997), *Mount Pleasant Project Modification Environmental Assessment Report* (EMGA Mitchell McLennan, 2010) and Project Approval DA 92/97 (Notice of Modification);
- Performance criteria and proposed final landuse are developed through stakeholder consultation;
- Takes into account local and regional initiatives;
- Compatible with surrounding landscape and landuse requirements;
- Addresses the limitations of land capability;
- Sustainable in terms of landuse;
- Stable and permanent landforms;
- Enhance the biodiversity values of the site;
- Secure and safe containment of waste substances;
- Clean, tidy and free of equipment / structures; and
- Free of unacceptable pollution.

The focus of the rehabilitation program through to 2020 at the Mount Pleasant Project will be the establishment of Box-Gum Woodland areas, in order to provide habitat for threatened species recorded or potentially occurring within the area. The biodiversity within this vegetation community lies predominantly in the grassy ground layer. The rehabilitation program at Mount Pleasant will focus on research and management practices that are designed to enhance this component of the landscape whilst also optimising the other components of the plant community. The best practice site management practices as described in the *Draft National Recovery Plan – White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Department of Environment, Climate Change and Water NSW, 2010) have been used where relevant as the basis for the development of this B&RMP. The B&RMP does not cover offset properties required under the federal *Environment Protection and Biodiversity Conservation Act 1999*.

This key plant community will be established across Mount Pleasant per the rehabilitation strategy illustrated on Figure 3.

1.6 Environmental Management System

Coal & Allied has in place an Environmental Management System (EMS) accredited to the International Standards Organisation (ISO) 14001 standard. The EMS is designed so that Coal & Allied can:

- Effectively manage its environmental issues;
- Ensure compliance with regulatory requirements;
- Continually improve its environmental performance; and
- Satisfy the expectations of stakeholders and the local community.

The EMS forms the basis of environmental management at Mount Pleasant Project and includes procedures, standards and management plans to ensure all regulatory requirements are met. This B&RMP (and any subsequent revisions) will form part of the EMS. The EMS will continue to operate during and following mine closure to ensure all environmental (including monitoring and management) and social responsibilities are met for up to five years after mine closure or as approved by relevant regulators.

1.7 Stakeholder Consultation

Community engagement and consultation has been ongoing during the development of the project. This engagement has included:

- Shopfronts for Coal & Allied at Muswellbrook and Singleton;

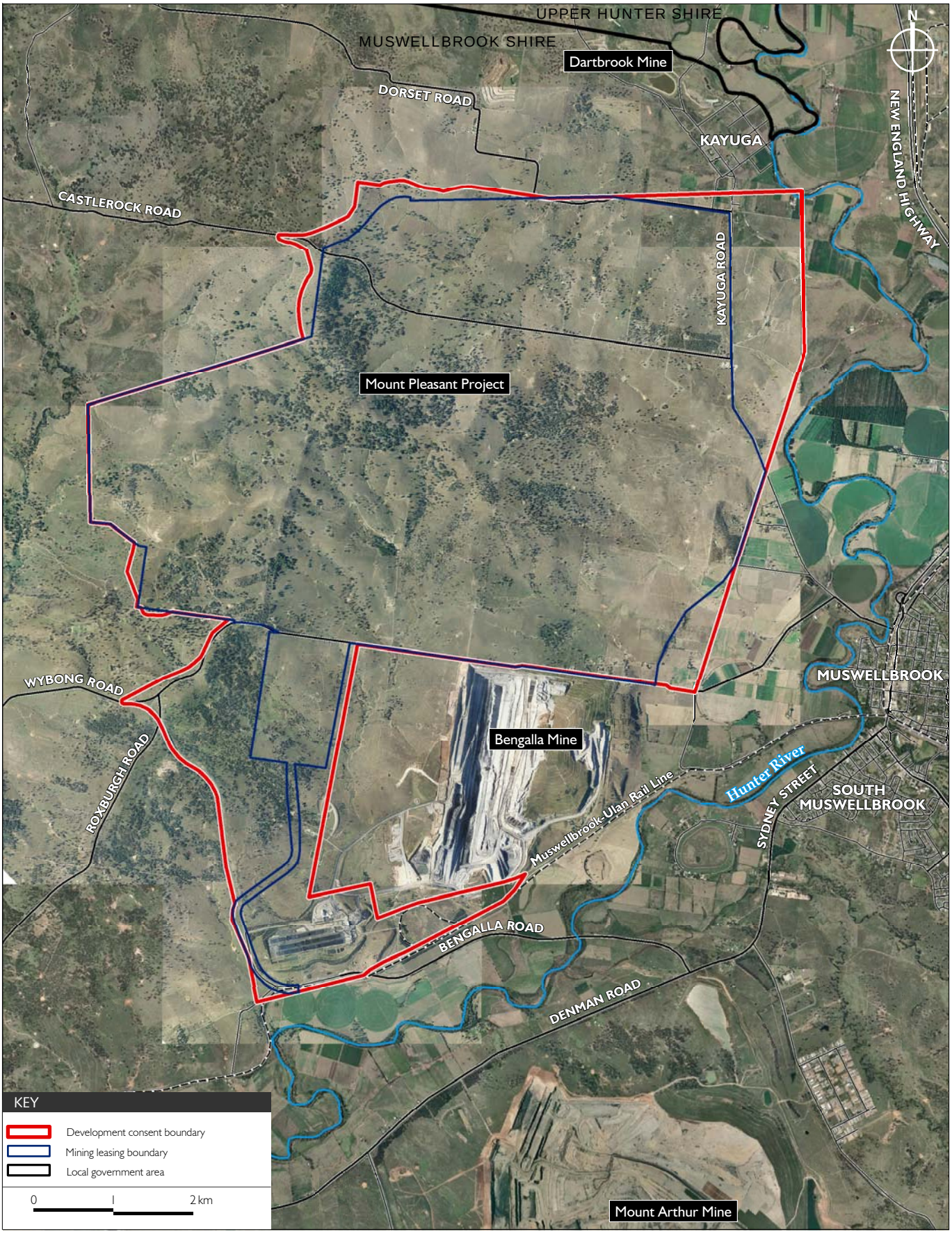
- Free call community information line;
- Website providing up to date information on the Mount Pleasant Project - www.coalandallied.com.au;
- Quarterly Newsletters to local businesses and residents; and
- Regular Mount Pleasant Project Community Consultative Committee (CCC) meetings - the CCC provides an interface between the community, mine management and the relevant government departments. The community representatives on the CCC are able to share information from CCC meetings with the wider community and to report back on community issues at CCC meetings.

Consultation specifically regarding the development of this B&RMP has been undertaken with:

- Department of Planning and Infrastructure (DP&I);
- Office of Environment and Heritage (OEH);
- NSW Office of Water within the Department of Primary Industries (NOW);
- Muswellbrook Shire Council; and
- Mount Pleasant Project CCC.

To optimise the synergy that strategies and management plans such as the Rehabilitation Strategy (AECOM, 2011) and this B&RMP offer in terms of landscape and land use, Coal & Allied proposes to continue to engage throughout the life of the mine with neighbouring operations, agency and community stakeholders.

Base references that will be used throughout this engagement will be the *Mount Pleasant Mine EIS* (ERM Mitchell McCotter, 1997), *Mount Pleasant Project Modification Environmental Assessment Report* (EMGA Mitchell McLennan, 2010), and the *Strategic Framework for Mine Closure* (ANZMEC & MCA, 2000).



030379 B&RMP F5 Rev D 28 Feb 2012

Project Site Locality

B&RMP – Mount Pleasant Project

FIGURE 1

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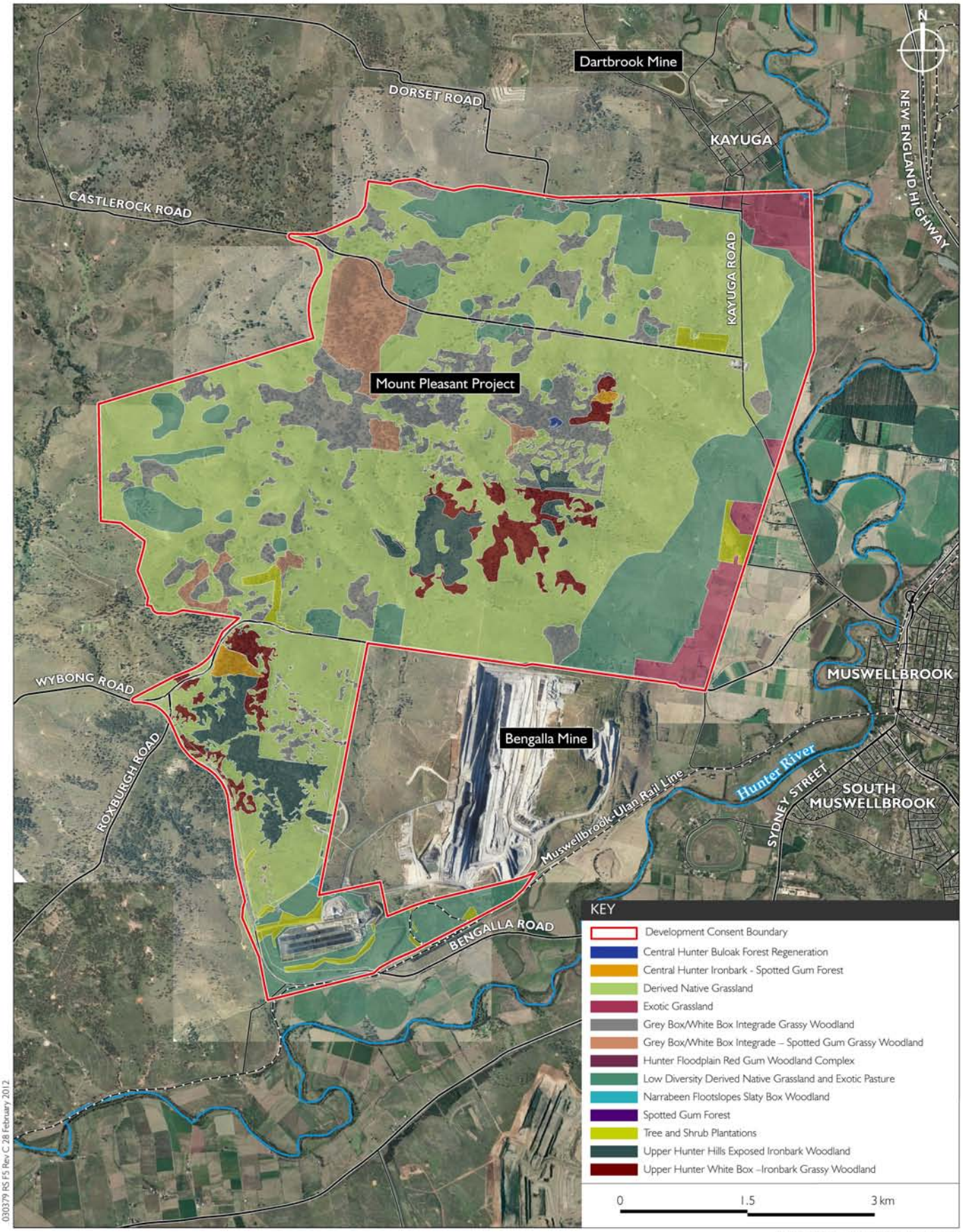

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Existing Environment

B&RMP – Mount Pleasant Project

FIGURE 2

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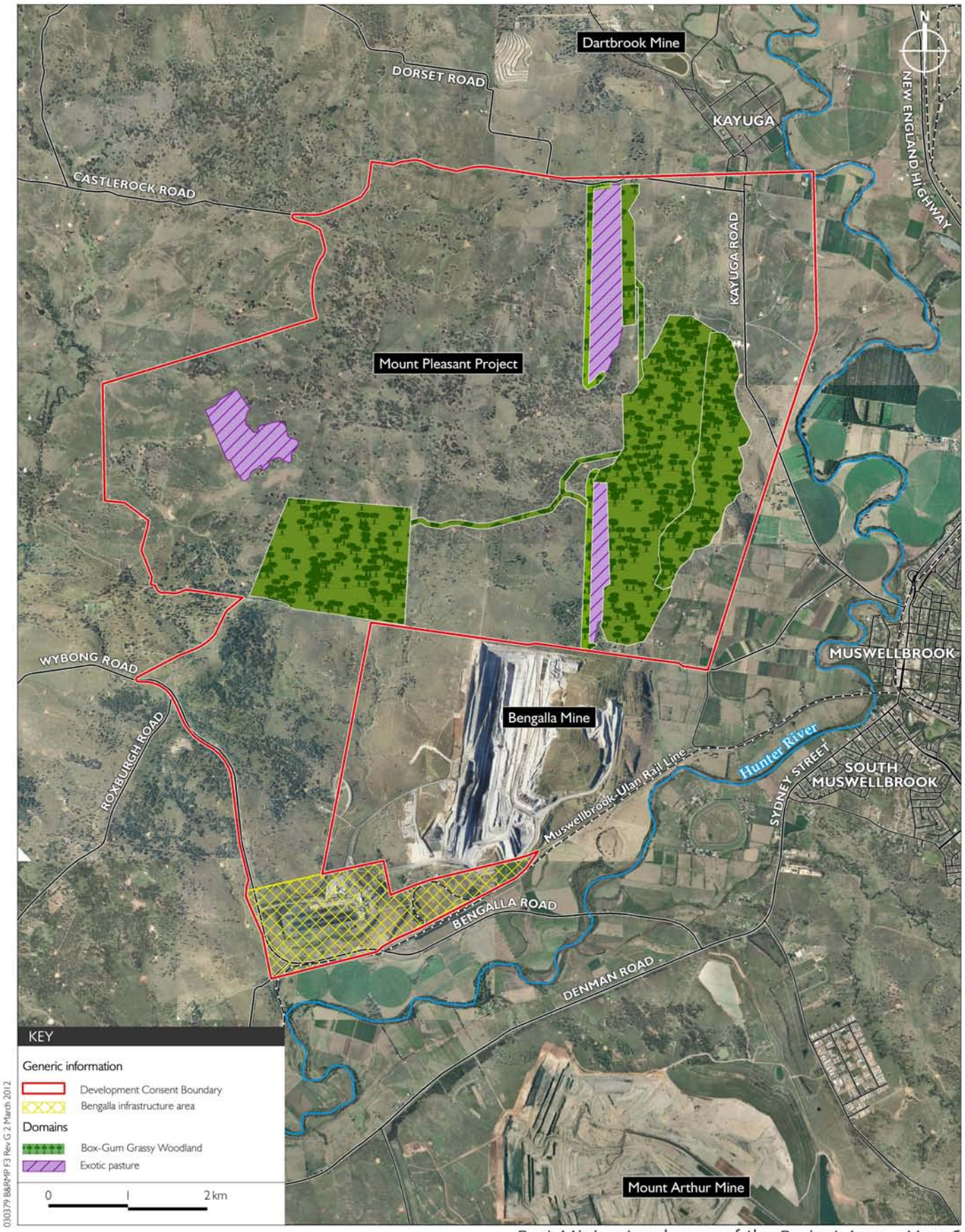

Post Mining Landscape of the Project Area – Year 6

B&RMP – Mount Pleasant Project

FIGURE 3

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2.0 Performance Criteria, Measures and Indicators

The performance criteria, measures and associated indicators have been developed in accordance with the range of project related documentation i.e. EIS, EA, Director-General's Report and the Project Approval. The performance or completion criteria are objective target levels or values that can be measured to quantitatively demonstrate the progress and ultimate success of a biophysical process. These criteria have been developed for each phase of the rehabilitation so that the rehabilitation success can be quantitatively tracked throughout the life of the mine. The performance measures quantify the rehabilitation and land management program in terms of efficiency or effectiveness and establish the indicative timeframes for completion. The performance indicators are used to define and evaluate the program, typically in terms of making progress towards the development of sustainable ecosystems whilst also providing a framework for the implementation of key activities. These indicators provide the basis for the procedural context of the site work practices. The performance indicators are attributes of the biophysical environment e.g. pH, slope, that can be used to approximate the progression of a biophysical process and can be measured to demonstrate and track the progress of an aspect of rehabilitation towards a desired completion criteria (I&I June, 2010).

The criteria, measures and indicators which provide the framework for the B&RMP are underpinned by a range of documents which relate to land management. These include industry standards, Rio Tinto Standards and Mount Pleasant Procedures. The B&RMP will be reviewed regularly with resultant amendments being recorded in documents such as the Mount Pleasant Annual Environmental Management Report (AEMR).

There is an element of risk attached to the development of completion or 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 post mining. Many variables operate at catchment or regional scales, such as river flows and pest outbreaks. Other factors that operate at continental or even global scales, such as climatic influences (including droughts or floods brought about by La Niña and El Niño events), could significantly influence the long-term sustainability of the vegetated lands encompassed by Mount Pleasant Project. To this end, the performance measures and associated indicators have been designed to provide an appropriate benchmark or guide against which to assess the management of project lands and the resulting improvements.

The performance measures and indicators in this B&RMP are designed to form the basis of the Performance Criteria and provide the ability to track the development of sustainable ecosystems through a series of conceptual stages which are shown diagrammatically in Figure 4 and described as:

- Stage 1 – Decommissioning – removal of hard stand areas, buildings, contaminated materials, hazardous materials;
- Stage 2 – Landform Establishment – incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology;
- Stage 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;
- Stage 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; and
- Stage 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.

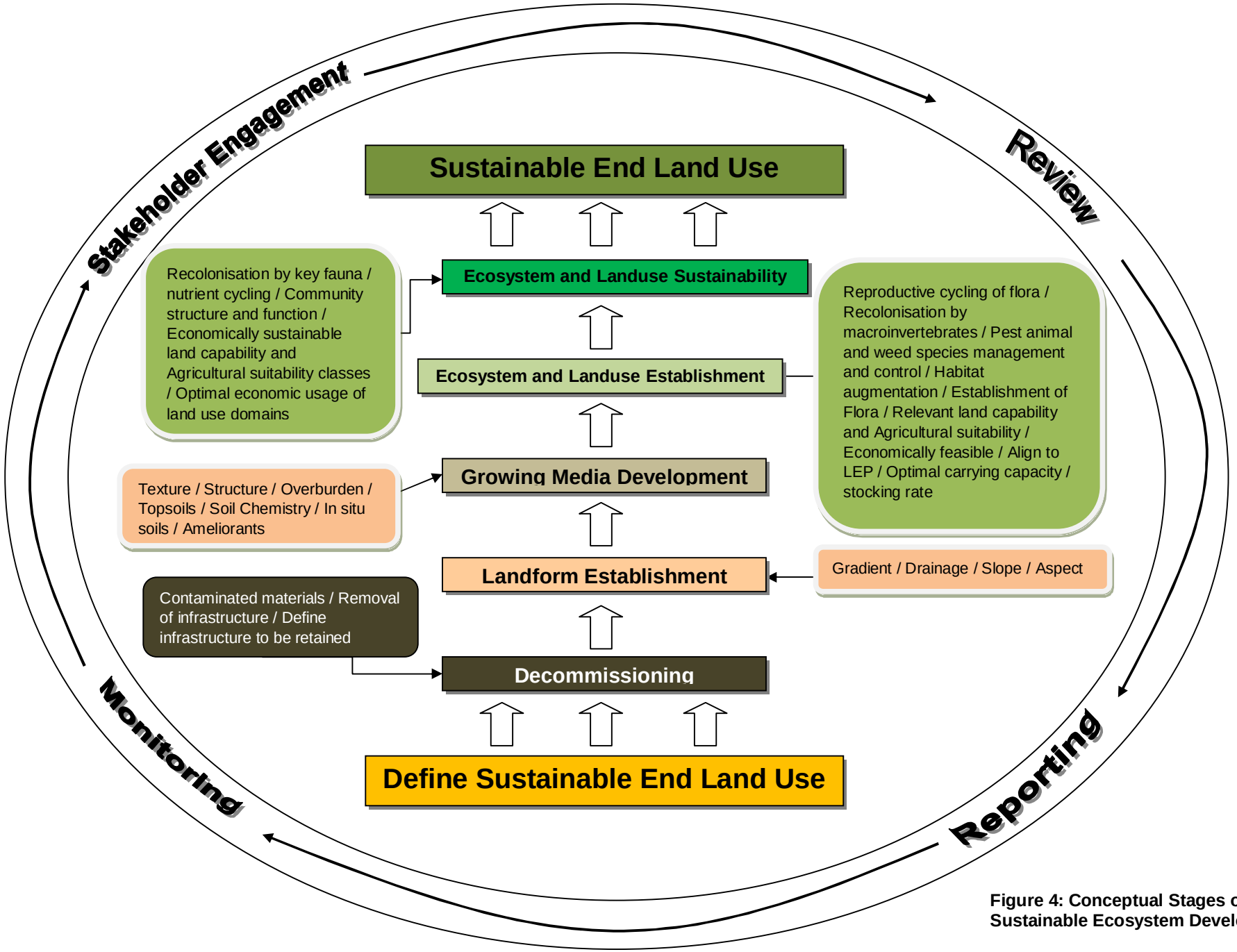


Figure 4: Conceptual Stages of Sustainable Ecosystem Development

2.1 Decommissioning

The first stage in the development of sustainable landuse and associated ecosystems, is that of decommissioning. In the context of this B&RMP, decommissioning is the formal process to remove some facet of the mining operation from its active status.

2.1.1 Surface Water

The water management system for the Mount Pleasant Project requires water to be effectively sourced, captured, diverted, stored, monitored, utilised and reticulated across the site. This system is based on adherence to well established, best water management practices in the Australian mining industry. The Mount Pleasant Project will also be undertaking activities determined as Controlled Activities under the Water Management Act 2000. The activities will be implemented using leading practice, and as described in the EIS and various Management Plans for the site.

Water run-off from the rehabilitation 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.

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 which may damage their integrity.

As far as possible, reconstructed drainage lines will be revegetated with species prevalent within the existing ephemeral water course. Vegetation established during rehabilitation will ensure the long term channel stability.

2.1.2 Groundwater

Proposed mining operations will commence in the eastern part of the site and extend westward down dip. During mine operations, the excavation will progressively expose all coal seams to gravity drainage. Complex interburden leakage is expected to develop. Mine pit development will initially induce localised depressurisation of the coal measures followed by a regional depressurisation. During the life of the mine, hydraulic grades will be inward towards the pits (ERM Mitchell McCotter, 1997).

Mining activities will have little impact on groundwater quality within the coal seams. Beneath the alluvium, the rate of upward leakage of saline waters will be slowed and eventually reversed due to seepage from the undisturbed coal measures to the pits. Rainfall recharge may migrate to increased depths thus potentially leading to groundwater quality improvements. When water levels recover following mining, a flow reversal may again occur leading to re-establishment of upward movement from the coal measures to the alluvium. The quality of water moving upwards will initially reflect alluvial water but will ultimately tend towards a mixed water quality based on contributions from remaining in situ coal seams, void and spoils water quality (ERM Mitchell McCotter, 1997).

The EIS predicts groundwater pit seepage to be 0.6 megalitres per day at Year 5. Modelling suggests that following mining, the pit or void will continue to attract seepage from the surrounding coal measures. The rate of seepage will steadily decline as the system approaches a state of equilibrium. Recovered void water levels in the North and South Pits are predicted to be between 130 metres Australian Height Datum (mAHD) and 150 mAHD.

Estimated recovery rates of water levels indicates that initially this will occur rapidly, followed by a period of more than 80 years to levels equivalent to restore river and alluvium levels. Recovery water includes rainfall recharge and alluvium leakage (ERM Mitchell McCotter, 1997).

2.1.3 Domains

The key domains are shown on Figure 5. These are:

- Mount Pleasant Infrastructure Areas;
- Void;

- Highwall/endwall;
- Tailing Storage Facilities (TSF);
- Overburden Emplacement.

Further information on these domains and the key issues that pertain to their management is provided in Sections 2.1.3.1 to 2.1.3.4 of this report.

The Performance Criteria, Performance Measures and Indicators together with the justification source for this data as they relate to the Decommissioning Stage are provided in Table 1.

2.1.3.1 Mount Pleasant Infrastructure Areas

Site infrastructure to be removed will include (if built as designed):

- Amenities/buildings (bathhouse(s), workshop(s), administration building(s) and store(s));
- Car parks;
- Sewage treatment plant;
- Explosives magazine;
- Helipad;
- Coal handling areas (Run of Mine (ROM) coal pads, ROM dump stations and raw coal stockpiles – including stacking and reclaiming equipment);
- Coal Preparation Plant (washery building, thickener and reagent farm and coarse reject truck load out bin(s));
- Product conveyors (conveyors, a surge bin or bins, train-loading bin, access roads, sediment dams or sumps, and lay down areas);
- Electrical and phone services (transmission lines, switchyards, sub-stations and phone lines);
- Water supplies (dams, pump stations, potable pipelines, non potable/dust suppression pipelines), heavy vehicle fill facilities (dust suppression));
- Fuel farm and fuel storage facilities;
- Road infrastructure (haul roads, mine access roads, load out facilities);
- Rail infrastructure (rail spur, loop and load out facility); and
- Raw water, rail loop and sedimentation dams.

The Bengalla Infrastructure area (refer Figure 5), while located within the southern portion of the Mount Pleasant Project development consent boundary, is owned and operated by Bengalla Mine and does not form part of the Mount Pleasant Project. This infrastructure area will not be decommissioned as part of the Mount Pleasant Project and does not form a domain within this report. It has been identified solely because it falls within the development consent boundary.

2.1.3.2 Voids, Highwalls and Endwalls

This domain includes the highwall, void, lowwall, spoil and ramps. The final void, lowwalls and ramps cannot be rehabilitated progressively over the mine life as they are required up to the end of production for accessing coal and related infrastructure services. The predicted locations of these items are shown in Figure 3.

In Year 6 of the operation, Coal & Allied anticipate that the floor of the final void will be dry. This will be confirmed by modelling if anticipated future mining applications are not approved. All areas of the site, with the exception of the final voids and their surrounding catchments, will be free draining. The aim of this is to maintain the effective catchment contribution and yield to the Hunter River following the cessation of mining.

The proposed final landform design will have:

- Coal seams capped where possible;
- A highwall slope angle of 50 degrees following blasting and dozing, or benching at 30m vertical incline and up to 25m horizontal incline, with part of the void filled;

- A lowwall slope angle of 10 degrees or up to 25 degrees; and
- The top batter to be 27 degrees and a safety berm along the entire length of the remaining high walls. The safety berm is to provide an engineered barrier between the pit and the surrounding area. The trench and berm are to be constructed in such a way that it would physically stop vehicles.

An evaluation of innovative uses for the final void will be investigated in more detail in the Mine Life Planning process in accordance with the *Rio Tinto Closure Standard* (Rio Tinto, 2009) and also in later versions of this Plan which are required by the Projects Approval conditions.

2.1.3.3 Tailings Storage Facility

Tailings disposal throughout the life of the project will be in the form of a thickened paste disposal method. Using this method, the TSF will be left for five years following last disposal for drying prior to rehabilitation. This type of thickened discharge technique is particularly amenable to closure and rehabilitation as the final surface does not pond water and the tailings material is dry. Post drying, the TSF will be revegetated with a species mix aligned to the surrounding plant community i.e. grassland and open woodland.

2.1.4 Overburden Emplacement

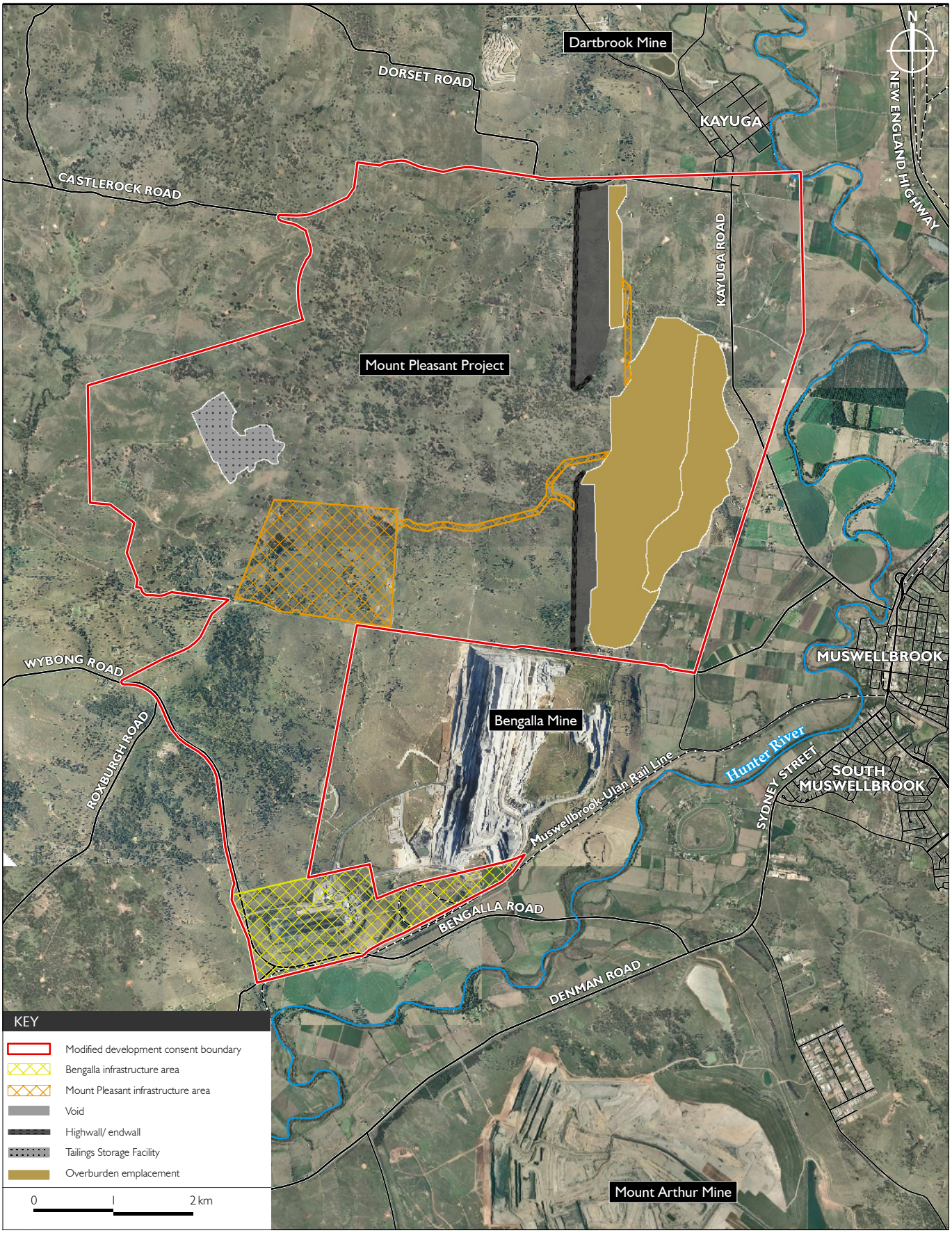
The mine will generally develop east to west. In Year 1, coal mining will commence with the partial excavation of the South Pit. Rock will be hauled to form the southern visual bund to the east of the South Pit effectively screening the mining operation from Muswellbrook. The southern visual bund will take approximately four years to complete and will extend from the northern end of the South Pit to Wybong Road.

In Year 3 excavation of the North Pit will commence. Rock from the excavation will be hauled to the northern visual bund to the east of the North Pit.

In Year 5 the southern and northern visual bunds will be complete and initial backfilling of the North and South Pits will have commenced.

Figure 3 shows a diagrammatic representation of the post mining landscape of the project at Year 6 end of mine life.

The proposed final landform consists of a long undulating ridgeline in the east of the site. The ridgeline has a north-south orientation and is designed to emulate the surrounding topography. The mined lands are to be rehabilitated back to grassy woodlands.



030379 B&RMP F5 Rev F 2 March 2012

Decommissioning

B&RMP – Mount Pleasant Project

FIGURE 5

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Table 1 Decommissioning

Criteria	Performance Measure	Performance Indicator	Justification /Source
Overburden Emplacement and Final Voids			
Encapsulation	Problematic materials will be capped.	Problematic coarse rejects will be capped by a minimum of 1m of benign material.	HSE Performance Standards (Rio Tinto, December 2008) Project Approval – Schedule 3 Condition 53
		Net acid generating materials will be capped by a minimum of 5m of benign material.	
		Carbonaceous material will be capped by a minimum of 3m of benign material .	
	Exposed coal seams will be covered with benign materials to prevent spontaneous combustion where practical.	Capped by a minimum of 3 m of material where practical.	
		Acceptable cover material for capping.	
Voids – Batters / Highwall			
Management of the final void during mine decommissioning	The use of the final void will be considered in consultation with the DRE and will be documented in the Decommissioning Plan that will be developed prior to the final five years of the mine life of Mount Pleasant. It is envisaged that the final decommissioning of the void will include: - Removal of mining facilities and infrastructure (dissemble, demolish and remove structures) - Stabilisation of any loose materials on unstable slopes if required - Installation of interim drainage management if required - Remove concrete pads and footings - Reuse or recycle materials (e.g. steel and concrete) where practicable, or dispose of appropriately - Disconnect and terminate services - Incorporation of void infrastructure and facilities within decommissioning plan.	Development and Implementation of Decommissioning Plan. Certificates for removal and disposal of hazardous materials present if applicable.	HSE Performance Standards (Rio Tinto, December 2008) Project Approval – Schedule 3 Condition 53

Criteria	Performance Measure	Performance Indicator	Justification /Source
Infrastructure Areas			
Process of decommissioning to occur throughout the life of the mine as infrastructure and facilities progressively become redundant. Site infrastructure and facilities to be removed will ultimately include (if built as designed) those listed in Section 2.1.3.1.	Progressive and final decommissioning will include the following: - Dissemble, demolish and remove structures; - Remove concrete pads and footings; - Reuse or recycle materials (e.g. steel and concrete) where practicable, or dispose of appropriately; - Disconnect and terminate services.	Implementation of Decommissioning Plan Certificates for removal and disposal of hazardous materials present.	HSE Performance Standards (Rio Tinto, December 2008) Project Approval – Schedule 3 Condition 53
Hazardous material assessment of infrastructure to identify the potential health and environmental risks associated with demolition of the infrastructure.	Inventory showing location of hazardous materials.	Implementation of Decommissioning Plan. Decommissioning Plan to include hazardous materials management. Certificates for removal and disposal of hazardous materials present if required. Detailed investigation if required.	HSE Performance Standards (Rio Tinto, December 2008) Project Approval – Schedule 3 Condition 53 Rio Tinto Environmental Standard E5, *Hazardous Materials and Contamination Control*
	Management of hydrocarbon soil contamination	Onsite treatment at the bioremediation area until the soil can be safely disposed in the spoil dump.	
Contamination assessment determines the risk of contamination.	Contamination assessments of soils. Identify areas of high risk for further evaluation.	Assessment of contamination and / or remediation requirements.	

Criteria	Performance Measure	Performance Indicator	Justification /Source
	Where contamination triggers specific handling and management requirements, develop a Remedial Action Plan to provide a framework for the appropriate management, remediation and validation of contaminated soils if required.	Develop Remedial Action Plan. Implement Remedial Action Works. Implement Validation Program. Certificates/audit statements showing remediation/ management of soils.	
	Geochemical characterisation and operational monitoring of spoil, coal waste and pit wall rock. Potentially acid forming spoil and reject deposited in specially designed and constructed facilities (e.g. TSF). Pit wall rock covered or otherwise managed to minimise risk of Acid Rock Drainage where practical.	If required, post-construction audits of emplacements and void management measures. If required, monitoring of drainage/seepage from spoil and coal waste and final void waters.	HSE Performance Standards (Rio Tinto, December 2008) Project Approval – Schedule 3 Condition 53
Minimise risk of spontaneous combustion	Undertake a spontaneous combustion assessment of previous stockpile areas where applicable.	If required and where practical monitoring for heat haze, smoke and odour, may include the use of thermal imagery.	HSE Performance Standards (Rio Tinto, December 2008) Project Approval – Schedule 3 Condition 53
Tailings Storage Facility			
Removal of tailings infrastructure	Removal of pipelines and pumps and related tailings infrastructure.	Implementation of Decommissioning Plan.	HSE Performance Standards (Rio Tinto, December 2008)

Criteria	Performance Measure	Performance Indicator	Justification /Source
Geochemical characterisation of tailings deposits	A selection of capped tailings dams that can be safely accessed and sampled by conventional drill rigs will be sampled for geochemical characterisation. The samples will be analysed for parameters such as: - Paste pH; - Paste Electrical conductivity (EC) (µS/cm); - Total Sulphur (% mass); - Sulphide Sulphur (% mass); - Acid Neutralising Capacity (ANC) as kg H_2SO_4/tonne .	No indication of acid generation i.e. acidic pH, high electrical conductivity or high sulphate (>1%).	Project Approval – Schedule 3 Condition 53

2.2 Landform Establishment

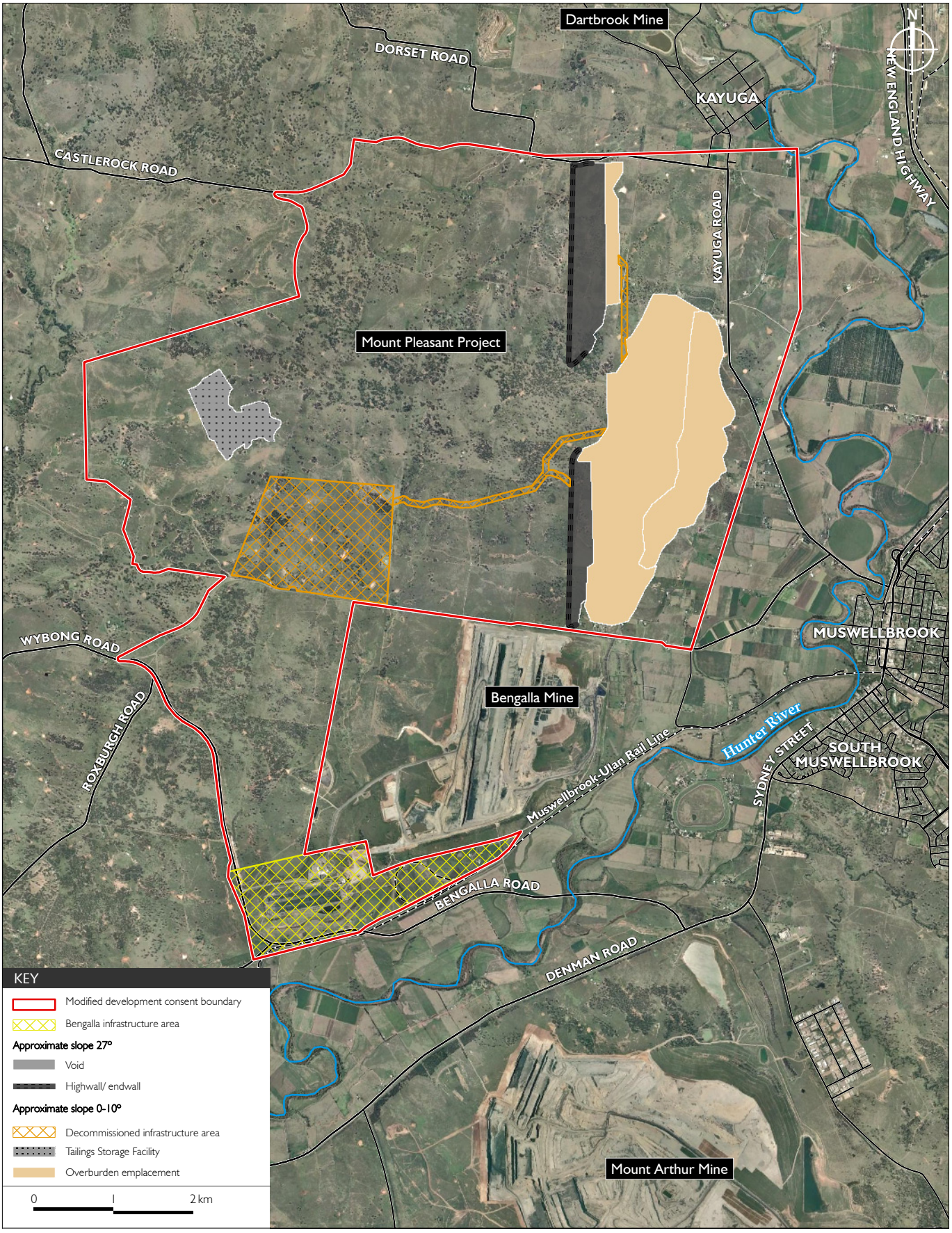
Following Decommissioning is the stage of Landform Establishment. In the context of this B&RMP, Landform Establishment encompasses the processes involved to achieve safe and stable landforms. This includes slopes, erosion controls, and drainage lines with integrated landscape features, which are compatible with surrounding landforms, whilst also ensuing that the rehabilitated areas of native vegetation link with undisturbed native vegetation.

In this context the key domains (as aligned to slope) shown on Figure 6 are:

- Decommissioned Infrastructure Areas;
- Void;
- Highwall / endwall;
- Tailing Storage Facility; and
- Overburden Emplacements.

The Criteria, Performance Measures and Indicators, together with the justification source which describe structures and method for this data, as relate to the Landform Establishment Stage are provided in Table 2 and address:

- Stabilising landforms;
- Minimising erosion;
- Preventing water pollution;
- Preventing access to open pits or other hazardous locations;
- Enhancing visual amenity; and
- Site user, stock and fauna safety.



030379 B&RMP F6 Rev G 2 March 2012

Landform Establishment

B&RMP – Mount Pleasant Project

FIGURE 6

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Table 2 Landform Establishment

Criteria	Performance Measure	Performance Indicator	Justification Source
All Domains except Unmined Lands			
The final landforms, batter slopes, drainage and benching designed to ensure the long term stability of the landform.	Design to enable the agreed end landuse (determined as part of the broader mine closure program) to be established.	Landform survey broadly comparable to design plan. Absence of slope failure or uncontrolled erosion.	
Landforms established during rehabilitation through to mine closure will be constructed to match surrounding landforms.	Elements such as water management areas, drainage paths, contour drains, ridgelines, and emplacements will be shaped, where possible, in undulating informal profiles in keeping with natural landforms of the surrounding environment.	The landform is to be shaped to ensure slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Drainage lines to be self-sustaining and predominantly constructed of natural materials (e.g. minimise concrete). Visual screens comprising mounding or bunding are established as per the Landscape Management Plan.	
Minimisation of constructed slopes greater than 10 degrees – low walls, ramps and drainage structures.	Identify the exceptions where angles of 10 degrees are necessary and are permitted to be constructed.	Landform survey broadly comparable to design plan.	

Criteria	Performance Measure	Performance Indicator	Justification Source
Steep slopes will be trimmed.	Trim slopes in accordance with designated site procedure.	Landform survey matches design.	
Minimise risk of spontaneous combustion.	Spontaneous combustion in both stockpiles and pit areas is monitored throughout the life of the operation and reported on in the AEMR.	Absence of carbonaceous material on the surface of the rehabilitation. No active spontaneous combustion areas. Monitoring program in place for spontaneous combustion.	
Tailings Storage Facility			
Operation of TSF	Establish a procedure to operate, inspect and monitor TSF	Performance as per TSF Procedure	HSE Performance Standards (Rio Tinto, December 2008) Project Approval – Schedule 3 Condition 53
Potential subsidence of materials deposited into the TSF will also be taken into account when designing the final landform.	TSF design and management to allow for progressive reshaping of the surface as settlement occurs. TSF design and management to allow for initial overfilling of the covering material to compensate for expected settlement	Engineering inspection of the TSF design and management.	
Problematic materials will be capped.	Tailings storage facilities are capped with overburden and rehabilitated after consolidation of tailings.	TSF design documentation.	
Overburden Emplacements			
The potential subsidence of materials deposited into these areas will be taken into account when designing the final landform.	Overburden emplacement design and management to allow for progressive reshaping of the surface as settlement occurs. Overburden emplacement design and management to allow for initial overfilling of the covering material to compensate for expected settlement.	Engineering inspection of overburden emplacement.	HSE Performance Standards (Rio Tinto, December 2008) Project Approval – Schedule 3 Condition 53
Problematic overburden materials will be capped.	Problematic overburden materials will be managed to mitigate risk.	Overburden emplacement design documentation.	
Voids and associated Batters			
Current void use is compatible with long term plans for voids.	Assessment and design of interim void uses will include assessment of risk factors that may affect the viability of final void uses.	Avoidance of interim uses that conflict with final use. Decommissioning Plan.	HSE Performance Standards (Rio Tinto, December 2008)

Criteria	Performance Measure	Performance Indicator	Justification Source
Final voids are managed to ensure geotechnical stability and appropriate landform design.	Final void management may require additional studies by qualified geotechnical engineer to assess post-closure stability. Final design of high walls, batters and other constructed slopes to achieve long-term stability.	Landform survey matches design.	Project Approval – Schedule 3 Condition 53
Measures to limit public access to the voids and to address ongoing public safety.	At the void crest (highwalls and endwalls) construct a safety berm and / or security fence to provide an engineered barrier between the pit and the surrounding area. The berm is to be constructed in such a way that it would physically stop a vehicle.	Compliance with safety berm and fence design.	
Long term integrity of the slopes of the final void.	Slopes of final void are stable. Determine appropriate slope configurations. Assess against a circular slip failure mode in a situation of torrential rain. Review the void slopes design adequate for geotechnical serviceability. Slope construction.	Determine the lowest credible strength of the spoil and friction angle. Model problem areas. Design incorporated into Decommissioning Plan. Survey to confirm built as designed. Visual inspections and survey conducted.	
Water interactions between void and surrounds.	Determine if water quality seeping into the void is as predicted in the EIS (ERM Mitchell McCotter, 1997).	Monitor increase in void standing depth - inflow volumes. Hydrological and water quality monitoring program implemented during operations and post-closure.	

2.3 Growing Media Development

In the context of this B&RMP, Growing Media Development incorporates the processes involved 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 the specialist requirements, e.g. soil ameliorants, aligned to the revegetation of the disturbed areas, whilst also incorporating consideration of landuses that may deviate from the traditional post mining landuses.

In this context the key domain as shown on Figure 7 is:

- Area Disturbed by Mining - Created Growing Media and/or Topsoil Establishment.

2.3.1 Overburden Characterisation

Supplementary Report 1 of the EIS provides a description of the characterisation of the overburden and interburden materials that are present at Mount Pleasant. The sampling program associated with the Supplementary Report 1 identified that some of the materials sampled produced leachate that is acidic, saline or sodic on weathering. These are characteristics that are known to produce adverse growing conditions for vegetative growth and elevated risk of soil erosion and sedimentation and need to be managed accordingly.

2.3.2 Soil Types and Suitability

Data derived from the EIS demonstrates the suitability of the soils of the project area in terms of the suitability of these soils for use as growing media and the stripping depth. Table 3 summarises the distribution of each soil type across the project area.

Table 3 Summary of Soil Types (ERM Mitchell McCotter, 1997 – Section 7)

Soil Types	Characteristics
Alluvial – Floodplain Soils	Uniform medium or fine textured clay profile, consisting of clay loams, silty clay loam or light clay topsoils. Slightly to highly dispersive.
Drainage Flat / Drainage Line Soils	Brown solonised soils and brown and yellow solidic soils. Slightly dispersible topsoils and highly dispersible subsoils.
Hillslope Soils	Dominate the study area. Topsoils are stable though occasionally highly dispersible. Subsoils are highly dispersible.
Sandy Hillslope Soils	Sandy parent material. Topsoil in two layers: - Light sandy clay loam, loam fine sandy or fine sandy clay loam; - Clayey sand, sandy loam or light – fine sandy clay loam. Subsoil is sandy – light medium clay – slightly – highly dispersible.
Volcanic Hillslope Soils	Uniform structured clay soils. Topsoil is fine sandy clay loam or light clay. Subsoils consist of silty – light medium clays. Slight – moderate dispersibility.

The suitability of these soils for use as top dressing and the stripping depth is summarised in Table 4.

Table 4 Summary of Soil Suitability for Use in Rehabilitation (ERM Mitchell McCotter, 1997 – Section 7)

Soil Unit Type	Suitable Stripping Depth (cm)
Alluvial Soils	Approximately the top half metre of this soil unit is suitable for topsoil, while all remaining material down to at least 2.5m is suitable for subsoil.
Drainage Flat / Drainage Line Soils	Surface layer is suitable for topsoils. Stripping depth to 0.2 m – though is depending on site specific soil characteristics. Soil below these layers is unsuitable due to unsuitable pH, dispersion characteristics, and structure.
Hillslope Soils	Surface soil material can be stripped down to a pale coloured (A2) horizon or in places down to a brighter coloured subsoil clay layer.

Soil Unit Type	Suitable Stripping Depth (cm)
Sandy Hillslope Soils	Surface layers are only suitable for topsoil, usually to a depth of 0.1m. Some areas not suitable due to high sand, gravel content or sandy texture.
Volcanic Hillslope Soils	Topsoil suitable to depths of 0.2m. Some areas not suited due to shallow soils or high content of gravel or rock.

Industry experience gained from the use of topsoil derived from pasture and returned to native plant communities has demonstrated the potential for these soils to incur land management issues such as erosion and weed incursions. To address these issues, the areas returned to native plant communities will, in the main, be based on “created growing media”, i.e. overburden and appropriate ameliorants such as organic fertilisers, gypsum and organic matter.

Soil management is fundamental in successful land management at the Mount Pleasant Project. The key objectives for managing the soil landscape (in context of vegetative cover and soil stability) include:

- Minimising bare soil patches, which would be affected by wind and water movement and the introduction and transportation of resources into and out of the system; and
- Favourable nutrient, infiltration and stability characteristics.

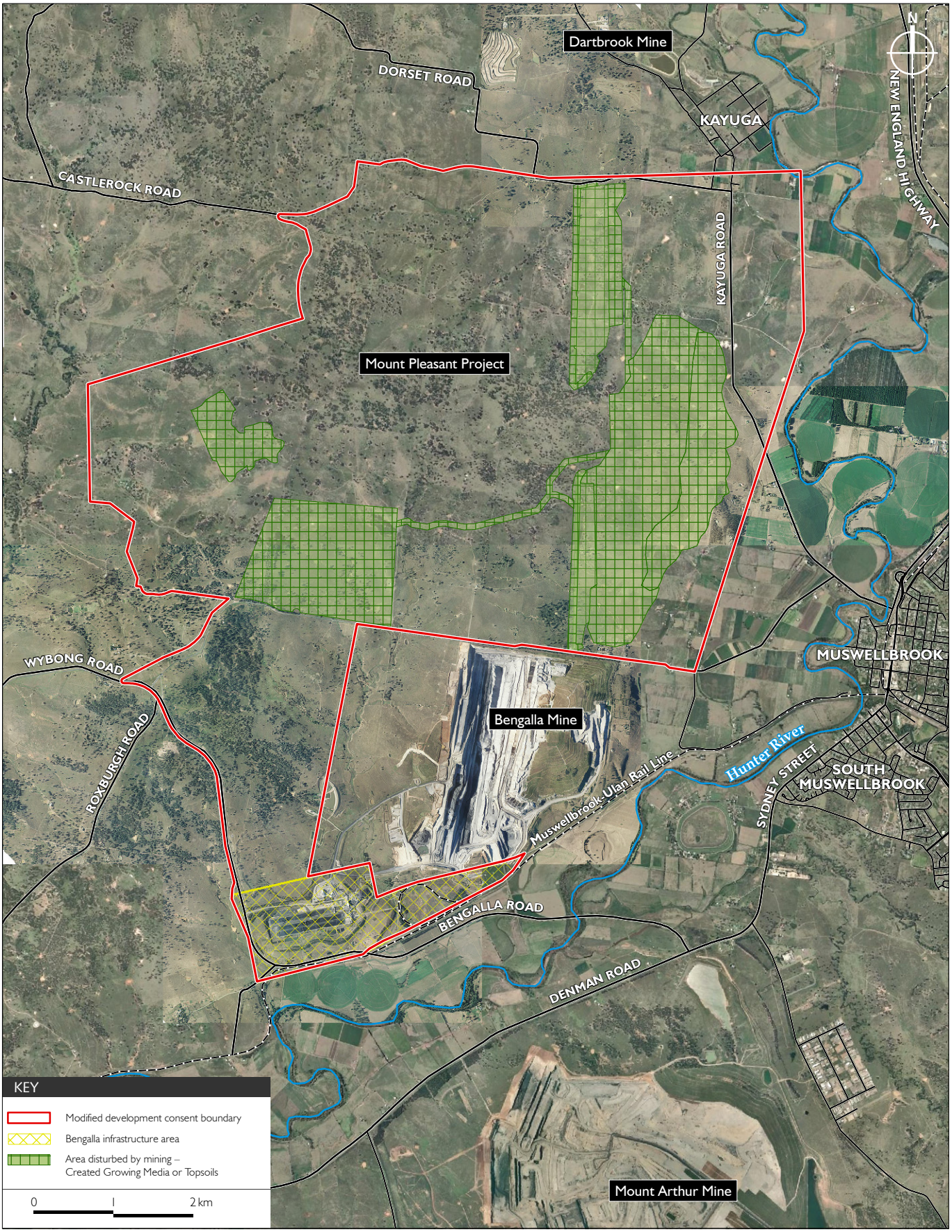
Management of the soil resource is defined in Table 5.

The Performance Criteria, Performance Measures and Indicators together with the justification source which describe the Growing Media Development stage are provided in Table 6.

Table 5 Soil Resource Management Strategies

Prior to Soil Stripping	During Soil Stripping and Stockpiling	Stockpiled Soil Awaiting use in Rehabilitation Works	During the Rehabilitation Program
- Quantification of soil resources aligned to pre-disturbance vegetation communities. - Characterisation of the suitability of soil resources for rehabilitation works. - Subsoil material that may potentially enhance the revegetation works would be investigated, with suitable materials to be stockpiled and used in the revegetation works. - Formulation of stripping and stockpiling guidelines including the nomination of appropriate depths, scheduling, location of areas to be stripped and stockpile locations. - Addition of gypsum at rates defined via monitoring of dispersion. The concept being that the gypsum will be incorporated throughout the subsoil material during the stripping and stockpiling operations, in doing so assisting in mitigating the risk of dispersive material at the time of respreading.	- Minimisation of vegetation clearance. - Selective stockpiling of soil according to pre-disturbance vegetation communities, soil type and salinity. - Stockpiling of soils in a manner that does not compromise the long-term viability of the soil resource. - Soil stockpiles will be located outside of proposed mining areas. - Vehicle movement will be kept to a minimum on the soils to be stripped. Traffic will be excluded from soils that are sensitive to structural degradation. - Loaders and trucks will be preferentially used over scrapers to minimise structural degradation. - Construction of stockpiles with a “rough” surface condition to reduce erosion hazard, improve drainage and promote revegetation. - Stockpiles will be generally no more than three metres in height in order to minimise problems with anaerobic conditions. - Stockpiles will be set out in windrows to maximise surface exposure and biological activity.	- Implementation of measures to ensure long-term viability of soil resources. - Stockpiles which are to remain inactive for extended periods are to be fertilised if required and seeded with appropriate seed mix to maintain soil structure, organic matter and microbial activity. - Installation of silt fences around stockpiles to control potential loss of stockpiled soil through erosion prior to vegetative stabilisation. - Stockpiles may be deep-ripped to establish aerobic conditions, prior to reapplication of stockpiled soil for rehabilitation. - Where necessary, an appropriate soil ameliorant will be applied to dispersive soil stockpiles. - Implement appropriate weed control strategies particularly for any noxious weeds. Immediate revegetation will provide vegetative competition to assist with control of undesirable plant species. - Stockpiles will be appropriately sign-posted to identify the area, the source of the soil i.e. native vegetation community or pasture and minimise the potential for unauthorised use or disturbance.	- Topsoil conditioning involving the addition of lime, gypsum or fertiliser will be used where required. - Soil ameliorants such as gypsum, wood and hay mulch, biosolids, municipal waste composts and other organic wastes are utilised based on availability of supply or Waste Regulation 1996 guidelines and are incorporated by ripping, plough or rotating hoe. The use of soil ameliorants is designed to prevent surface crusting, increase moisture and organic content, and buffer surface temperatures to improve germination. - Compacted soil is ripped to a depth of 30 cm along the contour prior to the application of topsoil and rock raking. - Topsoil will not be respread when wet, to avoid excessive compaction. - At all times topsoil respreading must be undertaken so that no visible dust leaves site. - Where possible, topsoil is dumped at the top of the slope and spread down slope to a depth of 10 cm. - Topsoil is to be used where available to promote species recruitment from direct soil return.

Prior to Soil Stripping	During Soil Stripping and Stockpiling	Stockpiled Soil Awaiting use in Rehabilitation Works	During the Rehabilitation Program
		- Topsoil stockpiles will be located away from mining, traffic areas and watercourses. - Level or gently sloping areas where available will be selected as stockpile sites to minimise erosion and potential soil loss.	- All contractor machinery used to handle and transport topsoil shall be washed down both prior to and at the completion of works to minimise the risk of transfer of weeds. - On completion of landform contouring, topsoiling and erosion and sediment control works, a vegetative cover will be applied as soon as practicable. Depending on the proposed post-mining landuse, this will involve direct seeding of selected shrub, grass and tree species.



030379 B&RMP F7 Rev F 2 March 2012

Growing Media Establishment

B&RMP – Mount Pleasant Project

FIGURE 7

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Table 6 Growing Media Development

Criteria	Performance Measure	Performance Indicator	Justification Source
All Domains			
Physical properties of the growing media	Tests assessing the growing media's physical properties – texture, structure and Emerson Aggregate assessment.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth Conductivity of replaced topsoil to be broadly within the range suitable for plant growth. The surface layer to be free of hazardous materials to a depth of at least 1 metre. Runoff water quality to be broadly trending towards values as per analogue sites. Soil nitrogen and phosphorous levels to be trending towards values comparable to analogue sites. Fertiliser regimes are aligned to the requirements for establishment and development of native species, based on soil pH, N, P and K. Organic carbon level to be broadly trending towards 20% of levels of reference sites after 10 years. Also refer Table 5.	HSE Performance Standards (Rio Tinto, December 2008)
Chemical properties of the growing media	Tests assessing the growing media's chemical properties – pH, salinity, nitrogen, potassium and phosphorous.		
Biological properties of the growing media	Tests assessing the growing media's biological properties – organic content, presence of a developing A horizon.		
Fecundity materials in topsoil	Research and/or assessment of topsoil seed load and other plant regenerative materials for area impacted by mined and unmined lands.	Fecundity materials stored in topsoils is defined. Topsoil is managed in accordance with inherent seed bank and regenerative materials.	
Area Disturbed by Mining - Created Growing Media and/or Topsoil Establishment and Associated Infrastructure			
Topsoil conservation and reuse	Topsoil resources pre mining are defined.	Topsoil is stripped and placed in accordance with the topsoil stripping plan.	HSE Performance Standards (Rio Tinto, December 2008)
	Topsoil resources post stripping are defined.		

Criteria	Performance Measure	Performance Indicator	Justification Source
	Topsoil resources post placement on areas of rehabilitated lands are defined based on post mining landuse.		
	Topsoil and subsoil are classified based on soil fertility in context of potential to support enhanced species diversity.	Research or assessment is undertaken to assess localised soil fertility in context of species diversity and the utilisation of topsoil and subsoil in the rehabilitation program.	
	Soil nitrate levels are assessed in context of native grasses growth and development	Research or assessment is undertaken assessing the impact of carbon sources on soil aligned to reducing nitrate levels.	
Soil ameliorants	Where topsoil has been deemed insufficient to sustain plant growth, or if topsoil is not available soil growth media amelioration may be required.	Soil ameliorants such as gypsum, wood and hay mulch, biosolids, municipal waste composts and other organic wastes are utilised based on availability of supply or Waste Regulation 1996 guidelines. Soil ameliorants are incorporated by ripping, plough or rotating hoe or other methods. The use of soil ameliorants prevents surface crusting, increase moisture and organic content, and buffer surface temperatures to improve germination.	HSE Performance Standards (Rio Tinto, December 2008)
	Dispersive topsoil and subsoil materials are ameliorated with gypsum.	An assessment is undertaken of the application rates for gypsum for topsoil and subsoil material to address dispersion rates.	
Erosion and sediment control	Assessment of the extent of erosion across the post mining rehabilitated lands.	No areas of significant active gully erosion.	HSE Performance Standards (Rio Tinto, December 2008)
	Assessment of sediment control features – their effectiveness.	All control measures are undertaken as per project area management plans. High risk disturbed areas are to be stabilised by a suitable method such as direct seeding or scatter using a fast growing sterile cover crop such as *Echinochloa esculenta* (Japanese Millet) at a rate of 20kg/ha combined with a native seed mix of 5-10kg/ha. This may be complimented by brush matting (as available) in large open areas.	
	Assessment of sediment control features – their maintenance.		

2.4 Ecosystem and Landuse Establishment

In the context of the B&RMP Ecosystem and Landuse Establishment incorporates the requirements for:

- Correct flora species selection in terms of the revegetation programs;
- The management and control of weed and vertebrate pest species;
- Suitable Land Capability classes;
- The development of systems to enhance opportunities for nutrient cycling; and
- The optimal use of onsite resources e.g. woody debris, rock, mulch.

In this context the key domains as shown on Figure 8 are:

- Post mining lands – Box-Gum Woodland;
- Post mining lands – Exotic Pasture.

The floristics and vegetation structure across the site and the surrounding areas have been extensively modified since European settlement. Grassland is the most common vegetation community on the site which has historically and continued to been used for beef cattle grazing. However, a high proportion of the project area has not been cultivated or sown with improved pastures. Consequently the landscape is largely dominated by scattered patches of woodland of various sizes and ages, and broad expanses of derived native grasslands.

Data on the key biodiversity issues are provided in the EA (EMGA Mitchell McLennan, 2010). Table 7 summarises the threatened species, populations and endangered ecological communities. These include the Commonwealth EPBC Act listed Endangered Ecological Communities (CEEC) and NSW TSC Act listed Endangered Ecological Communities (EEC).

Table 7 Threatened Species, Populations and Endangered Ecological Communities recorded within Mount Pleasant Project Area

Threatened Species / Populations / Communities	TSC Act	EPBC Act
Threatened Fauna Species Known to Occur in the Project Area		
Grey-crowned Babbler (*Pomatostomus temporalis temporalis*)	V	-
Brown Treecreeper (*Climacteris picumnus*)	V	-
Speckled Warbler (*Pyrrholaemus saggitatus*)	V	-
Black-chinned Honeyeater (*Melithreptus gularis gularis*)	V	-
Squirrel Glider (*Petaurus norfolcensis*)	V	-
Eastern Freetail Bat (*Mormopterus norfolkensis*)	V	-
Yellow-bellied Sheathtail bat (*Saccolaimus flaviventris*)	V	-
Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)	V	-
Diamond Firetail (*Stagonopleura guttata*)	V	-
Varied Sittella (*Daphoenositta chrysoptera*)	V	-
Dollar Bird (*Eurystomus orientalis*)	-	Migratory
Spotted-tailed Quoll (*Dasyurus maculates*)	V	E
Grey-headed Flying Fox (*Pteropus poliocephalus*)	V	V
Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)	V	-
Large-footed Myotis (*Myotis macropus*)	V	-
Greater Broad-nosed Bat (*Scoteanax rueppellii*)	V	-

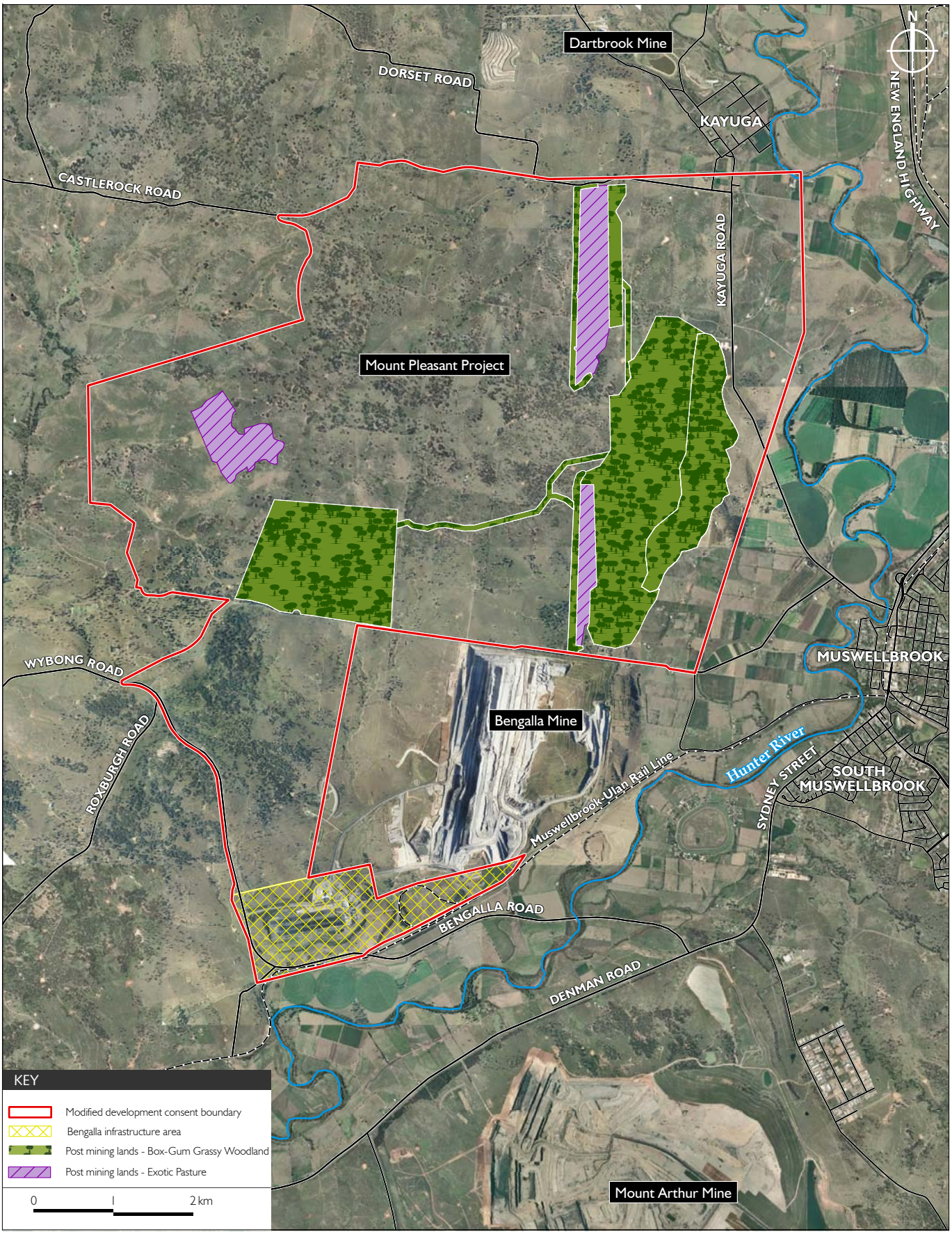
Threatened Species / Populations / Communities	TSC Act	EPBC Act
Threatened Fauna Species Considered Likely to Occur in the Project Area		
Regent Honeyeater (*Xanthomyza phrygia* syn. *Anthochaera phrygia*)	E	E Migratory
Swift Parrot (*Lathamus discolour*)	E	E
Hooded Robin (*Melanodryas cucullata*)	V	-
Little Lorikeet (*Glossopsitta pusilla*)	V	-
Scarlet Robin (*Petroica boodang*)	V	-
Large-eared Pied Bat (*Chalinolobus dwyeri*)	V	V
South-eastern Long-eared Bat (*Nyctophilus corbeni*)	-	V
Endangered Populations		
Tiger Orchid (*Cymbidium canaliculatum*)- Endangered Population in the Hunter Catchment	E	-
Threatened Flora Species Known to Occur in the Project Area		
Lobed Blue Grass (*Bothriocloa biloba*)	-	V
Endangered Ecological Communities		
Hunter Lowlands Redgum Forest	EEC	-
Upper Hunter White Box – Ironbark Grassy Woodland	EEC	CEEC
Grey Box/White Box Intergrade Grassy Woodland	EEC	CEEC
Grey Box/ White Box Intergrade – Spotted Gum Grassy Woodland	EEC	CEEC
Central Hunter Ironbark – Spotted Gum Forest	EEC	-
Narrabeen Footslopes Slaty Box Woodland	EEC	-
Derived Native Grassland	EEC	CEEC
Low Diversity Derived Native Grassland	EEC	CEEC

V= Vulnerable E= Endangered

Rehabilitation of Box-Gum Woodland on the areas of overburden emplacement entails moving the ecological community from lower to higher condition states through changed management systems. Understanding how the ecological community functions, what functions are absent in individual remnants and how they can be returned is fundamental to recovery. This understanding, and the existing industry wide knowledge and skills base that has been developed upon the restoration of these vegetation communities, form the premise for the rehabilitation and ongoing research program at the Mount Pleasant Project. Understanding the benefits of improved management of Box-Gum Woodland to the broader landscape, including benefits to agricultural production and the movement of native fauna are important considerations that underpin this rehabilitation strategy (Department of Environment, Climate Change and Water 2010).

Details pertaining to the management of visual screens are provided in the Mount Pleasant Project Landscape Management Plan.

This information has provided the framework for the development of the Criteria, Performance Measures and Indicators for Ecosystem and Landuse Establishment which are provided in Table 8.



0303379 B&RMP F5 Rev F 2 March 2012

Ecosystem and Landuse Establishment

B&RMP – Mount Pleasant Project

FIGURE 8

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Table 8 Ecosystem and Landuse Establishment

Criteria	Performance Measure	Performance Indicator	Justification Source
All Domains			
Weed Control	Weeds are controlled to appropriate levels.	The amount of weeds present is broadly comparable to reference sites or baseline survey. Regular inspections of the Mount Pleasant Project lands to identify areas requiring the implementation of weed management measures. Regular inspections and maintenance of topsoil stockpiles. Management of cattle movement to mitigate the risks associated with the control of weeds in manure, around stockyards, and key access corridors. Consultation with neighbouring land owners and the relevant government stakeholders, such as the Upper Hunter Weeds Authority, regarding regional weed management strategies. Implementation of appropriate weed management measures which may include mechanical removal, application of approved herbicides and biological control. Control of noxious weeds identified on the Mount Pleasant Project owned land in accordance with the relevant Department Primary of Industries control category and the regional Weed Management Plan. Identification of weed infestations adjacent to or within the proposed disturbance area during preclearance surveys. Follow-up inspections to assess the effectiveness of the weed management measures implemented and the requirement for any additional management measures.	HSE Performance Standards (Rio Tinto, December 2008) *Noxious Weeds Act 1993*

Criteria	Performance Measure	Performance Indicator	Justification Source
Pest animal species	Pest animal control for any declared pest animal species known on the project lands.	Mandatory pest control for any declared pests known to occur on the Mount Pleasant Project owned land. Use a range of appropriate pest control measures as determined (e.g. the destruction of habitat, trapping, targeted shooting programs and baiting). Follow-up inspections to assess the effectiveness of control measures implemented and the requirement for any additional control measures.	*Rural Lands Protection Act 1998*
Bushfire preparedness and risk mitigation	Vegetation is managed to control fire.	Indicators as described in *Bushfire Management Plan* (Coal & Allied, June 2007). Monitoring of fuel loads as per the *Bushfire Management Plan* (Coal & Allied, June 2007). A hazard reduction burning program to reduce fuel levels may be considered in conjunction with advice and assistance from the NSW Rural Fire Service. Controlled burns are undertaken at intervals across the site to create a mosaic fire pattern to allow fauna refuge in unburnt vegetation. The rotation of cattle grazing provides an effective management option for reducing fuel loads. Fire bans, as determined by the Rural Fire Service, will be adhered to by all personnel and will be enforced. Potential ignition sources such as those resulting from hot work practices including welding and cutting will be restricted where possible to workshop areas or within active parts of the mine where vegetation is non-existent. If this is not possible due to the remoteness of the location a Hot Work Permit is to be approved by the project supervisor. Hot Work Permits are not to be issued for work outside of workshops when ‘Total Fire Bans’ are in place. Water carts with fire fighting equipment capable of extinguishing fire outbreaks shall be maintained. This fire fighting equipment, together with graders and bulldozers used for mining, provides effective bushfire fighting capability.	*Bushfire Management Plan* (Coal & Allied, June 2007)

Criteria	Performance Measure	Performance Indicator	Justification Source
		Responsiveness is enhanced by emergency preparedness training for mine-site personnel. Ready access is maintained for vehicles to engage in water abstractions at dams on site or at defined water fill points. Outlets are compatible with fire fighting equipment. Firebreaks are established around the operations to prevent the spread of bushfires onto or from adjacent properties. These firebreaks are inspected annually for adequacy. Where the creation and maintenance of proposed firebreaks has the potential to interact with areas of Aboriginal Cultural Heritage Sites or Archaeologically Sensitive Areas, these activities will be undertaken in accordance with the *Mount Pleasant Open Cut Coal Mine Aboriginal Cultural Heritage Management Plan* (Rio Tinto Australia, February 2011). Any incident of unplanned bushfire will be reported directly to the Site Supervisor who will initiate an emergency response. If required, the Mine Manager will notify the local Rural Fire Service.	
Post Mining Lands – Box-Gum Grassy Woodland			
Species Selection	Establishment of Box-Gum Woodland.	Delineation of which species can be established from seed as against those that will recolonise from topsoil, those suitable for transplanting and / or the utilisation of tube stock or semi advanced plant material which has been grown from sexual or asexual means in a specialist nursery.	HSE Performance Standards (Rio Tinto, December 2008)
	Species list considers habitat enhancement aligned to the requirements of key fauna, including threatened fauna such as the Grey-crowned Babbler, Regent Honeyeater, Swift Parrot, Squirrel Glider, Spotted-tailed Quoll and Microchiropteran Bats.	Rehabilitation will be based on the use of canopy, sub canopy, understory and ground strata species consistent with a Box-Gum Woodland.	

Criteria	Performance Measure	Performance Indicator	Justification Source
	Species used are compatible with native biodiversity conservation outcomes. Revegetation focusing on reinstating endemic woodland ecological communities utilising flora species which provide a range of canopy, mid and understorey species.	Species sown are broadly comparable with existing plant communities. Species sown are broadly comparable with recommended species list from the EIS and EA or research.	
Seed collection	Seed Calendar to be developed for the site.	Seed Calendar contains information relating to: - Species flowering time – which can be referenced in terms of habitat value; - Fruiting and seed collection time; - Additional information on collection; - Viability data - where available.	HSE Performance Standards (Rio Tinto, December 2008)
	Data on seed collection.	Collated via the use of GIS data including: - Date; - Species; - Location.	
	Audits of the mine path in terms of seed availability.	Undertaken 12 months prior to mining. Resultant data is incorporated into the site GIS. The location of key trees and or stands of plants are recorded on GIS and marked in the field for future detection and assessment. The area to be cleared is inspected as per the Ground Disturbance Procedure (GDP) and Pre-Clearance Surveys with the occurrence of plants in fruit relayed to the sites environment staff. Seed collectors are advised as to the timing of proposed clearing. Plants located at accessible heights to enable seed collection are accessed with maximum harvesting of fruit / seed. For overstorey species and those not previously accessible, the seed collectors are to be on site on the day of clearing of vegetation.	

Criteria	Performance Measure	Performance Indicator	Justification Source
		In close liaison with the earthmoving operators, the site is under-scrubbed, removing all vegetative material not containing fruit/seed. The targeted plants are then fallen enabling ready access to the seed collectors. In the case of eucalypts, the harvested brush material is placed on tarpaulins ideally located in immediate proximity to the fallen tree to enable the fruit to dry and release the seed. To ensure reduced time and cost this material is to remain on site for approximately 2-7 days – this will be seasonally dependent. Once the fruit is opened and seed released and harvested the brush material is either placed onto the topsoil for subsequent removal via the topsoil stripping process or used as brush matting in other areas. Regular monitoring is undertaken of areas for appropriate, timely and cost effective seed collection.	
Seed collection – grass species	Optimum use of the onsite grass seed resource.	A Grass Seed Audit is undertaken defining distribution and density of resources of native grass seed. Grass seed should be harvested by vehicle mounted harvesters with the goal of maintaining a healthy production area. Grass seed production areas will be managed to improve the targeted seed. The areas will be monitored for the incursion of key weed species, including though not limited to Thistles, St John's Wort, Fleabane, Fireweed and exotic grasses.	HSE Performance Standards (Rio Tinto, December 2008)
	Local provenance seed	Seed collected onsite will be incorporated into the revegetation mix or propagated to produce tubestock for planting. Woodland / grassland seed and tubestock supply will preferentially be of local provenance. Seed and tubestock supplied from outside sources will be preferentially of Hunter provenance or from an area within NSW of similar climatic conditions to the Muswellbrook area.	

Criteria	Performance Measure	Performance Indicator	Justification Source
Germination and establishment of vegetation	Utilisation of seed	Records sheets and GIS databases are developed to track the collection, storage and utilisation of the Mount Pleasant Project seed resource.	HSE Performance Standards (Rio Tinto, December 2008)
	Appropriate germination and establishment occurs post sowing.	Species numbers for all strata are broadly comparable with reference sites.	
	Monitoring includes assessment of the density and distribution of pioneer species.	Number of pioneer species broadly comparable with baseline survey.	
	Topsoil placement.	Data on the location of topsoil / non topsoiled areas will be collected in the monitoring programs. Data will be collated using GIS.	
	Revegetation works aligned to seasonality of rainfall, evaporation and temperature.	Planting to be targeted between April and August, however may be outside these times if conditions are favourable. Post planting care including weed control will be implemented to enhance plant survival and establishment.	
	Tubestock or cell planting to provide buffers and windbreaks in exposed or high profile areas.	Tubestock is to be watered the day before and immediately prior to planting.	
	Hydromulch	An assessment as to the suitability of Hydromulch should be undertaken where slopes exceed 10° to provide quick soil cover and slope stability.	
	Fertilisers	Soil data and plant growing requirements provides the premise for fertiliser application rates and mix.	
	Predation by herbivores	An assessment will be made at the time of planting regarding the potential risk of predation by fauna (rabbits, hares, wallabies and kangaroos) and the need to protect plants by the pre planting application of deterrent spray, and / or tree guards and / or exclusionary fencing wherever practical.	
	Surface mulch	Mulch may be used in exposed areas to insulate against extreme temperatures, prevent wind erosion, retain moisture and provide an initial input into the nutrient cycle.	
Vegetation communities around the final void and TSF	Low wall, high wall and batters areas of void and the area of the TSF.	The vegetation communities of the low wall, high wall and batters of the final void and the area of the TSF will be determined in later versions of this plan.	HSE Performance Standards (Rio Tinto, December 2008)

Criteria	Performance Measure	Performance Indicator	Justification Source
Protective Ground Cover	Vegetation provides adequate ground cover of appropriate species over time.	Vegetation cover of desirable species is broadly consistent with reference site over time. Data is collected relating to percentage cover/area.	CSIRO Methodology for Ecosystem Function Analysis (EFA) (Tongway, 2004)
Minimise site impact in terms of compaction of soil, the spread of weeds and disturbance to vegetation	No uncontrolled entry of livestock or vehicles.	Vehicle access is restricted to defined access pathways for use by authorised vehicles. The main arterial tracks are maintained in good condition. Layout of surface works such as roads, survey lines, drill tracks and fencing, are planned and authorised to minimise dissection of habitat areas.	HSE Performance Standards (Rio Tinto, December 2008)
	Signage	Key habitat and rehabilitation areas will be fenced or signposted where appropriate to prevent the uncontrolled entry of livestock and to minimise vehicular traffic during the establishment phase.	
	Ground Disturbance	All works will be undertaken in accordance with the Ground Disturbance Permit system.	
Maximising salvage and beneficial use of resources	Mulching to enhance the recycling of the biological resource and improving soil structure and nutrients.	All vegetation up to a maximum sized medium sized tree (~0.2 m diameter) will be mulched onsite. Resultant mulch product will be respread across the soil surface.	HSE Performance Standards (Rio Tinto, December 2008)
	Optimum harvesting of fencing timber.	Vegetation deemed suitable for fencing will be selectively cleared and stockpiled out of the disturbance area.	
	Habitat Trees	Habitat trees are managed according to the Ground Disturbance Permit process.	
Habitat augmentation	Coarse Woody Debris	Horizontal placement of hollow logs or small piles of timber and rocks are installed across the site creating cavities for habitat for small ground dwelling mammals and reptiles. Coarse woody debris and / or rocks are placed to optimise inter connectivity across the landscape.	HSE Performance Standards (Rio Tinto, December 2008)
	Fallen timber	Fallen timber is left in situ in area not impacted by mining.	
Implementation of rehabilitation program	Resource allocation	Box-Gum Woodland vegetation has been established on the site. Visual screens comprising trees and shrubs are established as per the *Mount Pleasant Open Cut Coal Mine Landscape Management Plan.*	*Mount Pleasant Open Cut Coal Mine Landscape Management Plan*

Criteria	Performance Measure	Performance Indicator	Justification Source
Aboriginal heritage	No conflict between rehabilitation works / biodiversity and Aboriginal cultural heritage.	Site is managed according to the Ground Disturbance Permit process.	Aboriginal Heritage Conservation Strategy *Aboriginal Cultural Heritage Management Plan Mount Pleasant Open Cut Coal Mine (DA92/97)* (Rio Tinto Australia 2011)

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2.5 Ecosystem and Landuse Sustainability

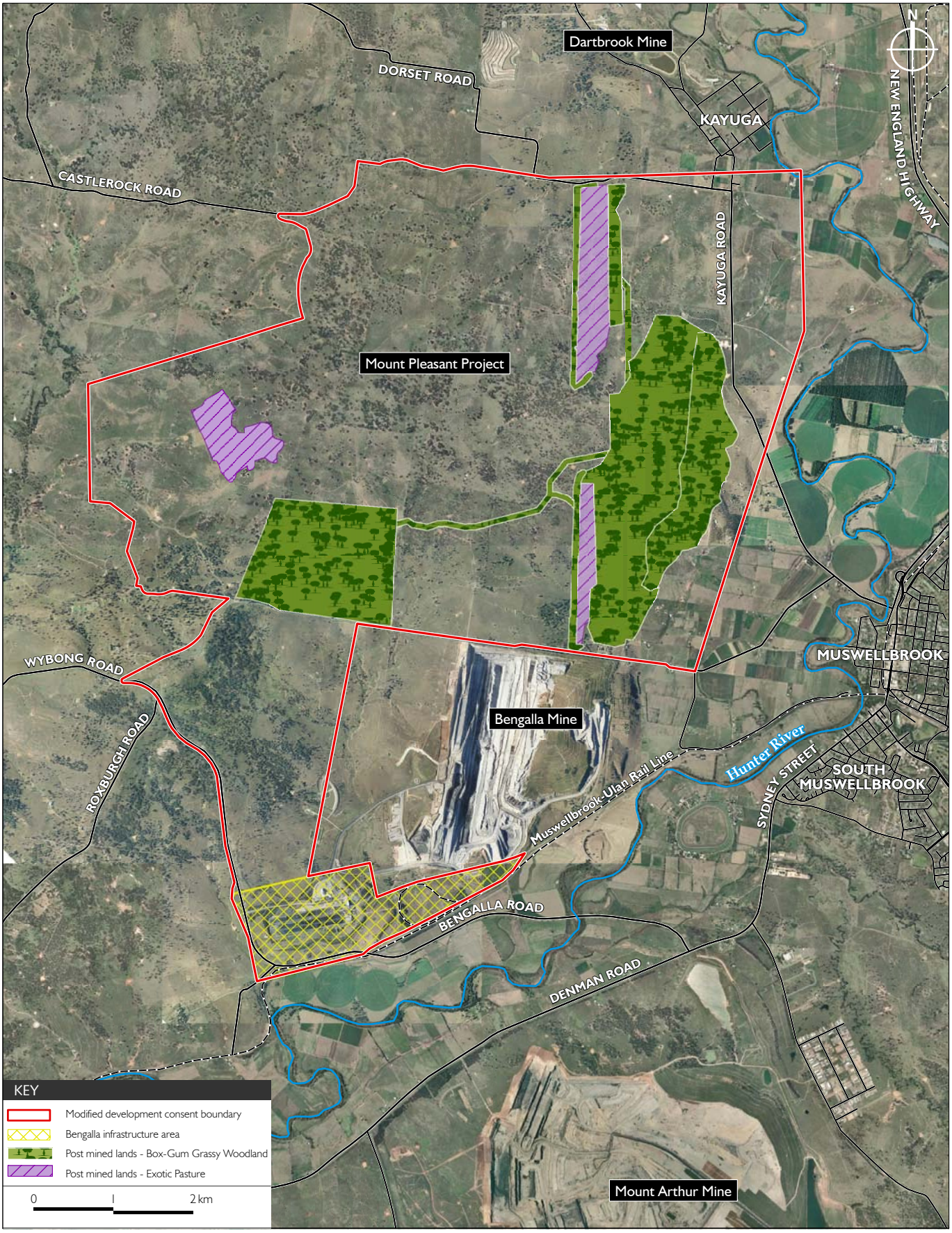
In the context of the B&RMP Ecosystem and Landuse Sustainability incorporates the:

- Development of profiles in the growing media;
- Development of land usage which is consistent with surrounding areas;
- Vegetation communities capable of withstanding catastrophic events e.g. bushfire and extensive drought;
- Nutrient cycling;
- Species diversity and abundance for both flora and fauna;
- Recolonisation of the sites by key indicator species;
- Natural recolonisation by invertebrates; and
- Suitable Land Capability classes.

In this context the key domains as shown on Figure 9 and are:

- Post mined lands - Box-Gum Woodland; and
- Post mined lands – Exotic Pasture.

The Criteria, Performance Measures and Indicators together with the justification source which describe structures and method for this data as they relate to the Ecosystem and Landuse Sustainability Stage is provided in Table 9.



0303379 B&RMP F5 Rev F 2 March 2012

Ecosystem and Landuse Sustainability

B&RMP – Mount Pleasant Project

FIGURE 9

COAL & ALLIED
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Table 9 Ecosystem and Landuse Sustainability

Criteria	Performance Measure	Performance Indicator	Justification Source
All Domains			
Final landuse	Consistency of final landuse with surrounding landuses. Incorporate landuse in terms of optimal social and economic benefit to the local and wider community. Landuse options are assessed in terms of planning constraints.	Final landuse takes into account local and regional initiatives. Land usage options obtain optimal economic and social return whilst minimising environmental impact. Data is recorded in the AEMR on community capacity building in terms of: - Number of employees - Community assistance program – aligned at building capacity in the local region - Community partnerships - Donations and sponsorships Final landuse is compatible with surrounding land function and landuse requirements. Final landuse addresses the limitations of land capability and growing media. Landuse will be aligned to the relevant land zonings as per the current Muswellbrook Local Environment Plan.	Muswellbrook Council LEP
All Domains – Except Infrastructure Areas			
Nutrient cycling	Monitoring of defined lands based on assessment of criteria aligned to landscape function, species diversity and abundance (flora and fauna) and habitat creation in keeping with that of defined habitat areas.	The methodology used to undertake site monitoring is Ecosystem Function Analysis (EFA) or similar methodology.	CSIRO Methodology for Ecosystem Function Analysis (EFA) (Tongway, 2004)
Ecosystem resilience	Monitoring of areas where weed and feral animal control has been implemented.	Weeds and pest animal species are broadly comparable to baseline or reference site.	
	Monitoring of the placement and utilisation of habitat features and artificial roosting/ nesting boxes.	Record utilisation of nest boxes.	
	Species density – overstorey and midstorey	Selective thinning is undertaken in rehabilitated areas so plant density is comparable to analogue sites.	

Criteria	Performance Measure	Performance Indicator	Justification Source
	Groundcover	Ground cover is to achieve a minimum Landscape Function Analysis (LFA) Landscape Organisation Indicator (LOI) of 50, over areas of Box-Gum Woodland. Areas of bare ground are broadly comparable to reference site.	
	Monitoring may include consideration of growing media including assessment of: - Soil pH; - Dispersion capability; and - Leaf litter.	pH levels, dispersion capability and leaf litter are within the range required to allow plant growth for Box-Gum Woodland species or broadly compared to reference site.	
	Risks associated with the implementation of a sustainable rehabilitation program (including post mining lands) are defined and contingencies defined to address these risks.	The data produced in the monitoring reports are reviewed and provide the premise for scientifically based recommendations in terms of the management of risks associated with the rehabilitation program. Risk is assessed in terms of: - woody species density; - species richness; - canopy cover; - soil nutrients; - soil stability; and - water infiltration.	
Ecosystem health	The ecosystem is in a condition comparable to the vegetation in reference site.	The data on live species, healthy species, trees with dieback, dead species, species flowering is comparable to reference sites.	
Ecosystem composition	The vegetation is comprised of a range of growth forms which is comparable to the vegetation in reference site.	Number of trees, shrubs, grasses, forbs is comparable to reference sites.	
Ecosystem structure	The ecosystem is developing in structure and complexity comparable to the vegetation in reference site.	Projected foliage cover at various stratums is comparable to reference sites.	
	Isolated mature paddock trees in non mined areas are protected from impacts that may cause premature death.	All works are undertaken in accordance with the GDP process. Weed control programs include consideration of the potential impact that herbicides designed to control woody weeds may have on mature paddock trees.	

3.0 Monitoring and Reporting

The monitoring program will be designed to demonstrate that performance criteria have been met. This period would also plan for remedial action where monitoring demonstrates performance criteria are unlikely to be met. If progressive rehabilitation has been successful, with stabilisation and revegetation meeting performance criteria this last phase of closure may be shortened (ANZMEC & MCA, 2000).

The following reporting will be undertaken in keeping with the managing, monitoring and reporting of any incidents, complaints, non-compliances with statutory requirements and exceedances of the impact assessment criteria and / or performance criteria:

- Preparation and implementation of an Environmental Management System which incorporates components of the monitoring and reporting program;
- Incident Reporting mechanism;
- Annual Environmental Management Report (AEMR);
- Independent Environmental Audit;
- Access to information via the project website which is updated regularly (at least every three months); and
- Data obtained from the annual monitoring using the CSIRO developed Landscape Functional Analysis methodology.

3.1 Impacts and Environmental Performance

Based on the description of the performance measures and the performance indicators, a consolidated program of monitoring is to be implemented. The monitoring, review and implementation of this B&RMP will be the responsibility of the Specialist Environment with support from the Environment Advisor. Details on the monitoring and performance as documented in this B&RMP are to be reported in the AEMR.

As a minimum, the long-term rehabilitation monitoring will:

- Compare monitoring results against rehabilitation objectives and targets;
- Identify possible trends and areas for improvement;
- Link to records of rehabilitation to determine causes and explain results;
- Assess effectiveness of environmental controls implemented;
- Where necessary, identify modifications required for the monitoring program, rehabilitation practices or areas requiring research;
- Compare flora species present against original seed mix and/or analogue sites;
- Assess vegetation health;
- Assess vegetation structure (upper, mid and lower storey); and
- Where applicable, assess native fauna species diversity and the effectiveness of habitat creation for target fauna species.

Where necessary, rehabilitation procedures will be amended accordingly to continually improve rehabilitation standards.

Details on the monitoring strategies include:

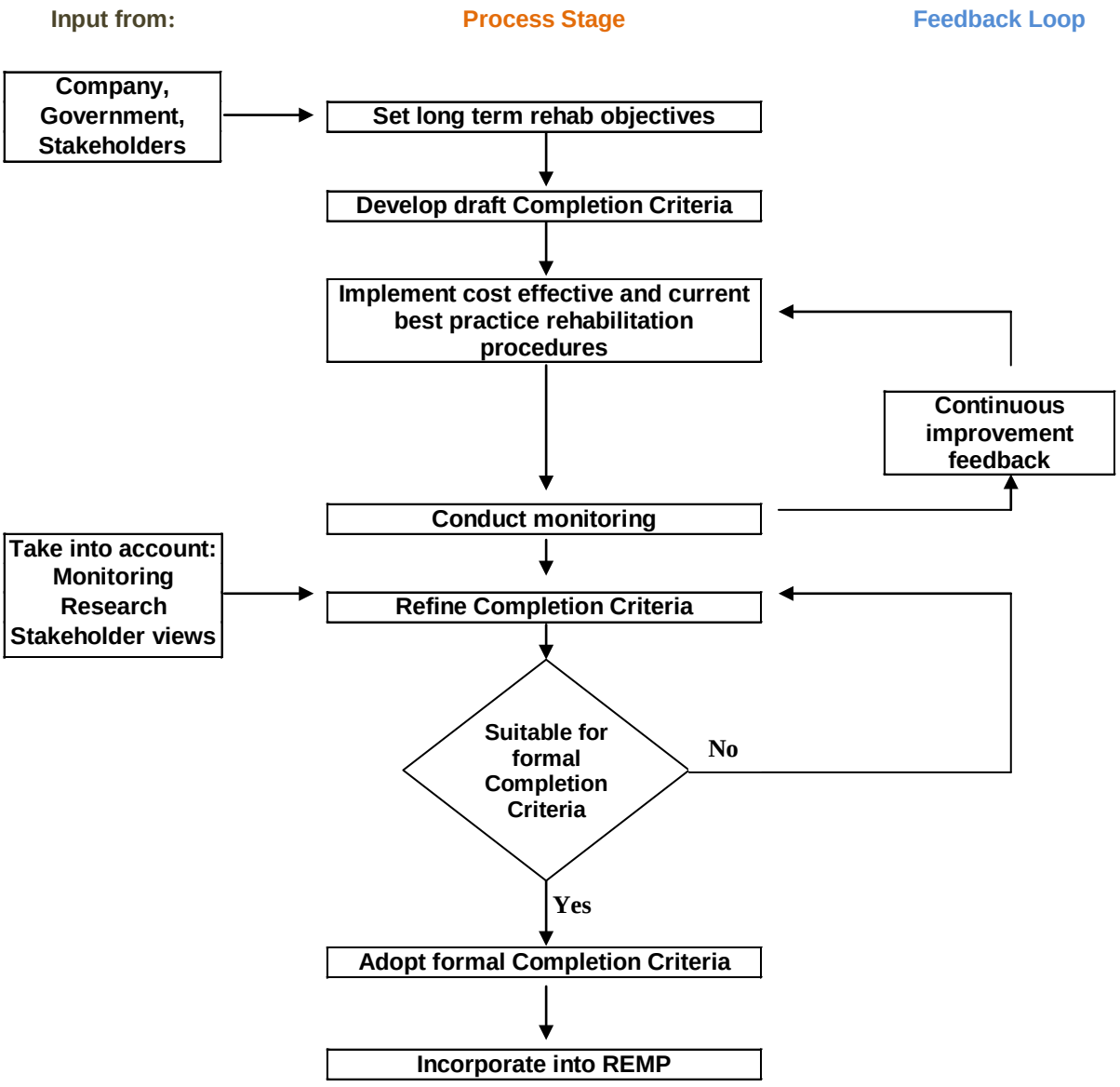
- Specifications for Ecosystem Functional Analysis – Appendix B; and
- Visual Assessment of Revegetated Areas – Appendix C.

3.2 Effectiveness of Management Measures

This component of the B&RMP provides the framework for the review phase of the operation, in doing so enabling the land management and utilisation techniques to be reviewed / amended so that the site can progress along a sustainability pathway. This reporting framework will reference associated documents such as the AEMR and REMP.

Rehabilitation is an iterative process which allows activities to be defined and improved upon throughout the lifetime of the mine. Monitoring of rehabilitation successes and failures will enable lessons learnt in early years of rehabilitation to be applied in subsequent and later years. It will also ensure that continuous improvement in the site's performance in terms of landscape and landuse is achieved. An example of an iterative, continual improvement approach to mine site rehabilitation which may be implemented is shown in Figure 10 (based on Nichols, 2005).

Figure 10 Continuous Improvement including Monitoring and Review Processes (based on Nichols 2005)



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4.0 Risk Assessment and Contingencies

Any land management program must incorporate consideration of unpredicted impacts. This section of the B&RMP has reviewed the impact of these unpredicted impacts via a risk based approach which assesses the potential consequences and mitigation measures in terms of the consequence category - environment.

The key risks associated with site rehabilitation, biodiversity and land management have been assessed using the likelihood ratings, maximum reasonable consequence ratings, risk matrix and classifications (*HSEQ Qualitative Risk Assessment* (Rio Tinto, Jan 2008)) listed in Table 10, Table 11, Table 12 and Table 13 respectively.

Table 10 Likelihood Ratings

Class	Likelihood	Likelihood Description	Frequency
A	Almost certain	Recurring event during the life – time of the operation / project.	Occurs more than twice per year
B	Likely	Event that may occur frequently during the life – time of an operation / project.	Typically occurs once or twice per year
C	Possible	Event that may occur during the life – time of an operation / project.	Typically occurs in 1-10 years
D	Unlikely	Event that is unlikely to occur during the life – time of an operation / project.	Typically occurs in 1-100 years
E	Rare	Event that is very unlikely to occur during the life – time of an operation / project.	Greater than 100 year event

Table 11 Maximum Reasonable Consequence Ratings

		Environmental – On Site
1	Minor	Near source confined and promptly reversible impact.
2	Medium	Near source confined and short term reversible impact.
3	Serious	Near source confined and medium term recovery impact.
4	Major	Impact that is confined and requiring long term recovery, leaving residual damage.
5	Catastrophic	Impact that is widespread-unconfined and requiring long –term recovery, leaving major residual damage (typically years).

Table 12 Risk Matrix

Likelihood	Consequence				
	1 - Minor	2 - Medium	3 - Serious	4 - Major	5 – Catastrophic
A – Almost Certain	Moderate	High	Critical	Critical	Critical
B – Likely	Moderate	High	High	Critical	Critical
C – Possible	Low	Moderate	High	Critical	Critical
D – Unlikely	Low	Low	Moderate	High	Critical
E - Rare	Low	Low	Moderate	High	High

Table 13 Risk Classification

Risk Class	Risk Management Response
Critical	Risks that significantly exceed the risk acceptance threshold and need urgent and immediate attention.
High	Risks that exceed the risk acceptance threshold and require proactive management. Includes risks for which proactive actions have been taken, but further risk reduction is impracticable. However active monitoring is required and the latter requires the sign-off from business unit senior management.
Moderate	Risks that lie on the risk acceptance threshold and require active monitoring. The implementation of additional measures could be used to reduce the risk further.
Low	Risks that are below the risk acceptance threshold and do not require active management. Certain risks could require additional monitoring.

Table 14 outlines the key identified risks and associated risk ratings for site rehabilitation, biodiversity and land management. The ratings assume that the risks are untreated i.e. have not been addressed by specific risk mitigation measures other than routine design and operational practice.

Table 14 Key risks associated with site rehabilitation, biodiversity and land management

Risk	Likelihood Rating	Consequence Rating	Risk Classification
Impact on threatened flora and vegetation communities (EMGA 2010).	**D**	**2**	**(L)**
Impact on threatened fauna (EMGA 2010).	**D**	**2**	**(L)**
Impact on habitat for native species (EMGA 2010).	**D**	**1**	**(L)**
Cumulative ecological impacts (EMGA 2010).	**D**	**2**	**(L)**
Impact on Aboriginal artefacts / cultural heritage.	**C**	**3**	**(H)**
Visual amenity impact on surrounding receptors, including Muswellbrook.	**C**	**1**	**(L)**
Erosion and soil disturbance.	**C**	**1**	**(L)**
Earthquake leading to failure and instability of void walls or TSF embankments.	**E**	**2**	**(L)**
Earthquake redirecting watercourse into or away from final void.	**E**	**2**	**(L)**
Continuous off-site release of contaminants from mined materials or final voids requiring long term management or treatment.	**C**	**3**	**(H)**
Inadequate or insufficient topsoil to create/enhance the desired ecological communities on post mined areas.	**C**	**3**	**(H)**
Inadequate weed and pest animal control leading to widespread failure of revegetation or continued sustainability of unmined ecosystems.	**C**	**3**	**(H)**
Inadequate or insufficient (incorrect species mix/quality) seed/seedlings for enhancement/rehabilitation of post mined lands and unmined areas.	**C**	**2**	**(M)**
The floor of the final void does not remain dry, resulting in problems attaining performance criteria and/or need for ongoing management.	**C**	**3**	**(H)**
Unplanned fire during ecosystem establishment may lead to widespread failure of revegetation.	**C**	**3**	**(H)**

Risk	Likelihood Rating	Consequence Rating	Risk Classification
Spontaneous combustion of coal seam leading to environmental impacts or property damage.	**D**	**3**	**(M)**
Major storm event resulting in flooding, geotechnical instability, major erosion and/or widespread damage to rehabilitated areas.	**C**	**3**	**(H)**
Severe and/or prolonged drought leading to widespread failure of revegetation.	**C**	**3**	**(H)**
Changing climate leading to failure of rehabilitation, failure of environmental management controls and/or inability to attain performance criteria.	**D**	**2**	**(L)**
New regulatory requirements or evolving community expectations leading to difficulties negotiating or attaining performance criteria.	**C**	**3**	**(H)**

Proposed mitigation measures to reduce the risks identified in Table 14 are outlined in Table 15.

Table 15 Proposed mitigation measures to reduce key risks

Risk	Proposed Mitigation Measures
Impact on threatened flora and vegetation communities. (EMGA 2010).	During construction the impact on threatened flora and vegetation communities will be managed through the Ground Disturbance Permit (GDP) process, which will include pre-clearance surveys. Unmined lands will be progressively restored and enhanced during the life of the mine, and rehabilitation will focus on the reinstatement of Box-Gum Woodland on mined lands.
Impact on threatened fauna. (EMGA 2010).	During construction the impact on threatened fauna will be managed through the GDP process, which will include pre-clearance surveys. Unmined lands will be progressively restored and enhanced during the life of the mine, and rehabilitation will focus on the reinstatement of Box-Gum Woodland on mined lands.
Impact on habitat for native species. (EMGA 2010).	During construction the impact on habitat for native species will be managed through the GDP process, which will include pre-clearance surveys. Unmined lands will be progressively restored and enhanced during the life of the mine, and rehabilitation will focus on the reinstatement of Box-Gum Woodland on mined lands.
Cumulative ecological impacts. (EMGA 2010).	During construction the cumulative ecological impacts will be managed through the GDP process, which will include pre-clearance surveys. Unmined lands will be progressively restored and enhanced during the life of the mine, and rehabilitation will focus on the reinstatement of Box-Gum Woodland on mined lands.
Impact on Aboriginal artefacts / cultural heritage.	All works undertaken in accordance with the GDP process, Rio Tinto Coal Australia guidelines and relevant Coal & Allied Procedures.
Visual amenity impact on surrounding receptors, including Muswellbrook.	The Mount Pleasant Project has been designed to mine from east to west, with a visual bund being created in the east in the early stages of mining to screen the mine from the town of Muswellbrook. Visual amenity impact will be managed in accordance with the Landscape Management Plan required under Schedule 3, Condition 47 of Project Approval DA 92/97.

Risk	Proposed Mitigation Measures
Erosion and soil disturbance.	Adhere to landform shaping criteria outlined within this B&RMP that considers drainage, slopes and burial of unsuitable materials and is designed to minimise erosion and sediment control during all phases of the project.
Earthquake leading to failure and instability of void walls or TSF embankments.	Design of constructed slopes and walls to withstand maximum credible earthquake loading.
Earthquake redirecting watercourse into or away from final void.	Assess risk of earthquake to adjacent watercourses and implement engineering controls if required.
Continuous off-site release of contaminants from mined materials or final voids requiring long term management or treatment.	Ongoing geochemical characterisation of mined materials and void wall rock during operations to accurately predict risk factors and develop management measures where required. Ongoing monitoring of runoff and seepage waters during operations to validate predictions.
Inadequate or insufficient topsoil to create / enhance the desired ecological communities on unmined areas.	Delineation of topsoil resources during the mine planning process. The rates for each aspect of the bulk earthworks have been based on actual third party cost information gathered from operating Coal & Allied sites located within the Hunter Valley. Review rehabilitation unit rates on an annual basis as part of reporting requirements. Topsoil segregation during the stripping, storage and return phases of mining. Review of the physical, chemical and biological parameters of topsoil and subsoil material. Utilisation of appropriate soil ameliorants as defined by the assessment of growing media parameters.
Inadequate weed and pest animal control leading to widespread failure of revegetation or continued sustainability of unmined ecosystems.	Weed control undertaken in accordance with the requirements of the *Noxious Weeds Act 1993.* Weed species density and distribution monitored and recorded using GIS. Pest animal species distribution and presence of damage monitored and recorded using GIS. Weed and pest animal control undertaken by competent operators with all works defined by site specific Pest Species and Weed Management Plan and Annual Works schedule.
Inadequate or insufficient (incorrect species mix/quality) seed / seedlings for enhancement / rehabilitation of unmined, post mining and key habitat areas.	Species mix used in enhancement/rehabilitation programs are aligned to the floristic structure of the plant community of the site. Comprehensive seed collection program undertaken to ensure adequate resources of seed are available during the life of the project. Assessment of seed / seedling resources based on research programs currently being implemented on site.

Risk	Proposed Mitigation Measures
The floor of the final void does not remain dry, resulting in problems attaining performance criteria and/or need for ongoing management.	Detailed hydrogeological modelling of pit water balance and water quality, including surface water and groundwater interactions with voids. Ongoing monitoring of pit water quantity and quality during operations to validate predictions. Careful selection of final void use, adoption of appropriate performance criteria and, if required, adjustment of pit water balance (e.g. by management of surface water inflows).
Unplanned fire during ecosystem establishment may lead to widespread failure of revegetation.	Adoption of standard fire prevention measures as defined in the *Bushfire Management Plan* (Coal & Allied June 2007). Biannual Landcare audits which are conducted on Coal & Allied buffer land. These audits assess bushfire risk and provide direction for management measures.
Spontaneous combustion of coal seam leading to environmental impacts or property damage.	Characterisation of spontaneous combustion risk and adoption of standard combustion prevention measures.
Major storm event resulting in flooding, geotechnical instability, major erosion and / or widespread damage to rehabilitated areas.	Design final landforms, structures and revegetation to cope with major storm events.
Severe and/or prolonged drought leading to widespread failure of revegetation.	Selection of drought-tolerant species for revegetation.
Changing climate leading to failure of rehabilitation, failure of environmental management controls and / or inability to attain performance criteria.	Assess climate change risks and implement adaptation measures where required.
New regulatory requirements or evolving community expectations leading to difficulties negotiating or attaining performance criteria.	Monitor trends and developments in legislation and changes to community expectations.

Key risk associated with site rehabilitation, landuse and land management in context of Community Trust are identified in Table 16.

Table 16 Key risks associated with site rehabilitation, landuse and land management – Community Trust

Risk	Likelihood Rating	Consequence Rating	Risk Classification
Post mining landuse does not build capacity for the local community.	**C**	**3**	**(H)**
New regulatory requirements or evolving community expectations leading to difficulties negotiating or attaining performance criteria.	**C**	**3**	**(H)**

Proposed mitigation measures to reduce the risks identified in Table 16 are outlined in Table 17.

Table 17 Proposed mitigation measures to reduce key risks – Community Trust

Risk	Proposed mitigation measures
Post mining landuse does not build capacity for the local community.	Land usage options are assessed in consultation with identified stakeholders in terms of optimal economic and social return. Baseline data is collected for key social and economic indicators for proposed post mining landuse – number of employees / community assistance programs / community partnerships / donations and sponsorships.
New regulatory requirements or evolving community expectations leading to difficulties negotiating or attaining closure criteria.	Monitor trends and developments in legislation and changes to community expectations.

5.0 Review and Implementation

5.1 Review

The following Section provides the Protocol for periodic review of the B&RMP. Reviews are conducted to assess the effectiveness of the procedures against the objectives of B&RMP.

The B&RMP will be reviewed, and if necessary revised, within three months of the submission of an:

- Annual review which has been undertaken as per Schedule 5 Condition 3 of the Approval;
- Incident report which has been undertaken as per Schedule 5 Condition 7 of the Approval;
- Audit which has been undertaken as per Schedule 5 Condition 9 of the Approval; and
- Any modification to the conditions of the Approval.

The B&RMP may also be revised due to:

- Deficiencies being identified;
- Results from the monitoring and review program;
- Recommendations resulting from the monitoring and review program;
- Changing environmental requirements;
- Improvements in knowledge or technology become available;
- Change in legislation;
- Where a risk assessment identifies the requirement to alter the Strategy;
- Change in the activities or operations associated with Mount Pleasant; and
- Following updating of the Rehabilitation and Environmental Management Plan.

The B&RMP will be progressively amended as required by the Mount Pleasant Mine EMS. Any major amendments to the B&RMP that affect its application will be undertaken in consultation with the appropriate regulatory authorities and stakeholders. Minor amendments to the B&RMP, such as formatting edits may be made with version control on the Mount Pleasant website.

5.2 Implementation

Table 18 defines personnel who are responsible for the monitoring, review and implementation of the Management Plan.

Table 18 Responsibilities

Title	Responsibility
Construction Phase	
General Manager Construction	Implement the procedures referenced in this Management Plan. Undertake training in relevant Management Plans and procedures as required. Provide resources required and support to implement these procedures.

Title	Responsibility
Specialist Environment	Prepare the relevant Management Plans. Implement, monitor and review the programs and procedures linked to this Management Plan. Consult with regulatory authorities as required. Undertake monitoring as required. Undertake maintenance as required. Provide measures for continual improvement to this Management Plan and procedures. Ensure all personnel undertaking works in relation to this Management Plan are trained and competent. Report the progress of any rehabilitation and monitoring of biodiversity in the AEMR.
Environment Advisor	Provide support for the implementation of the Specialist Environment's responsibilities.
Operational Phase	
Mine Manager	Implement the procedures referenced in this Management Plan. Undertake training in relevant Management Plans and procedures as required. Provide resources required and support to implement these procedures. Allow for forward planning to prepare and bulk shape areas.
Technical Services Manager	Implement the procedures referenced in this Management Plan. Undertake training in relevant Management Plans and procedures as required. Provide resources required to implement these procedures. Allow for forward planning to prepare and bulk shape areas.
Specialist Environment	Prepare the relevant Management Plans. Implement, monitor and review the programs and procedures linked to this Management Plan. Consult with regulatory authorities as required. Undertake monitoring as required. Undertake maintenance as required. Provide measures for continual improvement to this Management Plan and procedures. Ensure all personnel undertaking works in relation to this Management Plan are trained and competent. Report the progress of any rehabilitation and monitoring of biodiversity in the AEMR.
Environment Advisor	Provide support for the implementation of the Specialist Environment's responsibilities.

6.0 References

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EMGA Mitchell McLennan (2010). *Mount Pleasant Project Modification Environmental Assessment Report*. Prepared for Coal and Allied Operations Pty Limited.

ERM Mitchell McCotter (1997). *Mount Pleasant Mine Environmental Impact Statement*. Prepared for Coal & Allied Operations Pty Limited.

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Nichols, O.G. (2005)*. Development of rehabilitation completion criteria for native ecosystem establishment on mineral mines in the Hunter Valley.* Australian Centre for Minerals Extension and Research. ACARP Project No. C13048. Queensland.

Rio Tinto Australia (February 2011) *Aboriginal Cultural Heritage Management Plan Mount Pleasant Coal Mine (DA92/97)* Revised Version 2.

Rio Tinto (Jan 2008) HSEQ Qualitative Risk Assessment.

Rio Tinto (Dec 2008) HSE Performance Standards.

Rio Tinto (May 2009) Rio Tinto Closure Standard.

Rio Tinto Environmental Standard E5 – *Hazardous Materials and Contamination Control*

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7.0 Acronyms

ACM	Asbestos-containing material
AECOM	AECOM Australia Pty Ltd
AEMR	Annual Environmental Management Report
ANC	Acid Neutralising Capacity
B&RMP	Biodiversity and Rehabilitation Management Plan
CCC	Community Consultative Committee
CEEC	Commonwealth EPBC Act listed Endangered Ecological Community
Coal & Allied	Coal & Allied Operations Pty Limited
DP&I	NSW Department of Planning and Infrastructure
DRE	Division of Resources and Energy, within the NSW Department Trade & Investment, Regional Infrastructure & Services
DSE	Dry Sheep Equivalent
EA	Environmental Assessment titled *Mount Pleasant Project Modification – Environmental Assessment Report* (EMGA Mitchell McLennan, October 2010)
EC	Electrical conductivity
EEC	NSW TSC Act listed Endangered Ecological Community
EFA	Ecosystem Function Analysis
EIS	Environmental Impact Statement titled *Mount Pleasant Mine – Environmental Impact Statement* (ERM Mitchell McCotter, September 1997)
EMS	Environmental Management System
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GDP	Ground Disturbance Permit
GIS	Geographical Information System
ISO	International Standards Organisation
LEP	Muswellbrook Local Environment Plan
LFA	Landscape Function Analysis
LOI	Landscape Organisation Index
mAHD	metres Australian Height Datum
MOP	Mining Operations Plan
MSC	Muswellbrook Shire Council
NOW	NSW Office of Water, within the Department of Primary Industries
OEH	Office of Environment and Heritage
PCB	Polychlorinated biphenyls
REMP	Rehabilitation and Environmental Management Plan
ROM	Run of Mine
SMF	Synthetic mineral fibre
TSC Act	*Threatened Species Conservation Act 1995*
TSF	Tailings Storage Facilities

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Appendix A

Alignment to Project Approval Conditions

Appendix A Alignment to Project Approval Conditions

Project Approval Condition	Requirement	Section/s of this B&RMP
Schedule 3 Condition 32	The Applicant shall prepare and implement a Biodiversity Management Plan for the development to the satisfaction of the Director-General. This plan must:	
	a) be prepared in consultation with OEH and Council, and be submitted to the Director-General for approval prior to carrying out any development on site;	1.0
	b) include:	
	- a description of the short, medium, and long term measures that would be implemented to:	
	• manage the remnant vegetation and habitat on the site and in the offset area/s (if and when applicable); and	2.2 - 2.5
	• implement the offset strategy (if and when applicable), including detailed performance and performance criteria;	N/A
	- a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for:	
	• implementing revegetation and regeneration within the disturbance areas and offset areas, including establishment of canopy, sub-canopy (if relevant), understorey and ground strata;	2.2 - 2.5
	• maximising salvage and beneficial use of resources in areas that are to be impacted, including vegetative, soil and cultural heritage resources;	2.4
	• protecting vegetation and soil outside the disturbance areas;	2.4
	• rehabilitating creeks and drainage lines on the site, to minimise net loss of stream length and aquatic habitat;	2.4
	• managing salinity;	2.3
	• conserving and reusing topsoil;	2.3
	• undertaking pre-clearance surveys	2.4
	• managing impacts on fauna;	2.4
	• landscaping the site and along public roads to minimise visual and lighting impacts;	Refer Landscape Management Plan
	• collecting and propagating seed;	2.4
	• salvaging and reusing material from the site for habitat enhancement;	2.4
	• salvaging, transplanting and/or propagating threatened flora and native grassland;	2.4
	• controlling weeds and feral pests;	2.4
	• managing grazing and agriculture on site;	2.4
	• controlling access; and	2.4
	• bushfire management;	2.4

Project Approval Condition	Requirement		Section/s of this B&RMP
	- a program to monitor and report on the effectiveness of these measures, and progress against the performance and performance criteria;		3.0
	- a description of the potential risks to successful revegetation, and a description of the contingency measures that would be implemented to mitigate these risks; and		4.0
	- details of who would be responsible for monitoring, reviewing, and implementing the plan.		5.0
Schedule 3 Condition 47	Landscape Management Plan		
	b) provide for the establishment of trees and shrubs and/or the construction of mounding or bunding: • along the access road to the mine site; • around the water storage dams and coal preparation plant; • at other areas identified as necessary for the maintenance of satisfactory visual amenity;		2.4
Schedule 3 Condition 53 – Rehabilitation Objectives	The Applicant shall rehabilitate the site to the satisfaction of the Executive Director, Mineral Resources in DRE. This rehabilitation must be generally consistent with the proposed rehabilitation strategy depicted conceptually in the figure in Appendix 7, and comply with the objectives in Table 14.		
	Table 14 – Rehabilitation Objectives		
	Feature	**Objective**	
	Mine site (as a whole), including the final void	Safe, stable & non-polluting.	2.0
	Surface infrastructure	To be decommissioned and removed, unless the Director- General agrees otherwise.	2.1
	Land forms	To be set under condition 54 below.	2.2
	Landuse	To be set under condition 54 below.	2.3 - 2.5
	Community	Minimise the adverse socio-economic effects associated with mine closure.	4.0
Schedule 3 Condition 54 – Rehabilitation Strategy	Prior to commencing any development on the site, the Applicant shall prepare a Rehabilitation Strategy for the development to the satisfaction of the Director-General. This strategy must:		*Rehabilitation Strategy Mount Pleasant Open Cut Coal Mine* (AECOM, 2011)
	a) be prepared in consultation with relevant stakeholders, including DRE, NOW, Council and the CCC;		
	b) investigate options for the future use of the site upon the completion of mining;		
	c) describe and justify the proposed rehabilitation strategy for the site; and		
	d) define the rehabilitation objectives for the area, as well as the proposed performance criteria for this rehabilitation.		
Schedule 3 Condition 55 – Progressive Rehabilitation	The Applicant shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.		2.0

Project Approval Condition	Requirement	Section/s of this B&RMP
Schedule 3 Condition 56 – Rehabilitation Management Plan	The Applicant shall prepare and implement a Rehabilitation Management Plan for the development to the satisfaction of the Executive Director, Mineral Resources in DRE. This plan must:	
	a) be prepared in consultation with the Department, NOW, Council and the CCC;	1.7
	b) be submitted to the Executive Director Mineral Resources in DRE for approval, within 3 months of approval of the Rehabilitation Strategy;	1.0
	c) be prepared in accordance with any relevant DRE guideline;	1.0
	d) describe the measures that would be implemented to rehabilitate the site and implement the rehabilitation strategy (see condition 54); and	2.0
	e) build, to the maximum extent practicable, on the other management plans required under this consent.	1.0
Schedule 5 Condition 4 – Revision of Strategies, Plans and Programs	Within 3 months of:	
	a) the submission of an annual review under Schedule 5 Condition 3; b) the submission of an incident report under Schedule 5 Condition 7; c) the submission of an audit under Schedule 5 Condition 9; and d) any modification to the conditions of this consent, e) the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Director-General. *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.*	5.0
Schedule 5 Condition 11 – Access to Information	The Applicant shall:	As per the Coal & Allied website: http://www.coalandallied.com.au/
	a) make the following information publicly available on its website: • the EIS; • all current statutory approvals for the development; • approved strategies, plans and programs required under the conditions of this consent; • a comprehensive summary of the monitoring results of the development, which have been reported in accordance with the various plans and programs approved under the conditions of this consent; • a complaints register, which is to be updated on a monthly basis; • minutes of CCC meetings; • the annual reviews (over the last 5 years); • any independent environmental audit, and the Applicant's response to the recommendations in any audit; • any other matter required by the Director-General; and b) keep this information up to date, to the satisfaction of the Director-General.	

Appendix B

Specifications for Ecosystems Functional Analysis

Appendix B Specifications for Ecosystems Functional Analysis

The objective of this component of the monitoring program is to evaluate the progress of rehabilitation towards fulfilling long term landuse objectives and performance criteria. Monitoring frequency of rehabilitation areas would be undertaken dependent on the importance of the rehabilitation progress, generally annually but could be three yearly for less significant sites.

As a minimum, the long-term rehabilitation monitoring will:

- compare monitoring results against rehabilitation objectives and targets;
- identify possible trends and areas for improvement;
- link to records of rehabilitation to determine causes and explain results;
- assess effectiveness of environmental controls implemented;
- where necessary, identify modifications required for the monitoring program, rehabilitation practices or areas requiring research;
- compare flora species present against original seed mix and/or reference sites;
- assess vegetation health;
- assess vegetation structure (upper, mid and lower storey); and
- where applicable, assess native fauna species diversity and the effectiveness of habitat creation for target fauna species.

Where necessary, rehabilitation procedures will be amended accordingly to continually improve rehabilitation standards, or as more data becomes available regarding reference sites or the targeted vegetation community, performance criteria can be updated to ensure rehabilitation is improving on the right trajectory.

The methodology used to undertake this monitoring is Ecosystem Function Analysis (EFA). EFA consists of the Landscape Function Analysis (LFA) tool and vegetation assessment.

LFA assesses the landscape's ability to retain water and nutrients within the system. In terms of LFA, a soil landscape that is on a trajectory toward self sustainability (in context of vegetative cover and soil stability) would have:

- A high Landscape Organisation Index (LOI) i.e. a low number of bare soil patches (referred to as inter-patches) between obstruction components (referred to as patches) in the soil landscape, which would affect wind and water movement and the introduction and transportation of resources into and out of the system; and
- High Soil Surface Assessment indices, indicating that the site had favourable Nutrient, Infiltration and Stability characteristics.

Vegetation monitoring components are the other component of the EFA monitoring tool. This component is limited to the woodland areas as woody vegetation is typically not represented within pasture areas. An assessment of woody species density, species richness and canopy cover all contribute to the findings of the LFA in terms of available nutrients, soil stability and water infiltration. In terms of vegetation dynamics, a soil landscape that is on trajectory to self sustainability in context of vegetative cover would have:

- High percentage ground cover vegetation and/or leaf litter components with a corresponding low percentage of bare soil areas;
- High percentage canopy cover;
- High density of woody species; and
- High species richness (particularly pertinent to habitat complexity components).

Utilising the EFA method scientifically robust data is provided on the base sites, which when compared to the data collected from reference sites, accurately reflects if the site is on a trajectory towards a sustainable ecosystem. The interpretation of this data enables the development of land management recommendations to address those sites having lower EFA rankings.

Permanent transects and associated photo reference sites are to be established in areas of post-mining rehabilitation and correspondingly in adjacent undisturbed areas to provide reference sites. The reference sites will be selected to represent as close as possible the slope, aspect and proposed vegetation characteristics of the revegetation areas. The reference sites will provide data on the long term goal for the revegetation area.

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Appendix C

Monitoring Stages - Rapid Visual Assessment of Revegetated Areas

Appendix C Monitoring Stages - Rapid Visual Assessment of Revegetated Areas

Mount Pleasant is required to implement an annual rehabilitation inspection to evaluate how successful the rehabilitation works have been. The scope of the inspection is to include all existing and recently completed rehabilitation areas on site.

This annual inspection will be undertaken by a Visual Monitoring technique. Visual Monitoring is a field based rapid assessment tool that provides a quantitative assessment to various landscape contributors including:

- Vegetation components (overstorey, understorey and ground cover where applicable);
- Presence of exotic weed and feral animals species;
- Surface stability and erosion issues;
- Presence of available microhabitat; and
- Disturbance factors.

Each of these subcomponents is awarded a score to generate an overall result for each site. This allows comparison between different sites and over time. It also allows the identification of areas requiring remediation as indicated by low scores. In terms of Visual Monitoring, a soil landscape that is on a trajectory toward self sustainability would ideally have:

- Diversity of overstorey and understorey vegetative components which are mature and reproducing;
- Diversity of ground cover components with good soil coverage and leaf litter contribution;
- Lack of weeds and / or site disturbance associated with feral animal activity;
- Stable surface nature with organic matter (i.e. topsoil with organic content);
- Lack of features attributable to erosion;
- Lack of soil compaction and slow to nil water runoff;
- Highly available microhabitat components; and
- Lack of disturbance factors including unauthorised access, rubbish and physical disturbance such as fire or vandalism.