

MAC-ENC-MTP-044

BIODIVERSITY AND REHABILITATION MANAGEMENT PLAN

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1.0 Introduction

This Biodiversity and Rehabilitation Management Plan (B&RMP) has been developed to address Conditions of Project Approval 09_0062 Mt Arthur Coal – Open Cut Consolidation Project dated 24 September 2010 (Project Approval) which was issued to Hunter Valley Energy Coal Pty Ltd (HVEC) by the NSW Department of Planning (now NSW Department of Planning and 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:

- Biodiversity Offset Strategy – Schedule 3 Condition 36;
- Biodiversity Offset - Schedule 3 Condition 38;
- Long Term Security of Offsets – Schedule 3 Condition 39;
- Biodiversity Management Plan – Schedule 3 Condition 40;
- Conservation Bond – Schedule 3 Condition 41;
- Rehabilitation Strategy – Schedule 3 Condition 42;
- Progressive Rehabilitation – Schedule 3 Condition 43; and
- Rehabilitation Management Plan – Schedule 3 Condition 44.

This document has been prepared to address Schedule 3 Conditions 40 and 44 – 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 NSW Department of Planning and Infrastructure (DP&I) Project Approval Conditions that pertain to the B&RMP.

This B&RMP was prepared in consultation with NSW Trade & Investment – Mineral Resources, Muswellbrook Shire Council (MSC), Office of Environment and Heritage (OEH), NSW Office of Water (NOW) and the Mt Arthur Coal Community Consultative Committee (CCC). This B&RMP has also been submitted to the Director-General Department Trade and Investment, Regional Infrastructure and Services (DTRIS) for approval.

1.1. Purpose

The Rehabilitation Strategy (MAC, 2011) provides the overarching concepts for decision making in terms of landscape and land use for Mt Arthur Coal, whilst this B&RMP and other relevant management plans provide specific actions for management. The detail on implementation of the plan 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 and associated offset areas provide for:

- Pastoral, recreation and/or wildlife habitat opportunities with due consideration to visual amenity aligned to the surrounding landscapes;
- Successful design and rehabilitation of landforms to ensure structural stability, revegetation success and containment of wastes;

- Post-mining landuse which is compatible with surrounding land uses to provide suitable environmental and community benefits;
- Re-establishment of significant and/or threatened plant communities, including:
 - Upper Hunter White Box – Ironbark Grassy Woodland;
 - Central Hunter Box – Ironbark Woodland;
 - Central Hunter Ironbark – Spotted Gum Grey-Gum Box Forest;
 - Narrabeen Foothills Slaty Box Woodland;
 - Hunter Floodplain Red Gum Woodland Complex;
- Re-establishment of significant and/or threatened plant species or populations, including:
 - Lobed Blue-Grass (*Bothriochloa biloba*);
 - Tiger Orchid (*Cymbidium canaliculatum*);
 - Weeping Myall (*Acacia pendula*);
- Re-establishment of habitat for significant and/or threatened fauna species – as listed in Table 8.

1.2. Project Background

Mt Arthur Coal currently has approval to carry out the project in accordance with the Environmental Assessment titled *Mt Arthur Coal Consolidation Project Environmental Assessment* (6 volumes), dated November 2009, including the Response to Submissions, the Statement of Commitments and conditions of the Project Approval. This Project Approval is a step in Mt Arthur Coal's ongoing growth programs, and mining is currently expected to continue well beyond 2022. Further Project Approvals and all other regulatory requirements will be sought as required to facilitate ongoing mining at Mt Arthur Coal.

1.3. Project Area

HVEC operates Mt Arthur Coal¹ which consists of approved open cut and underground mining operations, a rail loop and associated rail loading facilities. The operations are located in the Upper Hunter Valley, NSW approximately five kilometres south west of Muswellbrook, refer to Figure 1.

Figure 2 provides an overview of the existing site, including the surrounding main drainage lines and vegetation communities together with information on the existing active mine workings.

In keeping with the commitment in the *Mt Arthur Coal Consolidation Project Environmental Assessment* (EA) (Hansen Bailey, 2009), the Rehabilitation Strategy and this B&RMP have been developed to ensure that the post mining landform of the site is designed to optimise productivity, whilst enhancing wildlife habitat in non farmed patches within the agricultural

¹ The combined operations of the project (including the former Mt Arthur North mine, Bayswater No. 2 mine, Bayswater No. 3 mine and the South Pit Extension Project) and the Mt Arthur Underground Project (MP 06_0091) are referred to as the Mt Arthur Coal Complex.

landscapes. An integral component of this commitment is that Mt Arthur Coal provides for at least 30% of the open cut disturbance area to be rehabilitated to native woody vegetation.

1.4. Biodiversity Offsets

The biodiversity offset strategy as described in Table 16 of Schedule 3 Condition 36 Biodiversity Offsets of the Project Approval and in the EA (Hansen Bailey, 2009) together with reference to the domains², are detailed in Table 1.

Table 1: Biodiversity Offset Strategy – (as per Project Approval Table 16)

Domain	Area Encompassed	Minimum Size (ha)	Offset Type
Conservation Areas	Mt Arthur Conservation Area	105	Existing vegetation
	Saddlers Creek Conservation Area	295	
Offset Areas	Thomas Mitchell Drive Off-Site Offset Area	495	Existing vegetation and vegetation to be established
	Thomas Mitchell Drive On-Site Offset Area	222	
	Roxburg Road 'Constable' Offset Area	110	
	Additional Off-Site Offset Area	165	
Rehabilitation Areas	Box-Gum Grassy Woodland	1,915	Vegetation to be established including 500 hectares of Box Gum Woodland.
	Edderton Road Revegetation Area		
	Consolidation Project Woodland Corridors		
	South Pit Extension Regeneration Corridors		
	South Pit Extension Rehabilitation Areas		
	TOTAL	3,307	

The Rehabilitation Areas can be further broken down into the following categories:

- Rehabilitation of mined lands – which will require performance criteria for decommissioning through to ecosystem and landuse sustainability; and
- Revegetation of non-mined lands – which will require performance criteria for ecosystem and landuse establishment through to ecosystem and landuse sustainability.

1.5. B&RMP Layout

This B&RMP defines how HVEC is going to meet the range of performance criteria, and provides performance measures and indicators against which these performance criteria are to

² A domain can be defined as a land management unit within a mine site, usually with similar geophysical characteristics. It is likely that most domains will require a different rehabilitation methodology to achieve the intended post-mining land use.

be assessed. 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.

1.6. Principles of this B&RMP

The principles of this B&RMP are aligned to the Landuse Goals and Objectives as they relate to Biodiversity and Rehabilitation that are described in Table 2.

This B&RMP also incorporates the following strategic objectives:

- Rehabilitation is consistent with the Mt Arthur Coal environmental assessments/documentation;
- Satisfy corporate and regulatory objectives and targets;
- Performance criteria and proposed final landuse are developed through stakeholder consultation;
- Takes into account local and regional initiatives;
- Consistent with surrounding landscape and landuse requirements;
- Addresses the limitations of land capability;
- Sustainable in terms of landscape;
- 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 at Mt Arthur Coal is to implement the Rehabilitation and Biodiversity Strategies, and re-establish significant and/or threatened plant communities, plant species, and fauna habitat.

The rehabilitation program will include the establishment of 500 hectares of Box-Gum Grassy Woodland, 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 Mt Arthur Coal will focus on 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.

Table 2: Landuse Goals and Objectives for Rehabilitation and Biodiversity

Goal	Objective	Considerations
<p>Successful design and rehabilitation of landforms to ensure structural stability, revegetation success and containment of wastes</p>	<p>Maximise likelihood of long term landform stability and minimise erosion</p>	<p>Slope angles and lengths compatible and consistent with regulatory requirements or better with investigation into improved landform shapes.</p>
	<p>Optimise final Tailings Storage Facility (TSF) dimensions</p>	<p>Safe and stable rehabilitation of final TSFs</p>
	<p>Ensure removal and/or containment of hazardous or contaminated material</p>	<p>Licensed hazardous materials managed in accordance with regulatory requirements.</p>
	<p>Determine suitable vegetation for re-establishment of woodlands and unimproved pastures based on a native species plant community</p>	<p>Sustainability of vegetation type and suitability to final landform type.</p> <p>Native vegetation establishment should consider local species and sourcing seed of local provenance as well as control of threatening processes, such as weeds, overgrazing, uncontrolled fire and pests.</p> <p>Faunal colonisation.</p> <p>Soil formation and conservation</p> <p>Drainage lines, water bodies and general hydrology.</p> <p>Plant growth characteristics.</p>
<p>Post-mining landuse compatible with surrounding landuses and provides optimal environmental and community benefits. This includes remnant vegetation within the Mining Lease and pastoral land uses.</p>	<p>Ensure final landuse is compatible with surrounding landuse.</p> <p>Ensure biodiversity and ecological objectives are achieved with post mining rehabilitation linking to remnant vegetation on and off site.</p>	<p>Consistency of final landuse with surrounding landuses.</p>
	<p>Incorporate landuse in terms of optimal social and economic benefit to the local and wider community.</p>	<p>Landuse is aligned to adjoining land usage – present and future.</p> <p>Landuse is designed to provide optimum social and economic value to the local and wider community whilst not negatively impacting on the areas biodiversity or environmental values, including planning of integrating remnant</p>

Goal	Objective	Considerations
		<p>vegetation areas.</p> <p>Landuse will be aligned to the relevant land zonings, for instance, as per the current Muswellbrook Local Environment Plan (LEP).</p> <p>Consideration of infrastructure requirements of post mining including roads within the site boundary and fencing.</p>
	<p>Encourage sustainability and diversity of landuse.</p> <p>Pasture areas to be of a suitable carrying capacity and link to non-mined pastoral areas where possible.</p>	<p>Consideration of vegetation type and landuse type and suitability to final landform.</p> <p>Ongoing management requirements.</p> <p>Control of threatening process including feral animals, weeds and bushfire.</p> <p>Post mining land ownership in relation to most suitable post mining landuse.</p>
<p>The post mining landscape of the site is designed to protect and enhance ecological and archaeological areas with particular reference to the establishment of 500ha of Box-Gum Grassy Woodland.</p>	<p>Implement a rehabilitation and revegetation program focusing on grassland and woodland based vegetation communities, which is based on scientifically robust data, methodologies and industry lead practice. Implement within the short term.</p>	<p>Investigate the long-term effects of management activities through research and monitoring of Box-Gum Grassy Woodland.</p> <p>Implement cost effective techniques for restoring degraded remnants, to improve functionality and restoration of understorey species.</p> <p>Investigate the impact of high threat weeds on component species and implement control methods that will not adversely impact the existing diversity in Box-Gum Grassy Woodland.</p> <p>Engage with stakeholders to disseminate the results from research which will be used to develop, promote and facilitate “best management” practice.</p>

1.7. Environmental Management System

Mt Arthur Coal has in place an Environmental Management System (EMS) certified to the International Standards Organisation (ISO) 14001 standard. The EMS is designed so that Mt Arthur Coal 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 Mt Arthur Coal and includes planning controls including risk assessments and clearing permits, improvement programs, management plans, system and operational procedures, awareness training and reporting. 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 to ten years after mine closure or as approved by relevant regulators.

This B&RMP is a component of the Mt Arthur Coal EMS.

1.8. Stakeholder Consultation

Community engagement and consultation has been ongoing throughout the life of the Mt Arthur Coal. This engagement has included:

- Free call community response line;
- Website providing information on the Mt Arthur Coal - <http://www.bhpbilliton.com>;
- Regular Mt Arthur Coal 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 and requests for input specifically regarding the development of this B&RMP and the Rehabilitation Strategy 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 (MSC);
- Mt Arthur Coal CCC; and
- Neighbouring mining operations.

To optimise the synergy that strategies and management plans, such as the Rehabilitation Strategy (MAC, 2011) and this B&RMP, offer in terms of landscape and land use, Mt Arthur

Coal 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 EA (Hansen Bailey, 2009), *Strategic Framework for Mine Closure* (ANZMEC & MCA, 2000) and the *Mt Arthur Coal Rehabilitation Strategy* (MAC-ENC-MTP-047).

Figure 1: Mt Arthur Coal Project Area

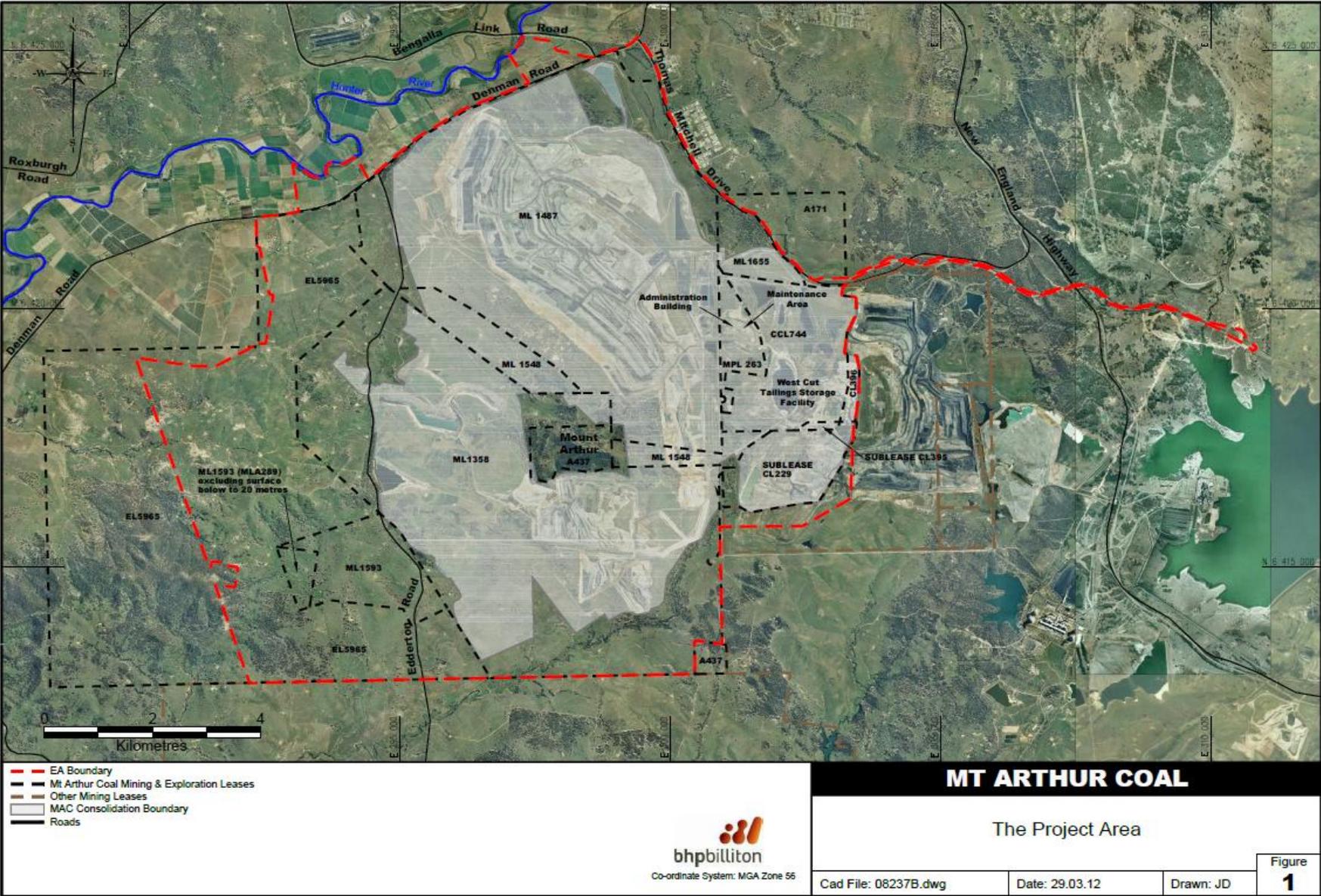
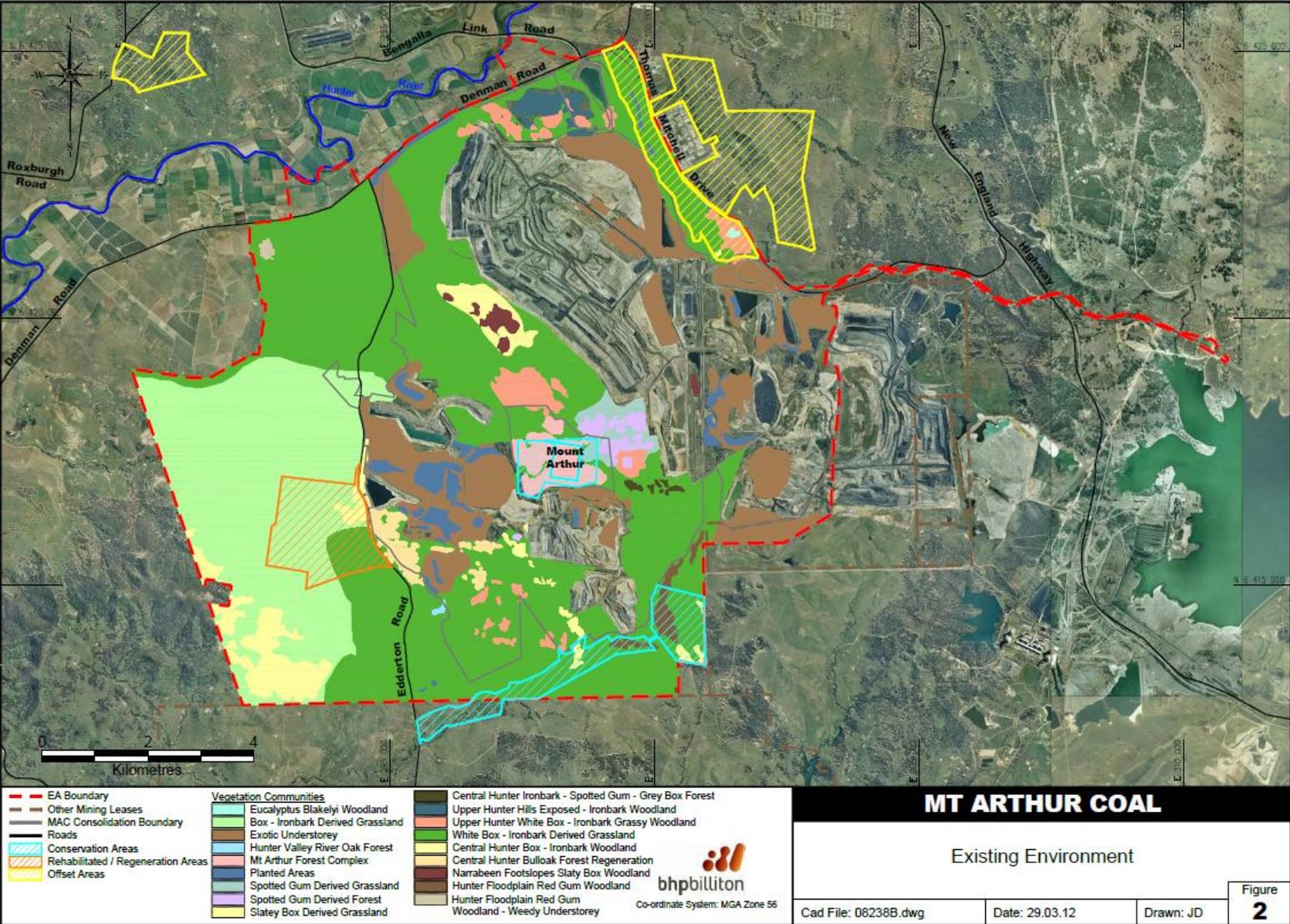


Figure 2: Existing Environment



2.0 Performance Criteria, Measures and Indicators

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.

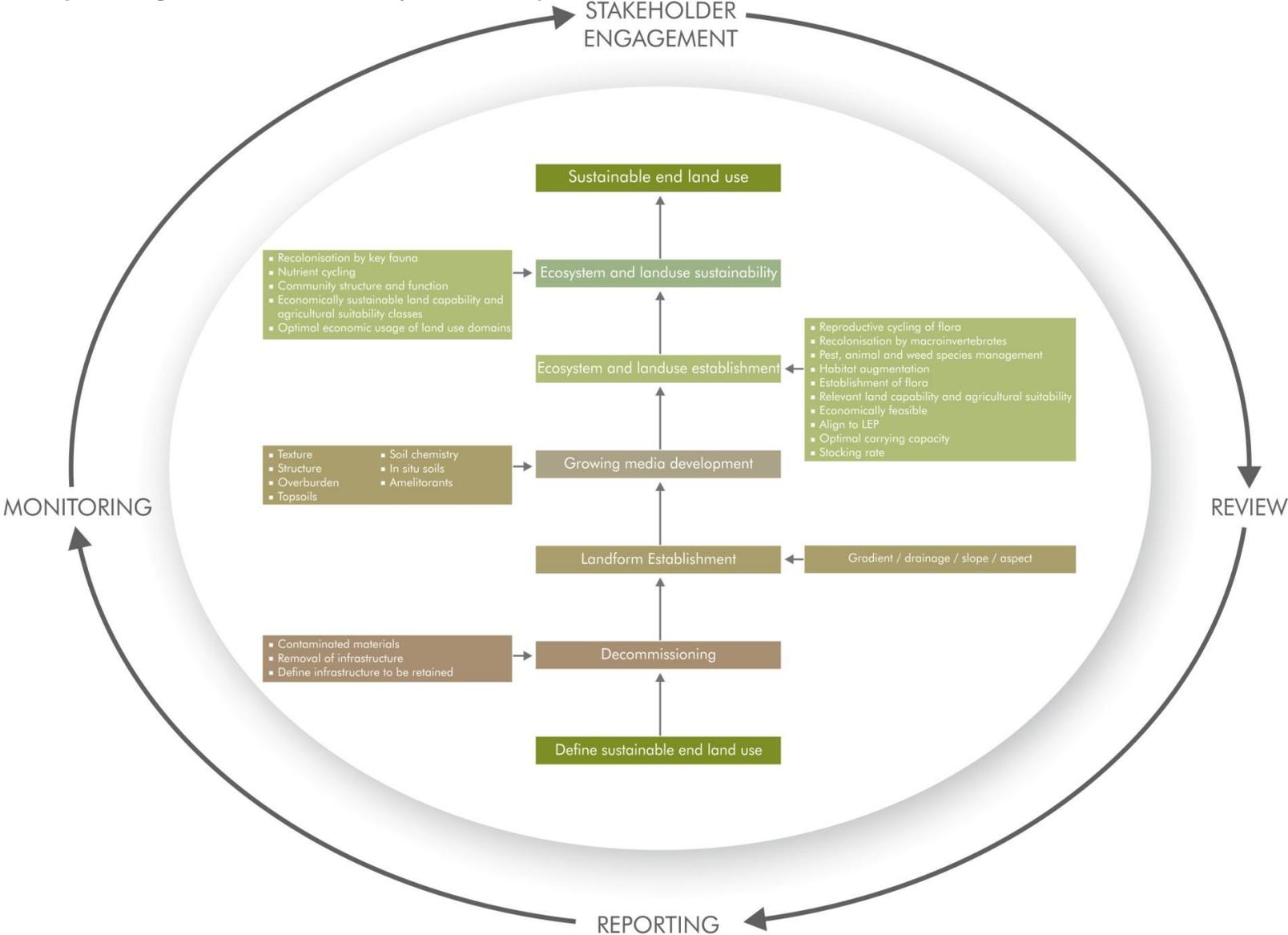
The performance measures quantify the rehabilitation and land management program in terms of efficiency or effectiveness and establish the indicative timeframes for completion. The performance indicators are used to define and evaluate the program, typically in terms of making progress towards the development of sustainable ecosystems whilst also providing a framework for the implementation of key activities.

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 3 and described as:

- Stage 1 – Decommissioning – removal of hard stand areas, buildings, contaminated materials, hazardous materials – this stage may not apply to all domains e.g. overburden emplacement;
- 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 3: Conceptual Stages of Sustainable Ecosystem Development



2.1 Decommissioning

For domains where hard stand areas, buildings, contaminated materials or hazardous materials may occur 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. The key domains are shown

Figure 4. These are:

- Infrastructure Areas;
- Voids;
- Highwalls;
- Tailing Storage Facility (TSF);
- Overburden Emplacement;
- Water Management Areas;
- Conservation Areas and Offset Areas, and
- Revegetation Areas and Non-Operational Lands.

Further information on these domains and the key issues that pertain to their management is provided in the following sections.

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 3. Timing of works include longer term actions as part of decommissioning of infrastructure with defined timelines to be established in the Decommissioning Plan which will be established five years prior to site closure. Other actions within Table 3 are either determined as part of Mining Operation Plan process in the short term (ranging from 1 to 7 years) or for short to medium term actions are to be in line with EA commitments.

2.1.1 Infrastructure Areas

All surface infrastructures at the Mt Arthur Coal where a post mining use cannot be identified will be removed from the site. Site infrastructure to be removed will include:

- Administration offices, car parking facilities, stores, bathhouses, workshop and warehousing facilities;
- Project administration facility located adjacent to the Coal Handling Preparation Plant (CHPP);
- Mt Arthur Coal CHPP, ROM coal hopper facilities, and product coal stockpile conveyors;
- Rail Loading Facilities, Rail Loop and conveyor;
- Overland conveyor to Bayswater Power Station (owned and operated by Macquarie Generation);
- Heavy vehicle wash down bays, drive through service and repair bays;
- Bulk oil storages and fuel tanks;
- Power supply and water reticulation systems; and
- Water storages, retention basins and associated water management structures.

All demolition work would be undertaken by competent persons under the direction of experienced demolition supervisors, with strict adherence to safe work procedures at all times. A demolition strategy would be developed by the demolition contractor at the appropriate time.

2.1.2 Residual Voids, Highwalls and Batters

This domain includes the final highwalls, voids, lowwalls, spoils and ramps. The final voids, 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.

Post mining it is expected the final voids will be utilised for water storage, however options for final void use and management will continue to be researched with further details to be provided in the Decommissioning Plan which will be compiled within five years of the closure of the mine. Post mining surface catchment areas of the final voids will be minimised to protect against external flooding, with runoff from most rehabilitated and revegetated areas of the Project being directed to local clean water drainage lines which will be re-established as part of progressive rehabilitation. 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.

Existing low wall and internal benches will require dozer shaping to achieve a stable, self sustaining final landform. During the low-wall dozer reshaping, water management structures such as contour banks, drains and drop structures will be established to divert as much of the surrounding catchment as possible away from the final void so as to limit the amount of water that accumulates in the void. The rehabilitation area will be trimmed, rock raked and deep ripped prior to the placement of topsoil to generally 0.2 metres thick. Native plant seeds and fertiliser will be spread across the disturbed land by aerial application or hydro mulching with appropriate vegetation species. Where appropriate, the use of additional ameliorants (lime, gypsum, biosolids, etc) will be considered to assist with the planned rehabilitation activities.

High walls and internal benches will require blasting and drilling works to achieve a final landform. During the highwall dozer reshaping, water management structures such as contour banks, drains and drop structures will be established to divert as much of the surrounding catchment as possible away from the final void so as to limit the amount of water that accumulates in the void.

The material blasted from the high wall will be used to cover any exposed coal seams and other carbonaceous material that might be left exposed. Native plant seeds and fertiliser will be spread across the disturbed area by aerial application or hydro mulching.

There may be a requirement for ongoing management of water in voids remaining at the cessation of operations. Determination of the exact requirements regarding potential volumes, water quality and disposal options will be determined progressively as the mine approaches closure and as further detail becomes available on the fluctuations of water quality in existing voids. Water management options post closure will continue to be examined over the life of the mine.

A Final Void Management Plan will be prepared as part of the closure planning process at Mt Arthur Coal to ensure all management strategies for the voids are documented and known.

2.1.3 Tailings Storage Facilities

As part of mine rehabilitation activities, all tailings produced from the CHPP will continue to be disposed of in the tailings storage facility. As for infrastructure and water management areas, the rehabilitated tailings dam will be integrated into the final mine landform and revegetation strategy. As an example, the tailings storage dam located in the Bayswater No. 2 and Drayton Sub-Lease Areas will be integrated with other rehabilitation in the Drayton Sub-Lease area to form an elevated landform to the east of the main Mt Arthur Coal landform.

A detailed tailings dam dewatering and capping methodology will be developed by suitable specialists and technical experts as part of the tailings management strategy. A conceptual program of works would include discharging tailings from the centre of the dam via the pipe head flocculation method. In general, this method is anticipated to provide improved tailings shear strength characteristics and improved drying of the tailings beach, which will facilitate the placement of a capping layer. In employing this proposed methodology it is anticipated that covering could simultaneously be undertaken from the centre and perimeter of the storage facility.

It is proposed that suitable capping material will be stockpiled within close proximity to the cell as an operational activity. The average thickness of the proposed cap will be approximately three metres and will be moved into place by specialist machinery. When the capping material is in place the area will be topsoiled and revegetated with a species mix aligned to the surrounding plant community i.e. grassland and open woodland.

2.1.4 Overburden Emplacement

The key components of the final proposed landform are defined in the EA (Hansen Bailey, 2009). Coarse reject will continue to be co-disposed within overburden emplacement areas or utilised in the construction of the tailings dams, stockpiles or other site based infrastructure.

A conceptual final landform design (upon the completion of mining activities) has been developed as shown on Figure 10 of the EA (Hansen Bailey, 2009). This confirms that, if mining were not continued beyond 2022, then the orderly closure of the Mt Arthur Coal could be achieved.

As a consequence of the EA requirements the following emerge as important completion criteria:

- Restoration of mined land to achieve visual amenity;
- Biodiversity conservation; and
- Ecologically sustainable land management practices.

An integral part of the rehabilitation program will be the characterisation of the reject emplacement, overburden and soil materials. Initial pasture and cover crop sowings will temporarily stabilise steep slopes prior to tree planting and sowing. Research and trials will continue in order to establish native grass species typical of the local area in rehabilitated pastoral grassland. Improved (exotic) pastures³ and occasional forage crops will be considered on areas of Class IV land (refer Section 8.15.2 of the EA (Hansen Bailey, 2009)).

For woody native ecosystem establishment different species combinations will be used to establish communities in accordance with the dominant species characterising those stated in Project Approval Condition 38 (a) and (b) and Commitment 15 (Appendix 3 - Statement of Commitments). Details on the species mix to be used in the revegetation programs are recorded in Site Procedures and Standards, with any subsequent changes in the mix to be reported in the Annual Environment Management Report (AEMR).

Other vegetation communities will include areas sown to exotic and native grasses, and native woodland and forest communities which will achieve linkages as well as function as woodlot and windbreaks for stocked areas.

³ Species of exotic grasses (Coolatai and African Love Grass) are considered a key threatening species, with these species not always being declared under the *Noxious Weeds Act*. Consideration will be given in site Procedures and Standards in context as to how exotic pasture species are managed across areas of different landuses, particularly where agricultural production based domains adjoin conservation based domains.

As proposed in Section 8.15.3 of the EA (Hansen Bailey, 2009) the final land uses of the rehabilitated site will include pastoral, recreation and/or wildlife habitat opportunities with due consideration to visual amenity aligned to the surrounding landscapes.

Onsite management measures designed to reduce the visual effect created by the overburden emplacement include:

- The integration of tree corridors on the overburden emplacement area as progressive rehabilitation occurs;
- The retention of the eastern flank of MacLean's Hill to assist in creating landscape diversity at the foot of overburden emplacements;
- Establishing visual and ecological planting patterns of native trees to achieve landscape patterns that complement the existing spatial distribution of tree and grass cover in a grazing landscape;
- Minimising exposure of work areas to sensitive receivers where possible; and
- Consideration of the feasibility of microrelief opportunities.

Progressive rehabilitation is also a central component to rehabilitation development and working towards a final landform. Progressive rehabilitation is reported within the AEMR and outlined in the Mining Operations Plan submitted to DTRIS (refer Appendix 5). Progressive rehabilitation will continue to occur to assist in meeting condition 43 (a) of the Project Approval regarding rehabilitation on emplacement faces visible to the community.

2.1.5 Water Management Areas

The water management system for Mt Arthur Coal 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. These principles are:

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

Final landform design will involve the reconstruction of a channel in the north west of the project area through to Denman Road as shown on

Figure 4. This may be reconsidered in future environmental assessments if mine life is extended.

A flood protection bund will be constructed between Denman Road and the Environmental Assessment Boundary where the topography is lower in elevation than the 1955 peak flood level in the Hunter River. Additional modelling has been undertaken of peak Hunter River levels and an existing dam wall along the original Whites Creek alignment has been extended to provide flood protection in the interim before a permanent flood protection bund is constructed closer to Denman Road. Water run-off from the rehabilitation landform is to be directed into channels that flow into the existing drainage pattern around the mine. The water run-off in the channels will vary in discharge depending on local weather conditions and storm activity. Temporary sediment controls such as the use of sediment dams, 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. Reconstructed creek lines will be revegetated with species prevalent within the existing creek channels, with enhanced density of over storey species where relevant e.g. the Fairford drainage line. Reconstructed creek channels will be established where required in accordance with best practice standards at the time of construction (Section 8.9.3 of the EA (Hansen Bailey, 2009)).

Temporary stabilisation measures may also be required, including such structures as sediment dams. Reconstructed creek design will include significant areas of rehabilitated overburden and other mine areas to ensure that the reconstructed channels are stable in a wide range of flows (Section 8.9.3 EA (Hansen Bailey, 2009)). To achieve rapid stabilisation, particularly in high flow scenarios, quick establishing pasture species will be used to minimise problematic weeds been introduced⁴.

There has been extensive use of pasture species for this purpose on both Mt Arthur Coal and other mines, and techniques are well developed. In terms of future use, these areas will be protected from incompatible land use activities such as over grazing which may damage their integrity.

Further details on the management of site water is addressed in the *Water Management Plan MAC-ENC-MTP-034* for the Mt Arthur mine complex. In accordance with the Project Approval Conditions 29 – 34 inclusive this document encompasses:

- Site Water Balance;
- Erosion and Sediment Control Plan;
- Surface Water Monitoring Program;
- Groundwater Monitoring Program; and
- Surface and Ground Water Response Plan.

⁴ Species of exotic grasses (Coolatai and African Love Grass) are considered a key threatening species, with these species not always being declared under the *Noxious Weeds Act*. Consideration will be given in site Procedures and Standards in context as to how exotic pasture species are managed in terms of their use in sediment and erosion control.

2.1.6 Conservation Areas and Offset Areas

The Mt Arthur and Saddlers Creek Conservation Areas have been created to protect Aboriginal cultural heritage and ecological values of the area. These conservation areas will be managed for biodiversity conservation.

The Offset Areas contain existing vegetation; however they will also be enhanced through the establishment of protective stock proof fencing, encouragement of natural regeneration and through further revegetation to increase ecological processes and biological diversity.

As discussed in Section 4.12 of the EA (Hansen Bailey, 2009), the mine plan for the project has been designed, as far as possible, to reduce environmental impacts, including specific impacts on threatened flora and fauna species. The approach to habitat management, vegetation and rehabilitation has specifically been developed to integrate conservation and offset areas with local and regional vegetation corridors, and Mt Arthur Coal's existing biodiversity conservation commitments.

As part of offset management strategy, Mt Arthur Coal is exploring the option of utilising strategic cattle grazing as a management tool within biodiversity offset and conservation areas. Research trials will be undertaken to determine whether offset and conservation areas can be utilised for strategic grazing without damaging ecological processes or compromising biodiversity values.

The offset areas are located within an area where the express intention is that the surface will not be disturbed; however, their establishment will not preclude the maintenance of tracks and fire breaks to meet fire control obligations under the Rural Fires Act 1997, the maintenance of service utilities, water management or erosion control works, or other such low impact activities. If part of this area is required by Muswellbrook Shire Council in the future for industrial usage or community infrastructure, appropriate offset realignment would be made to ensure no net decrease in the area or ecological value of land under long term protection. .

2.1.7 Revegetation Areas and Non-Operational Lands

Revegetation areas and non-operational lands should be surveyed for past farming structures that may require decommissioning, including stock dips, farm houses, sheds, etc.

Figure 4: Decommissioning and Landform Establishment

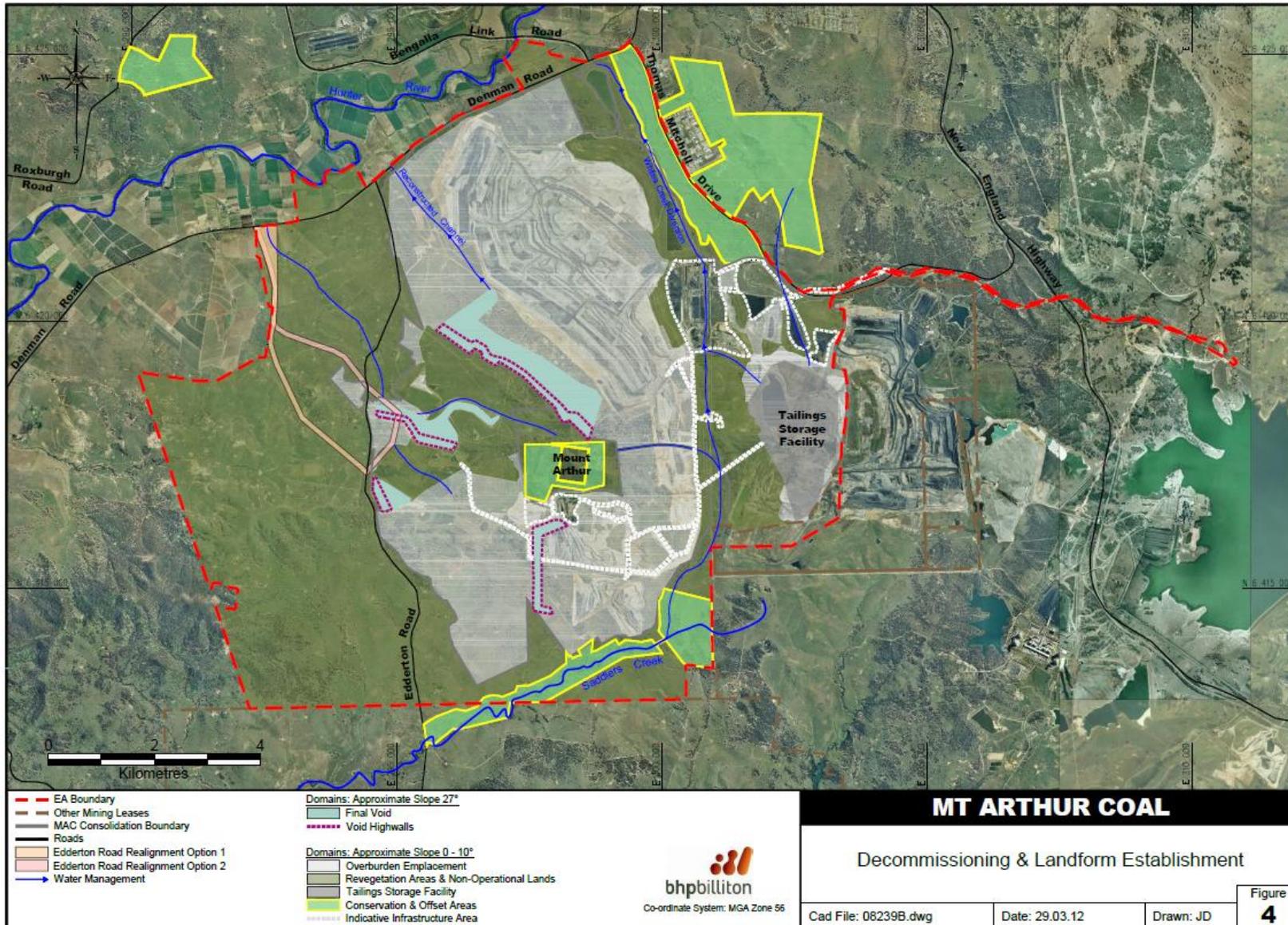


Table 3: Decommissioning (of infrastructure areas)

Criteria	Performance Measure	Performance Indicator	Justification/Source
Infrastructure Areas			
Licensed hazardous materials managed in accordance with regulatory requirements.	<p>Progressive and final decommissioning will include the following:</p> <ul style="list-style-type: none"> Disassemble, demolish and remove structures; Remove concrete pads and footings; Reuse or recycle materials (e.g. steel and concrete) where practicable, or dispose of appropriately; and Disconnect and terminate services. 	<p>Implementation of Decommissioning Plan.</p> <p>Certificates for removal and disposal of hazardous materials present.</p>	<p>Project Approval 09_0062 Mt Arthur Coal – Open Cut Consolidation Project dated 24 September 2010.</p> <p><i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013 (MAC, 2011).</i></p> <p>EMS Procedures.</p> <p><i>Rehabilitation Cost Estimate Guidelines – ESG1 (NSW Department of Trade & Investment).</i></p> <p><i>Guidelines to the Mining, Rehabilitation and Environmental Management Process - EDG03 (NSW Department of Trade & Investment).</i></p> <p>AS 2601-2001 The Demolition of Structures.</p>
Hazardous material assessment of infrastructure to identify the potential health and environmental risks associated with demolition of the infrastructure.	<p>Inventory showing location and quantities of:</p> <ul style="list-style-type: none"> Asbestos-containing materials (ACMs); Lead paints; Synthetic mineral fibre; and Polychlorinated biphenyls (PCBs). 	<p>Implementation of Decommissioning Plan.</p> <p>Decommissioning Plan to include hazardous materials management.</p> <p>Certificates for removal and disposal of hazardous materials present if required</p> <p>Detailed investigation if required.</p>	<p>AS 2601-2001 The Demolition of Structures.</p>
	<p>Management of hydrocarbon soil contamination.</p>	<p>Onsite treatment at the bioremediation area until the soil can be safely disposed in the spoil dump.</p>	

Criteria	Performance Measure	Performance Indicator	Justification/Source
Secure and safe containment of waste substances.	Contamination assessments of soils. Identify areas of high risk for further evaluation.	Assessment of contamination and / or remediation requirements.	
Voids and Highwalls			
Safe and stable rehabilitation of final voids.	The use of the final void will be considered in consultation with the DPI and will be documented in the Decommissioning Plan that will be developed prior to the final five years of the mine life of Mt Arthur Coal. It is envisaged that the final decommissioning of the void will include:	Development and Implementation of Decommissioning Plan. Certificates for removal and disposal of hazardous materials present if applicable.	Project Approval 09_0062 Mt Arthur Coal – Open Cut Consolidation Project dated 24 September 2010. <i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013 (MAC, 2011).</i> EMS Procedures. Decommissioning Plan. <i>Rehabilitation Cost Estimate Guidelines – ESG1 (NSW Department of Trade & Investment).</i> <i>Guidelines to the</i>
Current void use is compatible with long term plans for voids.	<ul style="list-style-type: none"> Removal of mining facilities and infrastructure (dissemble, demolish and remove structures); Stabilisation of any loose materials on unstable slopes if required; 		

Criteria	Performance Measure	Performance Indicator	Justification/Source
<p>Void water meets predictions of gradual change over long time frame.</p>	<ul style="list-style-type: none"> • 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; and • Incorporation of void infrastructure and facilities within decommissioning plan. 		<p><i>Mining, Rehabilitation and Environmental Management Process - EDG03</i> (NSW Department of Trade & Investment).</p>
Tailings Storage Facility			
<p>Removal of infrastructure associated with mine related activities – unless deemed as being required post mining.</p>	<p>Establish a procedure to decommission, inspect and monitor TSF.</p>	<p>Performance of the TSF as per procedure.</p>	<p>Project Approval 09_0062 Mt Arthur Coal – Open Cut Consolidation Project dated 24 September 2010.</p>
<p>Potential subsidence of materials deposited into the TSF will also be taken into account when designing the final landform.</p>	<p>Removal of pipelines and pumps and related tailings infrastructure.</p>	<p>Implementation of Decommissioning Plan.</p>	<p><i>Mt Arthur Coal Complex Open Cut</i></p>

Criteria	Performance Measure	Performance Indicator	Justification/Source
Confirm that historic tailings deposits are not acid generating.	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: <ul style="list-style-type: none"> • Paste pH; • Paste Electrical conductivity (EC) (µS/cm); • Total Sulfur (% mass); • Sulfide Sulfur (% mass); and • Acid Neutralising Capacity as kg H2SO4/tonne. 	No indication of acid generation i.e. acidic pH, high electrical conductivity or high sulfate (>1%).	<i>Mining Operations Plan FY2012 – FY2013</i> (MAC, 2011). EMS Procedures. Decommissioning Plan. <i>Rehabilitation Cost Estimate Guidelines – ESG1</i> (NSW Department of Trade & Investment). <i>Guidelines to the Mining, Rehabilitation and Environmental Management Process - EDG03</i> (NSW Department of Trade & Investment).
Overburden Emplacement and Voids			
Problematic materials will be capped.	Encapsulation.	Problematic coarse rejects will be capped by a minimum of 1m of benign material where design dictates this requirement.	Project Approval 09_0062 Mt Arthur Coal – Open Cut Consolidation Project dated 24 September 2010. <i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013</i> (MAC, 2011).
		Net acid generating materials will be capped by a minimum of 5m of benign material where deemed necessary within design and where practical.	
		Carbonaceous material will be capped by a generally 2 to 3m of benign material where practical.	

Criteria	Performance Measure	Performance Indicator	Justification/Source
	Exposed coal seams will be covered with benign materials to prevent spontaneous combustion where practical.	<p>Capped by a minimum of 3m of material where practical.</p> <p>Acceptable cover material for capping with further details outlined under Table 5 Landform Establishment.</p>	<p>EMS Procedures.</p> <p>Decommissioning Plan.</p> <p><i>Rehabilitation Cost Estimate Guidelines – ESG1</i> (NSW Department of Trade & Investment).</p> <p><i>Guidelines to the Mining, Rehabilitation and Environmental Management Process - EDG03</i> (NSW Department of Trade & Investment).</p>
Water Management Area			
Management of Water Management Areas.	<p>Decommissioning will include:</p> <ul style="list-style-type: none"> • Removal of infrastructure; • Installation of interim drainage management if required; and • Disconnect and terminate services. 	Implementation of Decommissioning Plan to occur in medium to longer term dependent on risk.	<p>Project Approval 09_0062 Mt Arthur Coal – Open Cut Consolidation Project dated 24 September 2010.</p> <p><i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013</i></p>

Criteria	Performance Measure	Performance Indicator	Justification/Source
	<p>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.</p>	<p>Develop Remedial Action Plan. Implement Remedial Action Works. Implements Validation program. Certificates/audit statements showing remediation/ management of soils.</p>	<p>(MAC, 2011). EMS Procedures. Decommissioning Plan. <i>Rehabilitation Cost Estimate Guidelines – ESG1</i> (NSW Department of Trade & Investment). <i>Guidelines to the Mining, Rehabilitation and Environmental Management Process - EDG03</i> (NSW Department of Trade & Investment).</p>
Conservation Areas, Offset Areas, Revegetation Areas and Non-Operational Lands			
<p>Undertake a hazardous materials assessment of infrastructure to identify the potential health and environmental risks associated with demolition of these facilities.</p>	<p>Past farming structures such stock dips, farm houses, sheds, etc surveyed for pesticide residues, PCBs and asbestos containing materials.</p>	<p>Structures removed and contamination contained, treated or removed. Certificates for removal and disposal of hazardous materials obtained where relevant. Detailed investigation if required.</p>	<p>EMS Procedures.</p>

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 and assessing opportunities for microrelief, erosion controls, and drainage lines with integrated landscape features, which are consistent with surrounding landforms, whilst also ensuring that the rehabilitated areas of native vegetation link with undisturbed and remnant areas of native vegetation.

In this context the key domains (as aligned to slope) shown on Figure 4 are:

- Infrastructure Areas;
- Voids;
- Highwalls;
- Tailing Storage Facility;
- Overburden Emplacements;
- Conservation and Offset Areas;
- Revegetation Areas and Non-Operational Lands; and
- Water Management Areas.

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 4 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.

Table 4: Landform Establishment

Criteria	Performance Measure	Performance Indicator	Justification/Source
All Domains except Conservation, Offset and Revegetation Areas and Non Operational Lands			
Stable and permanent, drainage and benching, batter slopes developed using a mix of existing methodologies and best industry practice with consideration to microrelief opportunities.	Design to enable the agreed end landuse to be established.	Landform survey broadly comparable to design plan. Absence of slope failure or uncontrolled erosion. Landscape evolution or suitable soil loss equation modelling to compare against comparable industry expectations.	<i>Mt Arthur Coal Consolidation Project Environmental Assessment</i> (Hansen Bailey, 2009). <i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013</i> (MAC, 2011).
All mining and overburden emplacement areas will be progressively rehabilitated. With works to be scheduled as soon as reasonably practicable following mining disturbance.	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. Approvals are in place for landforms where slopes are > 10 degrees. 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.	EMS Procedures. Decommissioning Plan. NSW Department of Mineral Resource <i>Emplacement Area Applications – Guidance Notes</i> (2006). <i>Mt Arthur Coal Complex – Sediment and Erosion Control Plan MAC-ENC-PRO-060</i>
Minimisation of constructed slopes greater than 10 degrees and allowing consideration for microrelief opportunities.	Identify the exceptions where angles of 10 degrees are necessary and are permitted to be constructed. Obtain regulatory approval if greater than 18 degrees.	Landform in accordance with design plan. Approvals in place for slopes >18 degrees.	

Criteria	Performance Measure	Performance Indicator	Justification/Source
Slope angles and lengths are compatible with regulatory requirements.	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.	
Voids, Highwalls and Water Management Areas			
Final voids are managed to ensure geotechnical stability and landform design appropriate with regulatory requirements.	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.	<i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013</i> (MAC, 2011). EMS Procedures. Decommissioning Plan.
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.	

Criteria	Performance Measure	Performance Indicator	Justification/Source
Long term integrity of the slopes of the final void.	<p>Slopes of final void are stable.</p> <p>Determine appropriate slope configurations.</p> <p>Assess against a circular slip failure mode in a situation of torrential rain.</p> <p>Review the void slopes design adequate for geotechnical serviceability.</p> <p>Slope construction.</p>	<p>Determine the lowest credible strength of the spoil and friction angle.</p> <p>Model problem areas.</p> <p>Design incorporated into Decommissioning Plan.</p> <p>Survey to confirm built as designed.</p> <p>Visual Inspections and survey conducted.</p>	
Water interactions between void and surrounds.	<p>Water quality seeping into the void is as predicted and modelled.</p>	<p>Monitor increase in void standing depth - inflow volumes.</p> <p>Hydrological and water quality monitoring program implemented during operations and post-closure.</p>	
Tailings Storage Facility			
Reshaping of TSF.	<p>Establish a procedure to reshape, inspect and monitor TSF.</p>	<p>Performance as per TSF Procedure.</p>	<p><i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013 (MAC, 2011).</i></p> <p>EMS Procedures.</p> <p>Decommissioning Plan.</p>
Potential subsidence of materials deposited into the TSF will also be taken into account when designing the final landform.	<p>TSF design and management to allow for progressive reshaping of the surface as settlement occurs.</p> <p>TSF design and management to allow for initial overfilling of the covering material to compensate for expected settlement.</p>	<p>Engineering inspection of the TSF design and management.</p>	
Problematic materials will be capped.	<p>Tailings storage facilities are capped with overburden and rehabilitated after consolidation of tailings.</p>	<p>TSF design documentation.</p>	
Overburden Emplacement			

Criteria	Performance Measure	Performance Indicator	Justification/Source
<p>The potential subsidence of materials deposited into these areas will also be taken into account when designing the final landform.</p>	<p>Overburden emplacement design and management to allow for progressive reshaping of the surface as settlement occurs.</p> <p>Overburden emplacement design and management to allow for initial overfilling of the covering material to compensate for expected settlement.</p>	<p>Engineering inspection of overburden emplacement.</p>	<p><i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013 (MAC, 2011).</i></p> <p><i>Mt Arthur Coal Annual Environmental Management Report (2010).</i></p> <p>EMS Procedures.</p>
<p>Problematic materials will be capped.</p>	<p>Tailings storage facilities are capped with overburden and rehabilitated using topsoil after consolidation of tailings.</p>	<p>Overburden emplacement design documentation.</p>	<p>Decommissioning Plan.</p>

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 domains as shown on Figure are:

- Infrastructure Areas;
- Void Batters and Highwalls;
- Created Growing Media or Topsoil Establishment;
- *In situ* soils;
- Water Management Areas.

2.3.1 Overburden Characterisation

The overburden and interburden materials that may be present at Mt Arthur Coal may include some materials that produce leachate that is 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 *Mt Arthur Coal EA* (Hansen Bailey, 2009 – Appendix Q) demonstrates the suitability of the soils for use as growing media and details the stripping depths. Table 5 summarises the characteristics of each soil type in the extended mine footprint proposed in the EA (Hansen Bailey, 2009 – Appendix Q).

Table 5: Summary of Soil Types in Proposed Extended Mine Footprint (Hansen Bailey, 2009 – Appendix Q)

Soil Class	Soil Types	Topsoil Suitability
1 – Lithosols (Great Soil Group [GSG] classification)	Rock outcrop, skeletal soils and shallow gravelly soils – sandy, loam or clayey gravels with greater than 50% of coarse fragments	Not suited due to excessive sand and gravel
2 - Earthy or Siliceous Sands or Alluvial Soils		Not suited due to its apedal nature, sandy texture and poor water holding capacity. May be best considered as an alternative source of topdressing material only if other sources are found to be insufficient
3 – Lithosols (GSG classification)		Marginally suitable as a topdressing material

Soil Class	Soil Types	Topsoil Suitability
4 - Brown Earths and Yellow Earths	Predominantly course-textured (sandy) soils Earthy sands, sandy earths	Marginal suitability, though top 15cm may be worthy of recovery due to seed resources and micro-organisms
5 - Yellow Podzolics	Massive earths, gradational, some uniform texture profiles, predominantly loamy	Red duplex soils are mostly suitable as a topdressing material. Risk of dispersion
6 - Red-Yellow Podzolics, Non-Calcic Brown Soils and Red Brown Earths	Red and yellow duplex soils	Brown and darker coloured duplex soils are considered suitable as topdressing material
7 - Brown Podzolics, Grey-Brown Podzolics and Brown Duplex Soils	Brown, yellow brown, grey or dark coloured duplex soils	
8 - Krasnozems on the steeper slope units, and Prairie Soils and Grey-Brown Structured Earths on the alluvial flats	Uniform or gradational, yellow, red, brown, grey-brown or dark clays	

Industry experience gained from the use of topsoil derived from pasture and returning 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 returning to native plant communities where suitable topsoil supplies are not available, will in the main, be based on “created growing media”, the basis being overburden and appropriate ameliorants, i.e. organic fertilisers, gypsum and organic matter.

Soil management is fundamental in successful land management at Mt Arthur Coal. 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 6. The Performance Criteria, Performance Measures and Indicators together with the justification source which describe the Growing Media Development stage are provided in Table 7.

Table 6: Soil Resource Management Strategies

Prior to Soil Stripping	During Soil Stripping and Stockpiling	Stockpiled Soil Awaiting use in Rehabilitation Works	During the Rehabilitation Program
<ul style="list-style-type: none"> Quantification of soil resources aligned to pre-disturbance vegetation communities. Characterisation of the suitability of soil resources for rehabilitation works. Formulation of stripping and stockpiling guidelines including the nomination of appropriate depths, scheduling, location of areas to be stripped and stockpile locations. 	<ul style="list-style-type: none"> Minimisation of vegetation clearance. Selective stockpiling of soil where appropriate 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. Where possible, soil stockpiles will be located outside of proposed mining areas to avoid unnecessary short term rehandling or relocation. Loaders and trucks will be preferentially used over scrapers to minimise structural degradation dependant on haul distance and equipment availability. Stockpiles will be generally three metres in height in order to minimise problems with anaerobic conditions. 	<ul style="list-style-type: none"> Implementation of measures to ensure long-term viability of soil resources. Fertilise and seed stockpiles with a suitable pasture mix which will be inactive for extended periods to maintain soil structure, organic matter and microbial activity. Installation of silt fences or a containment windrow around stockpiles where required to control potential loss of stockpiled soil through erosion prior to vegetative stabilisation. Where necessary, an appropriate soil ameliorant will be applied to dispersive soil stockpiles. Implement appropriate weed control strategies particularly for any noxious weeds. Stockpiles will be appropriately sign-posted to identify the area. Level or gently sloping areas where available will be selected as 	<ul style="list-style-type: none"> 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 if deemed practical and based on availability of supply or Waste Regulation 1996 guidelines and are incorporated. 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 along the contour prior to the application of topsoil and rock raking. Topsoil will not be respread when wet, to avoid excessive compaction. Topsoil respreading

Prior to Soil Stripping	During Soil Stripping and Stockpiling	Stockpiled Soil Awaiting use in Rehabilitation Works	During the Rehabilitation Program
		<p>stockpile sites to minimise erosion and potential soil loss.</p> <ul style="list-style-type: none"> • Stockpiles are designed to enable easy deposition, recovery and weed control e.g. shape should allow for weed layer to be easily scalped off prior to soil recovery 	<p>undertaken so that no visible dust leaves site.</p> <ul style="list-style-type: none"> • 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. • 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. • Soil structure may be assessed during the future to review settlement over the longer term.

Figure 5: Growing Media Development

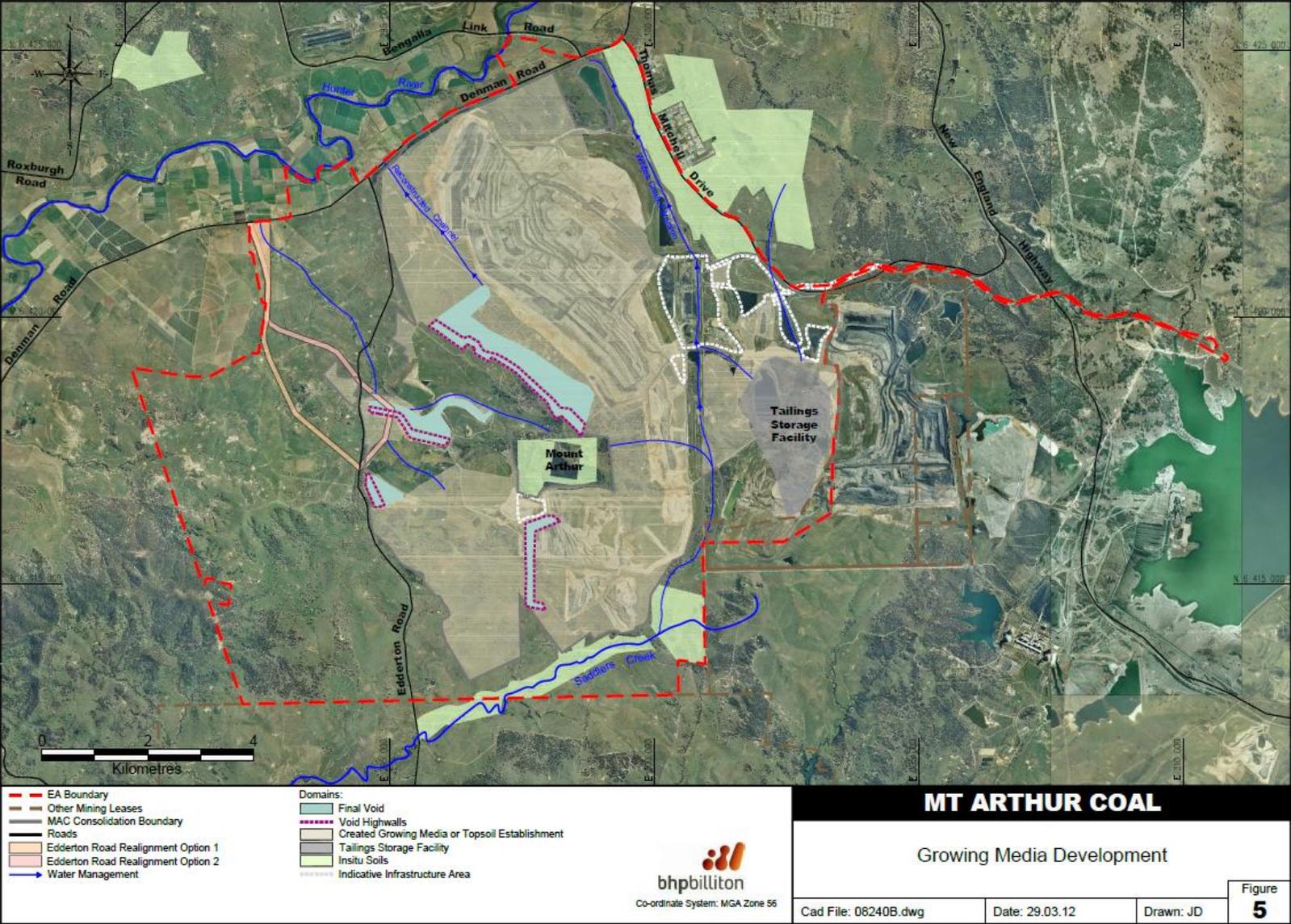


Table 7: Growing Media Development

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, ESP and CEC of growing media to be broadly within the range suitable for targeted species growth. Conductivity of growing media to be broadly within the range suitable for plant growth.	EMS Procedures.
Chemical properties of the growing media.	Tests assessing the growing media’s chemical properties – pH, salinity, cation exchange capacity (CEC) , exchangeable sodium capacity (ESP) , nitrogen, potassium and phosphorous.	The surface layer to be free of hazardous materials to a depth of at least 1 metre. Off-site runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years. Soil nitrogen and phosphorous levels to be trending towards the range suitable for plant growth for grassland and woodland vegetation communities.	
Biological properties of the growing media.	Tests assessing the growing media’s biological properties – organic content, presence of the A horizon.		
Threatened flora.	For areas of known Lobed Blue Grass (<i>Bothriochloa biloba</i>) topsoil will be stripped, stored and managed separately.	Topsoil containing Lobed Blue Grass (<i>Bothriochloa biloba</i>) seed load available for use in returning to defined areas.	Trial Project and guidance from independent consultant.
Created Growing Media or Topsoil Establishment			
Growing media are characterised and managed accordingly in	Topsoil resources pre mining are defined.	The location of the topsoil stockpiles is recorded on GIS	<i>Mt Arthur Coal Consolidation Project Environmental Assessment</i> (Hansen Bailey, 2009).
	Topsoil resources post stripping are defined.		

Criteria	Performance Measure	Performance Indicator	Justification/Source
context of the post mining landuse and landscape.	Topsoil resources post placement on areas of rehabilitated lands is defined based on post mining landuse and location.		<i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013 (MAC, 2011).</i>
Plant communities are aligned to the physical and chemical characteristics of the growing media.	Topsoil is classified based on physical, chemical and biological characteristics in context of their potential to support enhanced species diversity.	On site assessments are undertaken to assess localised soil characteristics in context of species diversity and the utilisation of topsoil in the rehabilitation program.	<i>Mt Arthur Coal MAC-ENC-PRO-012 – Clearing and Topsoil Stripping.</i>
	Where relevant soils having high nitrate levels are ameliorated.	Industry review and where warranted onsite investigation is undertaken assessing the impact of carbon sources on soil aligned to reducing nitrate levels.	<i>Mt Arthur Coal MAC-ENC-PRO-034- Waste Handling and Disposal</i> <i>Mt Arthur Coal Soil Stripping Management Plan.</i> <i>Mt Arthur Coal Flora and Fauna Management Plan</i>
<i>In situ Soils and Created Growing Media or Topsoil Establishment</i>			
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.	<i>Mt Arthur Coal Consolidation Project Environmental Assessment (Hansen Bailey, 2009).</i>
	Dispersive topsoil materials are ameliorated with gypsum.	Assess the application rates for gypsum for topsoil material to address dispersion rates.	EMS Procedures – Erosion & Sediment Control Plan MAC-ENC-

Criteria	Performance Measure	Performance Indicator	Justification/Source
Erosion and sediment control.	Assessment of the extent of erosion across the post mining rehabilitated lands.	No significant areas of unstable active gully erosion.	PRO-060 Mt Arthur Coal <i>Annual Environmental Management Report (2010)</i> . Landcom 2006 <i>Managing Urban Stormwater: Soils and Construction</i> .
	Assessment of sediment control features – their effectiveness.	All control measures are undertaken as per site management plans.	
	Assessment of sediment control features – their maintenance.	Disturbed areas are to be stabilised by direct seeding or scatter using a fast growing sterile cover crop such as <i>Echinochloa esculenta</i> (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.	
Management of treated sewage.	Treated sewage effluent will be disposed of on areas of defined suitable soils.	Soils which are suitable for irrigation with effluent are defined.	

2.4 Ecosystem Establishment

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

- Correct flora species selection in terms of the revegetation programs for plant communities, plant species and habitat as listed in the Project Approval;
- The management and control of fire, weed and vertebrate pest species;
- Suitable Land Capability classes;
- The development of landscapes 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 6 are:

- Infrastructure Areas;
- Void batters;
- Post mined lands – pasture;
- Post mined lands – woodland;
- Edderton Road – Woodland;
- Conservation and Offset Areas;
- Water Management Areas; and
- Non-operational lands.

The post mined lands, Edderton Road Revegetation Area and non-operational lands domains are to be managed to enhance habitat and corridor values for the longer term.

The short to long term management and revegetation of these lands will require:

- Regeneration and revegetation works;
- Corridor establishment and management;
- Habitat augmentation;
- Fencing and access control;
- Weed and vertebrate pest species management and control;
- Strategic grazing and stock control; and
- Bushfire hazard assessment and risk mitigation.

The final adopted rehabilitation and management option for these areas will largely depend on their prevailing condition and, particularly, whether they have been cleared or contain remnant vegetation.

Rehabilitation at Mt Arthur Coal is generally divided into areas for biodiversity outcomes and areas of pasture (the predominant previous site use). Mt Arthur Coal has specifically agreed to establish a minimum of 30% of the disturbance area for open cut operations to woody vegetation in doing so re-establishing 500 hectares of Box-Gum Grassy Woodland. Through rehabilitation and revegetation programs Mt Arthur Coal will focus on the re-establishment of:

- Significant and/or threatened plant communities, including:
 - Upper Hunter White Box – Ironbark Grassy Woodland;
 - Central Hunter Box – Ironbark Woodland;
 - Central Hunter Ironbark – Spotted Gum Grey-Gum Box Forest;
 - Narrabeen Foothills Slaty Box Woodland; and
 - Hunter Floodplain Red Gum Woodland Complex; and
- Significant and/or threatened plant species or populations, including:
 - Lobed Blue-grass (*Bothriochloa biloba*);

- Tiger Orchid (*Cymbidium canaliculatum*); and
- Weeping Myall (*Acacia pendula*); and
- Habitat for significant and/or threatened animal species.

As a function of beef cattle grazing the landscape is largely dominated by scattered patches of woodland of various sizes, ages and condition and broad expanses of derived native grasslands⁵.

Data on the key biodiversity issues are provided in the EA (Hansen Bailey, 2009). Table 8 summarises the threatened species, populations and ecological communities either present or likely to occur on the site. These include the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed Critically Endangered Ecological Communities (CEEC) and NSW *Threatened Species Conservation Act 1995* (TSC Act) listed Endangered Ecological Communities (EEC) and Vulnerable Ecological Communities (VEC).

Table 8: Threatened Species, Populations and Endangered Ecological Communities Recorded or Considered Likely to Occur Within Mt Arthur Coal Project Area

Threatened Species / Populations / Communities	TSC Act	EPBC Act
Threatened Fauna Species Known to Occur in the Project Area		
White-throated Needletail (<i>Hirundapus caudacutus</i>)		Marine -Migratory
Rainbow Bee-eater (<i>Merops ornatus</i>)		Marine -Migratory
Grey-crowned Babbler (<i>Pomatostomus temporalis temporalis</i>)	V	-
Hooded Robin (<i>Melanodryas cucullata cucullata</i>)	V	
Speckled Warbler (<i>Pyrrholaemus sagittatus</i>)	V	-
Turquoise Parrot (<i>Neophema pulchella</i>)	V	
Diamond Firetail (<i>Stagonopleura guttata</i>)	V	-
Eastern Freetail Bat (<i>Mormopterus norfolkensis</i>)	V	-
Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	V	V
Eastern Bent-wing Bat (<i>Miniopterus schreibersii oceanensis</i>)	V	-
Eastern Cave Bat (<i>Vespadelus troungtoni</i>)	V	
Large-footed Myotis (<i>Myotis macropus</i>)	V	-
Yellow-bellied Sheath-tail Bat (<i>Saccolaimus flaviventris</i>)	V	
Greater Broad-nosed Bat (<i>Scoteanax rueppellii</i>)	V	-
Squirrel Glider (<i>Petaurus norfolcensis</i>)	V	

⁵ Derived native grassland is “native grassland” remaining after the removal or dieback of previous woody canopy vegetation (shrubs or trees) to a point where woody vegetation has less than 10% cover. In these areas whilst the trees and shrub cover may have been removed in many instances the ground cover has not been cultivated or improved but only grazed. As such these areas are dominated by native grasses and forbs and may be floristically similar to some natural native grassland communities.

Threatened Species / Populations / Communities	TSC Act	EPBC Act
Threatened Fauna Species Likely to Occur in the Project Area		
Brown Treecreeper (<i>Climacteris picumnus</i>)	V	-
Black-chinned Honeyeater (<i>Melithreptus gularis gularis</i>)	V	-
Masked Owl (<i>Tyto novaehollandiae</i>)	V	
Spotted-tailed Quoll (<i>Dasyurus maculates</i>)	V	E
Diamond Firetail (<i>Stagonopleura guttata</i>)	V	-
Endangered Populations		
Painted Diuris (<i>Diuris tricolor</i>) – listed as an endangered population in the Muswellbrook LGA	E	V
Weeping Myall (<i>Acacia pendula</i>) – Endangered Population in the Hunter Catchment	E	-
Tiger Orchid (<i>Cymbidium canaliculatum</i>)- Endangered Population in the Hunter Catchment	E	-
Threatened Flora Species Known to Occur in the Project Area		
Lobed Blue Grass (<i>Bothriochloa biloba</i>)	-	V
Endangered Ecological Communities		
Upper Hunter White Box – Ironbark Grassy Woodland	EEC	-
Blakely’s Red Gum Woodland	EEC	CEEC
Central Hunter Ironbark – Spotted Gum – Grey Box Forest	EEC	-
Central Hunter Box – Ironbark Woodland	EEC	
Mount Arthur Forest Complex	EEC	CEEC
Narrabeen Foothills Slaty Gum Woodland	VEC	-
Hunter Floodplain Red Gum Woodland	EEC	CEEC
Derived Native Grassland	EEC	

V= Vulnerable E= Endangered

Understanding how the ecological communities functions, what functions are absent in individual remnants and how they can be returned is fundamental to the rehabilitation program. This understanding together with the existing industry wide knowledge and skills base form the premise for opportunities to assess suitable rehabilitation research programs at Mt Arthur Coal. Understanding the benefits of improved management of Box-Gum Grassy Woodland to the broader landscape, including benefits to agricultural production and the movement of native fauna are important considerations that underpin this B&RMP.

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 9.

Figure 6: Ecosystem and Landuse Establishment

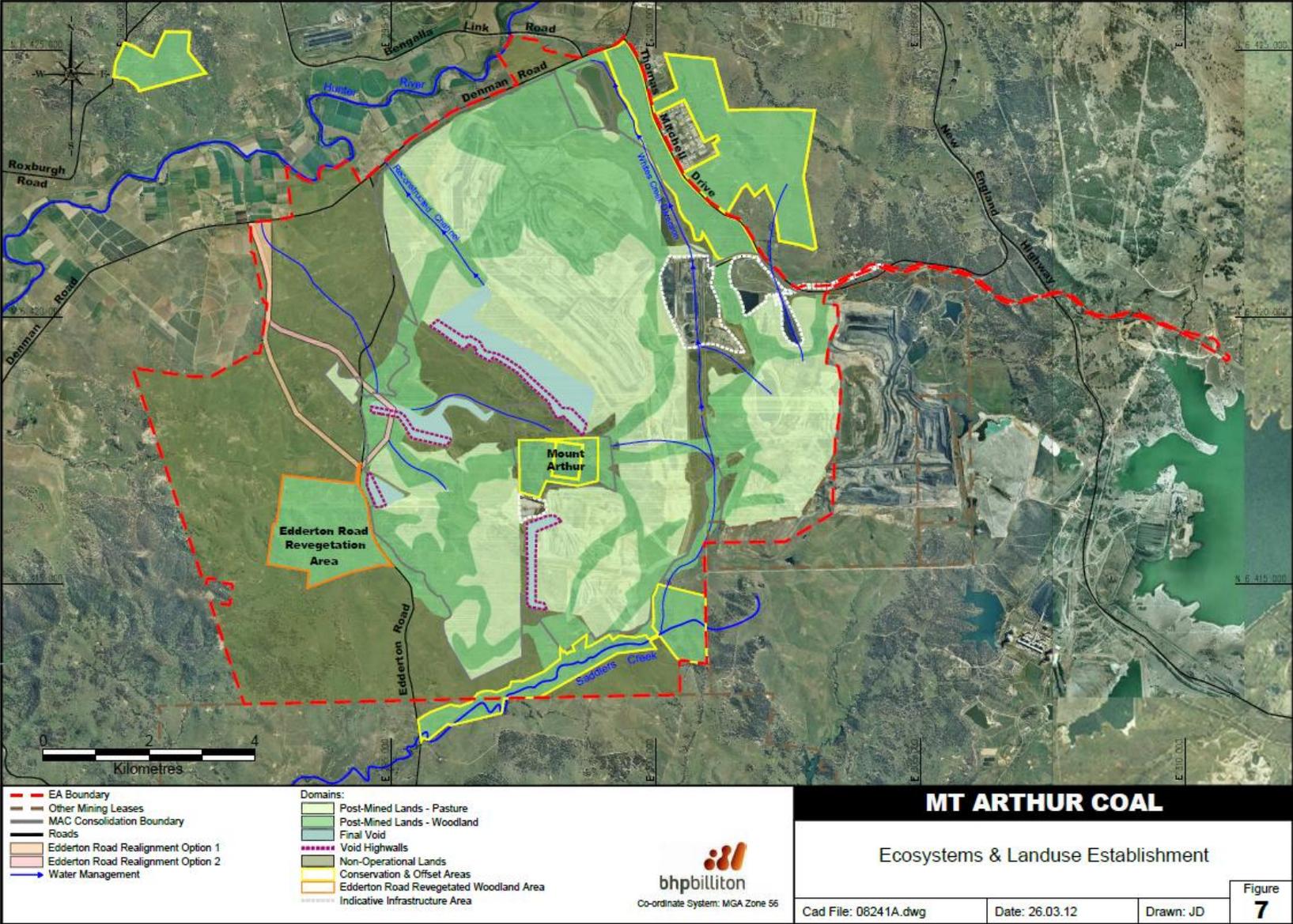


Table 9: Ecosystem and Landuse Establishment

Criteria	Performance Measure	Performance Indicator	Justification/Source
All Domains			
<p>Threatening processes, such as weeds, overgrazing, uncontrolled fire and pest species will be managed in accordance with relevant legislation.</p>	<p>Weeds are managed and controlled.</p>	<p>The amount of weeds present are broadly comparable to reference sites or baseline survey.</p> <p>Regular inspections of Mt Arthur Coal lands, including topsoil stockpiles, to identify areas requiring the implementation of weed management measures.</p> <p>Management of cattle movement to mitigate the risks associated with the control of weeds in manure, around stockyards, and key access corridors by education of site operational personnel.</p> <p>Consultation with neighbouring land owners and the relevant government stakeholders, such as the Upper Hunter Weeds Authority.</p> <p>Implementation of appropriate weed management measures which may include mechanical removal, application of approved herbicides and biological control.</p> <p>Control of noxious weeds identified on Mt Arthur Coal mine owned land in accordance with the relevant Department Primary of Industries control category.</p> <p>Identification of weed infestations adjacent to or within the proposed disturbance area during preclearance surveys.</p> <p>Follow-up inspections to assess the effectiveness of the weed management measures implemented and the requirement for any additional management measures together with data analysis where possible to assess performance</p>	<p><i>Noxious Weeds Act 1993.</i></p> <p>Australian and NSW Weed Strategies.</p> <p>TSC Act – Key Threatening Processes.</p> <p>EMS Procedures.</p>

Criteria	Performance Measure	Performance Indicator	Justification/Source
<p>Threatening processes, such as weeds, overgrazing, uncontrolled fire and pest species will be managed in accordance with relevant legislation.</p>	<p>Pest animal control for any declared pest animal species known on the project lands.</p>	<p>Pest control for declared pests known to occur on Mt Arthur Coal owned land.</p> <p>Use a range of appropriate pest control measures as determined (e.g. the destruction of habitat, trapping, targeted shooting programs and baiting).</p> <p>Follow-up inspections to assess the effectiveness of control measures implemented and the requirement for any additional control measures.</p>	<p><i>Rural Lands Protection Act 1998.</i></p> <p>TSC Act – Key Threatening Processes.</p> <p>EMS Procedures.</p> <p><i>Mt Arthur Coal Flora and Fauna Management Plan.</i></p>
<p>Sustainability of vegetation type and suitability to final landform type.</p>	<p>Vegetation is managed to control fire.</p>	<p>Monitoring of fuel loads. A hazard reduction burning program to reduce fuel levels may be considered in conjunction with advice and assistance from the NSW Rural Fire Service.</p> <p>The rotation of cattle grazing provides an effective management option for reducing fuel loads.</p> <p>Fire bans, as determined by the Rural Fire Service, will be adhered to by all personnel and will be enforced.</p> <p>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.</p> <p>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.</p> <p>Responsiveness is enhanced by emergency preparedness training for mine-site personnel.</p>	<p><i>Rural Fires Act 1997.</i></p> <p>EMS Procedures.</p> <p><i>Mt Arthur Coal Archaeology and Cultural Heritage Management Plan.</i></p> <p><i>Mt Arthur Coal Bushfire Management Plan (2010).</i></p>

Criteria	Performance Measure	Performance Indicator	Justification/Source
		<p>Firebreaks are established around the operations to prevent the spread of bushfires onto or from adjacent properties. These firebreaks are inspected for adequacy.</p> <p>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 Mt Arthur Coal's Procedures.</p> <p>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.</p>	
Post Mined Lands – Woodland, Post Mined lands – Pasture, Edderton Road Woodland, Conservation and Offset Areas			
Biodiversity Offset Strategy is implemented in accordance with that as described in the Project Approval.	Establishment of 500ha of Box-Gum Grassy Woodland.	Delineate 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.	<i>Mt Arthur Coal Consolidation Project Environmental Assessment</i> (Hansen Bailey, 2009).
	Species list has been compiled with consideration of habitat enhancement aligned to the requirements of key fauna, including threatened Woodland Birds, Micro chiropteran Bats and the Squirrel Glider.	Rehabilitation will be based on the use of canopy, sub canopy, understory and ground strata species consistent with a Box-Gum Grassy Woodland.	EMS Procedures. Draft National Recovery Plan for White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Department of

Criteria	Performance Measure	Performance Indicator	Justification/Source
	<p>Species used are compatible with agricultural or native biodiversity conservation outcomes.</p> <p>Revegetation focusing on reinstating endemic woodland ecological communities utilising flora species which provide a range of canopy, mid and understorey species.</p>	<p>Species sown are broadly comparable with existing plant communities.</p> <p>Species sown are broadly comparable with recommended species list from the EA or research.</p>	<p>Environment, Climate Change and Water NSW, Sydney 2010).</p> <p><i>Mt Arthur Coal Flora and Fauna Management Plan.</i></p>
<p>Native vegetation establishment will consider local species and sourcing seed of local provenance.</p>	<p>Seed Calendar to be developed for the site.</p>	<p>Seed Calendar contains information relating to:</p> <ul style="list-style-type: none"> - Fruiting and seed collection time; - Additional information on collection; and - Viability data - where available. 	<p>EMS Procedures.</p>
	<p>Data on seed collection.</p>	<p>Collated via the use of GIS data including:</p> <ul style="list-style-type: none"> - Date; - Species; and - Location. 	
	<p>Audits of the mine path in terms of seed availability.</p>	<p>Seed assessment undertaken prior to mining.</p> <p>The location of key trees and or stands of plants are recorded on GIS and marked for future detection and assessment.</p> <p>Works are undertaken in accordance with the Pre-clearance Survey Procedure</p> <p>Regular monitoring is undertaken of areas for appropriate, timely and cost effective seed collection.</p>	

Criteria	Performance Measure	Performance Indicator	Justification/Source
Native vegetation establishment will consider local species and sourcing seed of local provenance.	Optimum use of the onsite grass seed resource.	<p>A Grass Seed Audit is undertaken defining distribution and density of resources of native grass seed.</p> <p>Grass seed should be harvested where possible and practical by vehicle mounted harvesters with the goal of maintaining a healthy production area.</p>	<p>EMS Procedures.</p> <p><i>Mt Arthur Coal Flora and Fauna Management Plan.</i></p>
	Local provenance seed.	<p>Seed collected onsite will be incorporated into the revegetation direct seeding mix or propagated to produce tubestock for planting.</p> <p>Woodland/grassland seed and tubestock supply will preferentially be of local provenance dependent on availability.</p>	
	Utilisation of seed.	Record sheets and Geographical Information System (GIS) databases are developed to track the collection, storage and utilisation of the Mt Arthur Coal seed resource.	<p>Mt Arthur Coal MAC-ENC-PRO-012 – <i>Clearing and Topsoil Stripping.</i></p> <p><i>Mt Arthur Coal Flora and Fauna Management Plan.</i></p>
	Re-establishment of threatened flora.	Reintroduction of threatened plant species into defined areas through seed resource, propagation and/or transplanting.	
		Location of all threatened plants identified on GIS and assessed during Pre-clearance Surveys.	
	Appropriate germination and establishment occurs post sowing.	Sites to be monitored for germination, survival, growth, species composition and self-regeneration.	
Topsoil placement.	Data on the location of topsoil/non-topsoiled areas will be recorded as part of the AEMR.		

Criteria	Performance Measure	Performance Indicator	Justification/Source
	Revegetation works aligned to seasonality of rainfall, evaporation and temperature.	Planting to be undertaken aligned to optimal seasonal conditions in consideration of schedules. Post planting care including weed control, fertiliser and any irrigation 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 to be used for establishment of windbreaks or visual screening.	
	Hydro mulching or aerial seeding.	Hydro mulching or aerial seeding may be applied where final slopes exceed 10° to provide quick soil cover and slope stability.	
Plant communities are aligned to the physical and chemical characteristics of the growing media.	Fertilisers.	Soil data and plant growing requirements provides the premise for fertiliser application rates and fertiliser mix.	
Effective habitat linkages are aligned to surrounding vegetated lands in terms of the size of	Low wall, high wall and batters areas of voids and the area of the TSFs.	The vegetation communities of the low wall, high wall and batters of the final voids and the area of the TSF's will be determined in later versions of this plan.	Decommissioning Plan.
	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.	<i>CSIRO Methodology for Ecosystem Function Analysis (EFA)</i> (Tongway, 2004).

Criteria	Performance Measure	Performance Indicator	Justification/Source
stands and corridor length and design.	No uncontrolled entry of livestock or vehicles.	<p>Vehicle access is restricted to defined access pathways for use by authorised vehicles.</p> <p>The main arterial tracks are maintained in good condition.</p> <p>Layout of surface works such as roads, survey lines, drill tracks and fencing, are planned and authorised to minimise dissection of habitat areas.</p> <p>Stock proof fencing is installed and maintained.</p> <p>Main gates will be locked (key controlled) and signposted.</p>	Mt Arthur Coal <i>MAC-ENC-PRO-012 – Clearing and Topsoil Stripping</i> .
	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 Excavation Permit.	
Consistency of final land use with surrounding land uses.	Collaborative approach with adjoining mines to site rehabilitation.	<p>Corridors developed as per approved landuse.</p> <p>Research programs are developed in consideration of neighbouring mines.</p>	<i>Mt Arthur Coal Consolidation Project Environmental Assessment (Hansen Bailey, 2009).</i>
Plant growth characteristics will be incorporated in terms of fauna recolonisation	Optimum harvesting of large woody debris.	<p>Vegetation deemed suitable for fencing will be selectively cleared and stockpiled out of the disturbance area.</p> <p>Large woody debris deemed suitable for habitat enhancement is identified as part of pre clearance and post-clearance inspections which are a component of the Ground Disturbance procedure.</p>	EMS Procedures.

Criteria	Performance Measure	Performance Indicator	Justification/Source
	Habitat Trees.	Habitat trees and associated fauna are managed according to the EMS Procedure	
Sustainability and diversity are attained by assessment of vegetation type, land use type and suitability to final landform.	Artificial roosting/nesting boxes.	Nest boxes will be installed to supplement arboreal habitat. Data on the location of each nest box is collected and collated via GIS. Data relating to utilisation and condition of the nest boxes is collected on an on-going basis which will also determine any maintenance or replacement required.	Mt Arthur Coal MAC-ENC-PRO-012 – <i>Clearing and Topsoil Stripping S Procedures.</i> Mt Arthur Coal <i>Flora and Fauna Management Plan.</i>
	Nesting structures (mammal and avian).	Species specific habitat and/or nesting features are incorporated where relevant in areas across the site.	
	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.	
	Fallen timber.	Fallen timber is left <i>in situ</i> in area not impacted by mining.	
	Drainage depression (frog ponds) creation providing riparian and aquatic habitat.	Habitat for vegetation, amphibian and water fowl is designed and installed to enhance connectivity across the landscape. Optimal habitat is designed, installed and maintained and includes depression, dams and creek lines. Habitat is developed using common native rushes /sedges in unshaded locations, free from predatory fish, nearby grassland and sheltering sites of vegetation and rocks.	
Biodiversity Offset Strategy is implemented	Plant species selection.	Plant species are used which create suitable habitat for woodland birds e.g. flaky bark, production of small and large sized woody debris, diversity of flowering time.	EMS Procedures.

Criteria	Performance Measure	Performance Indicator	Justification/Source
in accordance with that as described in the Project Approval.	Research into management of growing media related to the development of Box-Gum Grassy Woodland.	Research program is developed to assess the key components and requirements of the growing media of the Box-Gum Grassy Woodland.	<i>Guidelines for the Translocation of Threatened Plants in Australia</i> (Australian Network for Plant Conservation) Project Approval NSW Dept of Planning (Sept 2010)- Condition 44(d) <i>NSW Threatened Species Conservation Act</i>
	Management of Weeping Myall (<i>Acacia pendula</i>).	Implement a research program in terms of the optimising growing conditions and reproductive process for <i>Acacia pendula</i> .	
	Seed collection, storage and utilisation of grass and forb species.	Research program is developed to define the seed collection, storage and utilisation of grass and forb species. Revegetation programs will include the use of direct seeding, tubestock planting and transplanting techniques aligned to the known germination requirements of the plant species.	
	Management of Lobed Blue-grass (<i>Bothriochloa biloba</i>).	Define known areas of Lobed Blue-grass with data captured on the Mt Arthur Coal GIS.	
	Propagation of Tiger Orchid (<i>Cymbidium canaliculatum</i>).	On site research or industry knowledge reviewed and site program developed to define the propagation requirements for the Tiger Orchid.	

Criteria	Performance Measure	Performance Indicator	Justification/Source
Ongoing management requirements	Resource allocation.	500ha of Box-Gum Grassy Woodland vegetation established on the site. Visual screens comprising trees and shrubs are established along public roads including Thomas Mitchell Drive, Denman Road and Edderton Road to minimise visual and lighting impacts.	<i>Mt Arthur Coal Consolidation Project Environmental Assessment</i> (Hansen Bailey, 2009). Draft National Recovery Plan for White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland (Department of Environment, Climate Change and Water NSW, Sydney 2010).
Post mining land ownership is aligned to post mining land use.	Long term security measures aligned to land ownership.	Long term security for Mt Arthur Conservation Area, Saddlers Creek Conservation Area and Thomas Mitchell Drive Off-Site and On-Site Offset Areas by the end of September 2012.	Project Approval NSW Dept of Planning (Sept 2010).
		Long term security for Additional Off-Site Offset Area by the end of September 2014.	
Aboriginal heritage.	No conflict between rehabilitation works / biodiversity and Aboriginal cultural heritage.	Site is managed according to the Pre-clearance Survey Procedure.	<i>Mt Arthur Coal Archaeology and Cultural Heritage Management Plan.</i>

Criteria	Performance Measure	Performance Indicator	Justification/Source
<p>Pasture species mix aligned to preferred land capability and pasture productivity.</p>	<p>Agricultural area to be assessed in terms of providing alternative employment opportunities i.e. carrying capacity, beef cattle husbandry.</p>	<p>Research trials completed to determine whether strategic grazing is a suitable management tool for biodiversity offset and conservation areas and, if suitable, an appropriate management regime for the grazing program.</p> <p>Stock are excluded from areas of rehabilitation until the area has been stabilised.</p>	<p>EMS Procedures. <i>Draft National Recovery Plan for White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland</i> (Department of Environment, Climate Change and Water NSW, Sydney 2010).</p>
<p>Final land use is consistent with surrounding land function and land use requirements.</p>		<p>Stock should not be introduced to high quality remnants that have not been historically grazed.</p> <p>Grazing managers aim to promote a spatially variable, structurally complex grassland structure; uniformly short, closely-cropped ‘grazing lawns’ are to be avoided.</p> <p>Intensive grazing over short periods (mob or crash grazing) interspersed by lengthy rest periods is to be applied.</p>	
<p>Final land use addresses the limitations of land capability and growing media.</p>		<p>Fertilisers are not to be applied and exotic pasture species are not be sown.</p> <p>Monitoring of areas of grassland aligned to pasture includes assessment of ground cover, carrying capacity, species diversity.</p> <p>Rotational cattle grazing provides an effective management option for improving pasture through increasing species diversity by reducing weed infestations and limiting potential fire hazards.</p> <p>Stocking rates are reduced during periods of prolonged drought to ensure pasture species survival.</p> <p>Stocking program incorporates consideration of flower/seeding times of native grass species.</p> <p>Estimated stocking rates are reviewed in areas showing indications of regenerating important ecological communities.</p> <p>Knowledge of the nutritional requirements of various livestock classes assists in matching pasture feed supply to livestock</p>	

Criteria	Performance Measure	Performance Indicator	Justification/Source
		requirements from the seasonal range of pasture available. Traffic and stock are excluded from areas of remnant vegetation unless on designated tracks or emergency traffic.	

2.5 Ecosystem and Landuse Sustainability

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

- Development of functional soil horizons in the growing media;
- Development of land usage which is consistent with surrounding areas and mine objectives;
- Vegetation communities capable of recovering from 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 fauna species;
- Natural recolonisation by invertebrates; and
- Suitable Land Capability classes.

In this context the key domains as shown on

Figure and are:

- Infrastructure Areas;
- Water Management Areas;
- Woodland;
- Pasture; and
- Non-Operational Lands.

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 10.

Figure 7: Ecosystem and Landuse Sustainability

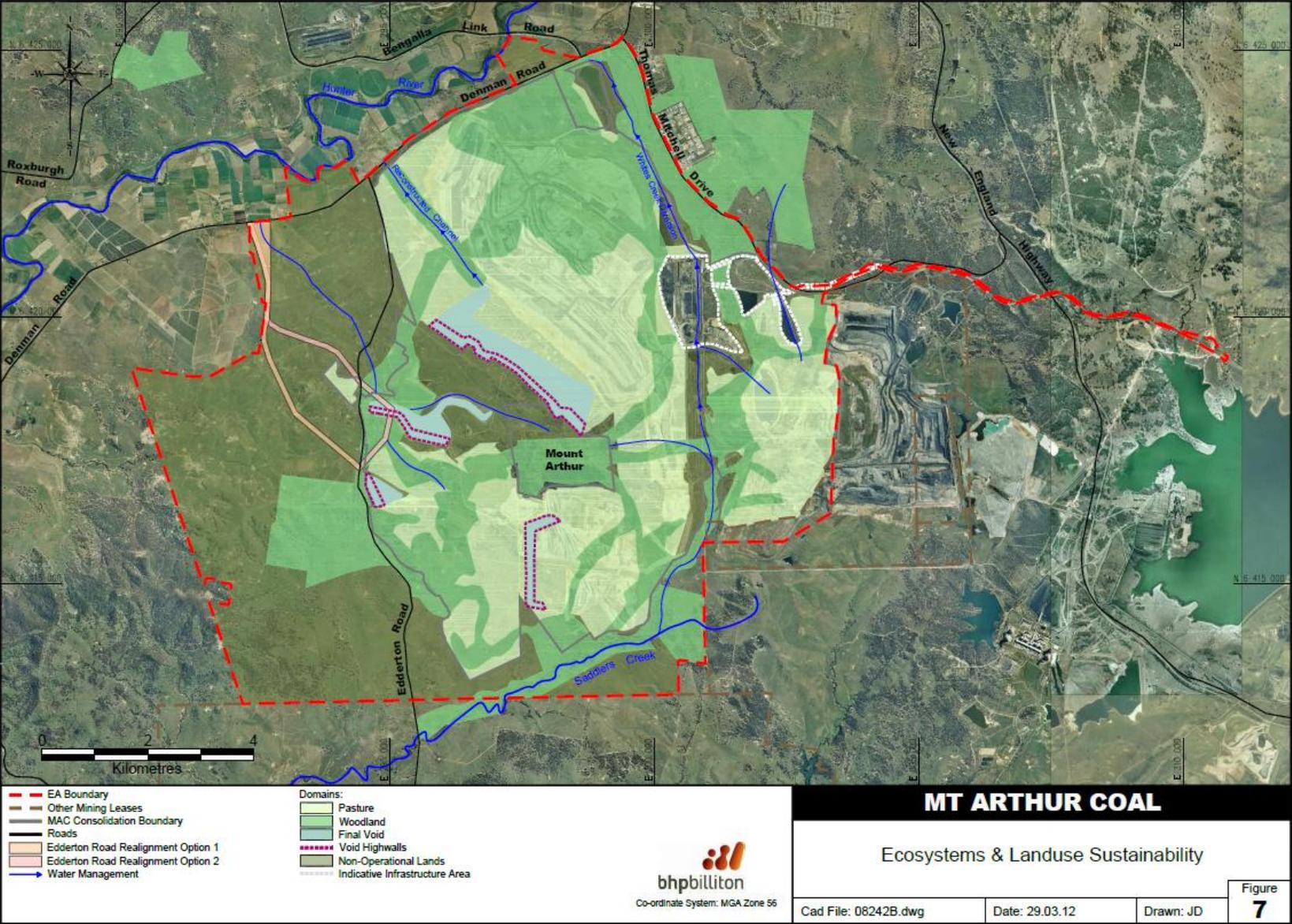


Table 10: Ecosystem and Landuse Sustainability

Criteria	Performance Measure	Performance Indicator	Justification/Source
All Domains, excluding Infrastructure Areas			
Landuse is aligned to adjoining land usage – present and likely future.	Consistency of final landuse with surrounding landuses.	Final landuse takes into account local and regional initiatives.	Muswellbrook Council LEP.
Landuse is planned to provide social and economic value to the local and wider community whilst not negatively.	Incorporate landuse in terms of optimal social and economic benefit to the local and wider community.	Land usage options obtain optimal economic and social return whilst minimising environmental impact.	CSIRO Methodology for Ecosystem Function Analysis (EFA) (Tongway, 2004).
Landuse will be aligned to the relevant land zonings as per the current Muswellbrook Local Environment Plan.	Landuse options are assessed in terms of planning constraints.	Data is recorded in the AEMR on community capacity building in terms of: <ul style="list-style-type: none"> • Number of employees; • Community assistance program – aligned at building capacity in the local region; • Community partnerships; and • Donations and sponsorships. 	<i>Mt Arthur Coal Complex Open Cut Mining Operations Plan FY2012 – FY2013</i> (MAC, 2011).
Final land use considers local and regional initiatives from consultation.		Final landuse is compatible with surrounding land function and landuse requirements.	<i>Mt Arthur Coal Complex Rehabilitation Strategy</i> (MAC, 2011).
		Final landuse addresses the limitations of land capability and growing media.	<i>Mt Arthur Coal Flora and Fauna Management Plan.</i>
		Landuse will be aligned to the relevant land zonings as per the current Muswellbrook Local Environment Plan.	

Criteria	Performance Measure	Performance Indicator	Justification/Source
<p>Ecosystem resilience, health and composition are monitored in rehabilitated and established landscapes.</p>	<p>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.</p>	<p>The methodology used to undertake site monitoring is Ecosystem Function Analysis (EFA) or other similar and acceptable methodology.</p>	
	<p>Monitoring of areas where weed and feral animal control has been implemented.</p>	<p>Weeds (in terms of density and key species) and pest animal species (in terms of damage) are broadly comparable to baseline or reference site.</p>	
	<p>Monitoring of the placement and utilisation of habitat features and artificial roosting/nesting boxes.</p>	<p>Record utilisation of nest boxes.</p>	
	<p>Species density – overstorey and midstorey.</p>	<p>Selective thinning, with consideration of life cycle and self thinning, is undertaken in rehabilitated areas so plant density is comparable to analogue sites.</p>	
	<p>Groundcover</p>	<p>Ground cover is to achieve a minimum Landscape Function Analysis (LFA) Landscape Organisation Indicator (LOI) of 50, over areas of Box-Gum Grassy Woodland. Areas of bare ground are broadly comparable to reference site.</p>	

Criteria	Performance Measure	Performance Indicator	Justification/Source
	<p>Monitoring may include consideration of growing media including assessment of:</p> <ul style="list-style-type: none"> - Soil pH, salinity, cation exchange capacity (CEC) , exchangeable sodium capacity (ESP) , nitrogen, potassium and phosphorous; and - Leaf litter. 	<p>Salinity, cation exchange capacity (CEC) , exchangeable sodium capacity (ESP) , nitrogen, potassium and phosphorous and leaf litter are within the range required to allow plant growth for Box-Gum Grassy Woodland species or broadly compared to reference site.</p>	
	<p>Risks associated with the implementation of a sustainable rehabilitation program (including post mining lands) are defined and contingencies defined to address these risks.</p>	<p>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.</p> <p>Risk is assessed in terms of:</p> <ul style="list-style-type: none"> - woody species density; - species richness; - canopy cover; - soil nutrients; - soil stability, and - water infiltration. 	
<p>Ecosystem resilience, health and composition are monitored in rehabilitated and established landscapes.</p>	<p>The ecosystem is in a condition comparable to the vegetation of the reference site.</p>	<p>The data on live species, healthy species, trees with dieback, dead species, and species flowering is comparable to reference sites.</p>	
	<p>The vegetation is comprised of a range of growth forms which is comparable to the vegetation in reference site.</p>	<p>Growth form of trees, shrubs, grasses, forbs is comparable to reference sites with consideration of variable factors between reference and rehabilitation sites.</p>	

Criteria	Performance Measure	Performance Indicator	Justification/Source
	The ecosystem is developing in structure and complexity comparable to the vegetation in reference site.	Projected foliage cover at various strata is comparable to reference sites with due consideration to stage of growth and maturity of the 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 Pre-clearance Survey Procedure. Weed control programs include consideration of the potential impact that herbicides designed to control woody weeds may have on mature paddock trees	
Ongoing management requirements.	.	.	
	Continual review of new technologies and research.	Rehabilitation programs use lead practice technology and incorporate recent research findings.	
Pasture			
Pasture species mix aligned to preferred land capability and pasture productivity.	Maintenance program in place for the management of fertiliser/weed control and pasture productivity. Agricultural landscape are sustainable in terms of stock handling facilities, stock water supplies and pasture health.	Soil physical and chemical parameters are broadly within the range required to allow plant growth for Box –Gum Grassy Woodland species. Noxious and key weed species densities are broadly comparable or less than reference sites. Stock watering dams are provided where appropriate. Assessment of the site productivity is undertaken based on Potential Carrying Capacity in Dry Sheep Equivalent (DSE)	<i>Sustainable Carrying Capacity - Monitoring Tools</i> (Victorian DPI, 2005). <i>Beef Stocking rates and farm size – Hunter Region</i> (NSW DPI 2006).

3.0 Monitoring and Reporting

The post closure monitoring and measurement program will be similar to that undertaken during the operation of the mine. This may be scaled back to focus on those aspects of the site that have the potential to cause pollution or that are designated indicators of the success or failure of the rehabilitation works.

The monitoring program will be designed to demonstrate that performance criteria have been met. This program will generate 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:

- Amendments to the Environmental Management System which incorporates components of the monitoring and reporting program;
- Incident reporting mechanism;
- Annual Environmental Management Report (AEMR);
- Independent Environmental Audit; and
- Data obtained from the monitoring using the CSIRO developed Landscape Functional Analysis methodology.

Post closure monitoring will be undertaken in line with the monitoring programme until relinquishment of the mining lease or until such a time that data collection demonstrated the site was on a sustainable path of trajectory to a sustainable ecosystem and/or landuse.

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 Environment & Community Manager with support from the Environmental Superintendent. 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 the effectiveness of habitat creation for target fauna species.

Where necessary, rehabilitation procedures will be amended according to the above continuous improvement feed-back strategy and in line with continually improving rehabilitation standards.

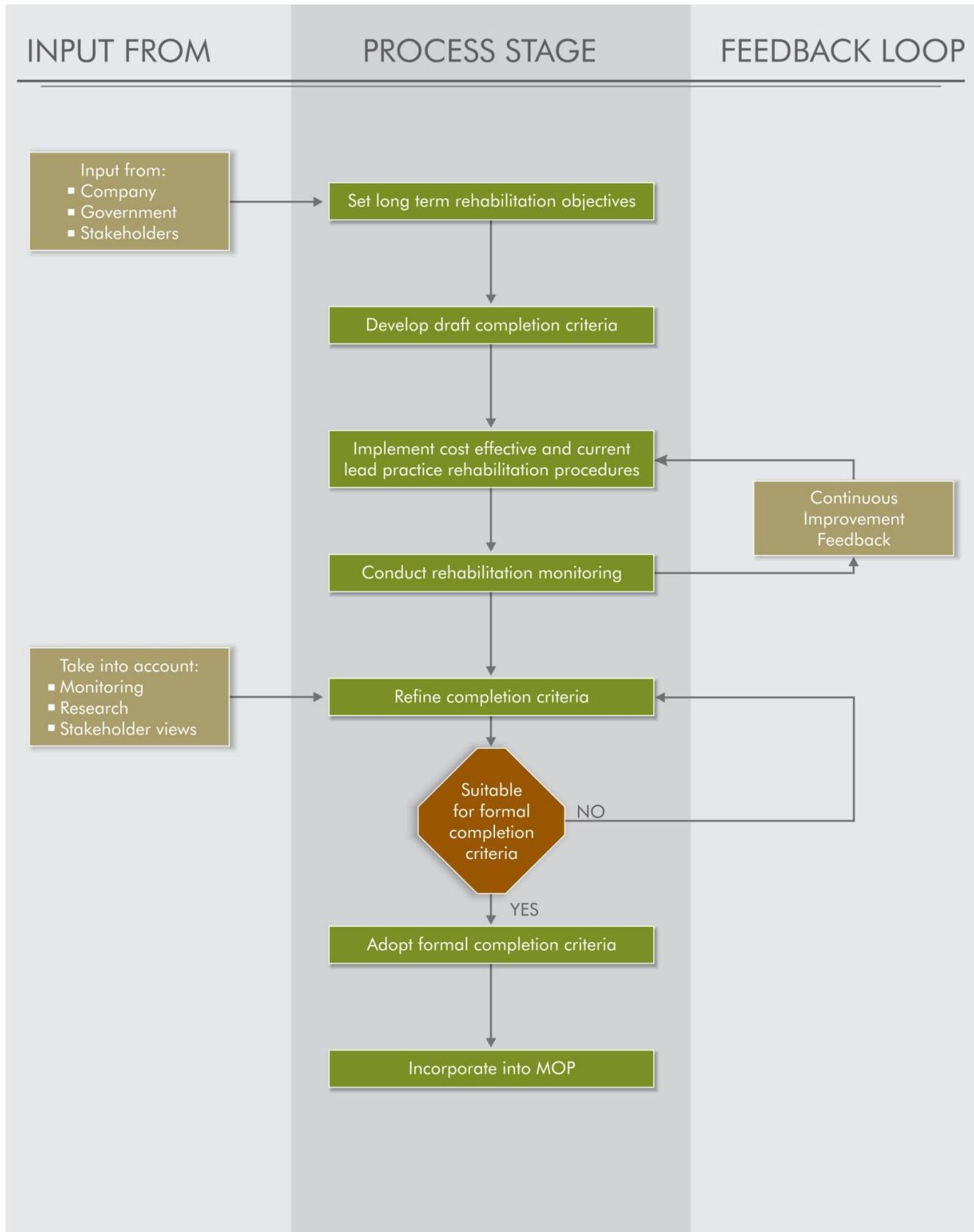
Details on the monitoring strategies include:

- Specifications for Ecosystem Functional Analysis or alternative assessment – Appendix 2;
- Visual Assessment of Revegetated Areas – Appendix 3; and
- Assessment of Potential Carrying Capacity - Appendix 4.

3.2 Effectiveness of Management Measures

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 years. In this context Mt Arthur Coal has considerable previous and on-site experience to draw upon. 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 (based on Nichols, 2005).

Figure 8: Continuous Improvement including Monitoring and Review Processes (based on Nichols 2005)



4.0 Risk Assessment and Contingencies

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 BHP Billiton HSEC Risk Assessment Tools – Quantitative Risk Assessment Matrix (Table 11), Consequence Table (Table 12) and Likelihood Table (Table 13). Appendix E of the EA (Hansen Bailey, 2009) provides an Environmental Risk Assessment of the Mt Arthur Coal Consolidation Project. The relevant issues for site rehabilitation, biodiversity and land management have been extracted and are shown in Table 14.

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

Table 15.

Table 11: Quantitative Risk Assessment Matrix

Likelihood or Frequency	Consequence Severity				
	Low (1)	Minor (2)	Moderate (3)	Major (4)	Critical (5)
E – Almost Certain	High	High	Extreme	Extreme	Extreme
D – Likely	Moderate	High	High	Extreme	Extreme
C – Possible	Low	Moderate	High	Extreme	Extreme
B – Unlikely	Low	Low	Moderate	High	Extreme
A - Rare	Low	Low	Moderate	High	High

Table 12: Consequence Table

Severity Level	Natural Environment	Social/Cultural Heritage	Community/ Government/ Reputation/ Media
1	Limited damage to minimal area of low significance	Low-level repairable damage to commonplace structures	Public concern restricted to local complaints
2	Minor effects on biological or physical environment	Minor medium-term social impacts on local population. Minor damage to structures/ items of some significance. Mostly repairable	Minor, adverse local public or media attention and complaints
3	Moderate, short-term effects but not affecting ecosystem functions	On-going social issues. Permanent damage to items of cultural significance	Attention from media and/ or heightened concern by local community. Criticism by NGOs
4	Serious medium term environmental effects	On-going serious social issues. Significant damage to structures/ items of cultural significance	Significant adverse national media/ public/ NGO attention
5	Very serious, long term environmental impairment of ecosystem function	Very serious, widespread social impacts. Irreparable damage to highly valued items	Serious public or media outcry (international coverage)

Table 13: Likelihood Table

A – Almost Certain	Occurs 1 or more times a year
B – Likely	Occurs once every 1-10 years
C – Possible	Occurs once every 10-100 years
D – Unlikely	Occurs once every 100-1,000 years
E – Rare	Occurs once every 1,000-10,000 years

Table 14: Mt Arthur Coal Consolidation Project – Environmental Risk Assessment – Key Risks Associated with Site Rehabilitation, Biodiversity and Land Management (Extract of Appendix E of EA (Hansen Bailey, 2009))

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Control Measures	Revised Risk Assessment		
			C	L	R		C	L	R
Air Quality	Vegetation clearing, drilling and topsoil stripping	Windblown dust	3	C	H	Disturb only the minimum area necessary for mining. Reshape, topsoil and rehabilitate completed overburden emplacement areas as soon as practicable after the completion of overburden placement. Any obsolete roads will be ripped and revegetated. Access tracks used by topsoil stripping scrapers during their loading and unloading cycle will be watered. Topsoil stripping will not occur in dry dusty conditions. Long term topsoil stockpiles, not used for over 6 months, will be revegetated.	3	C	H
	Overburden emplacement		3	C	H		3	C	H
Change in Landscape	Overburden Stockpile Dumps	Visual	2	E	H	Visual Impacts Assessment has been completed, which assessed impacts and identified mitigation and management measures. Mt Arthur Coal to maintain a visual bund constructed to screen views of the mining operation from South Muswellbrook. A Landscape Management Plan that will specify control measures to reduce the visibility of the operation off-site will continue to be applied.	1	E	H
	Exposed Earthworks		2	E	H		1	E	H

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Control Measures	Revised Risk Assessment		
Ecology	Vegetation clearing, drilling and topsoil stripping	Loss of biodiversity and disruption to threatened flora and fauna habitats	2	E	H	<p>Development of a Compensatory Habitat Area of 717 hectares of Offset Area and 500 hectares of regenerated woodland consisting of native endangered ecological communities, including Upper Hunter White Box – Ironbark Woodland, Hunter Floodplain Red Gum Woodland, Central Hunter Bullock Forest Regeneration, and extensive areas of Native Derived Grassland.</p> <p>Mine rehabilitation areas returning to Box-Gum Grassy Woodland will be replanted/sown with local native plant species.</p> <p>Ongoing ecological monitoring to provide feedback about the condition of vegetation at Mt Arthur Coal.</p> <p>The Tiger Orchid will be translocated to a conservation area; nest boxes will be erected to make up for the loss of nest boxes within extension areas.</p> <p>Pre-clearance surveys will be conducted within all patches of forest and woodland to be cleared and flora and fauna of conservation significance detected will be translocated into protected habitat.</p>	1	E	H
Water Management	Topsoil stripping, haul roads, un-rehabilitated spoil	Dirty water runoff entering local waterways	2	C	M	Mt Arthur Coal will continue to manage surface water in accordance with the approved Water Management Plan which prescribes the system to effectively source, capture, divert, store, monitor, utilise and reticulate water on site.	2	C	M

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Control Measures	Revised Risk Assessment		
Mine Rehabilitation	Topsoil stripping and land preparation	Loss of productive topsoil	3	C	H	A Soils and Land Capability Impact Assessment has been completed for the Project by GSS Environmental. The assessment reviewed the soil types within the proposed mining areas, identified any soil materials with potentially adverse quality (e.g. acid sulphate generating), identified the suitability of topsoils for use as topdressing material and identified mitigation and management measures for the Project.	3	C	H
		Deterioration of land capability	3	C	H		2	D	H
	Rehabilitation	Erosion	2	D	H	Progressive rehabilitation at Mt Arthur Coal will continue to be undertaken in accordance with approved Landscape and Revegetation Management Plans, focusing on utilising a mixture of improved pasture and grasses and native trees and shrubs.	1	B	L
		Invasion of Weed Species	1	B	L		1	B	L
		Invasion of feral animals	1	B	L		2	A	L
	Final Landform	Acid Rock Drainage	2	A	L	The proposed mine plan for the Project will allow the development of an undulating, free-draining and stable landform generally consistent with the	2	B	L
		Unstable Landform	2	B	L		2	B	L
		Poor Drainage	2	B	L		2	C	M

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Control Measures	Revised Risk Assessment		
		Erosion	2	C	M	surrounding environment Detail in regard to the revision of biodiversity corridors and final landform is provided in the EA. Rehabilitation at Mt Arthur Coal is designed to be compatible with the surrounding landform, stable and able to support final land use(s). To ensure a stable final landform, the majority of overburden emplacement slopes are shaped to 10 degrees or less. The long-term rehabilitation strategy will be revised for the Project.	1	C	L

Table 15: Key Risks Associated with Site Rehabilitation, Landuse & Land Management – Community Trust

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Control Measures	Revised Risk Assessment		
			C	L	R		C	L	R
Post mining landuse	Building capacity for local community.	No net value to local community.	3	C	H	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.	3	C	H
Performance criteria	New regulatory requirements or evolving community expectations.	Leads to difficulties negotiating or attaining performance criteria.	3	C	H	Monitor trends and developments in legislation and changes to community expectations.	3	C	H

5.0 Review and Implementation

5.1 Review

The following Section provides the Protocol for periodic review of this 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 to six months of the submission of an:

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

This 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 Management Plan;
- Significant change in the activities or operations associated with Mt Arthur Coal; and
- Following updating of the Mining Operations Plan.

This B&RMP will be progressively amended as required by the Mt Arthur Coal EMS. Any significant 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 may be made with version control on the MAC website.

5.2 Implementation

Table 16 defines personnel who are responsible for the monitoring, review and implementation of this B&RMP.

Table 16: Responsibilities for Implementation of this B&RMP

Title	Responsibility
Mine Manager/Manager Contract Mining and Technical Services Manager	Assist, where relevant, to implement the procedures referenced in this Management Plan. Provide resources required and support to implement these procedures. Allow for forward planning to prepare and bulk shape areas.

Title	Responsibility
Environment & Community Manager	<p>Prepare the relevant Management Plans and implement, monitor and review the programs and procedures linked to this Management Plan.</p> <p>Consult with regulatory authorities as required.</p> <p>Undertake monitoring as required.</p> <p>Undertake maintenance as required.</p> <p>Provide provisions to engage expertise assistance as required.</p> <p>Provide measures for ongoing review to this Management Plan and procedures where required.</p> <p>Report the progress of any rehabilitation and monitoring of biodiversity in the AEMR.</p>
Environmental Superintendent	<p>Provide support for the implementation of the Environment & Community Manager responsibilities.</p>

6.0 References

- Australian and New Zealand Minerals and Energy Council (ANZMEC) and Minerals Council of Australia (MCA) (2000). *Strategic Framework for Mine Closure*, (ANZMEC & MCA).
- Australian Standard 2601-2001 *The Demolition of Structures*.
- Department of Environment, Climate Change and Water (February 2010) *NSW National Recovery Plan White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland A critically endangered ecological community Draft for Public Comment*.
- Hansen Bailey (2009) *Mt Arthur Coal Consolidation Project Environmental Assessment. Prepared for Hunter Valley Energy Coal Pty Ltd*.
- I&I (June 2010). *Rehabilitation and Environmental Management Plan (REMP) Guidelines. Consultation Draft V2.0*. NSW Government Industry and Investment, Minerals and Energy Division, Mineral Resources Branch.
- Landcom (2006) *Managing Urban Stormwater: Soils and Construction*.
- Mt Arthur Coal Annual Environmental Management Report (2010)*.
- Mt Arthur Coal Complex (MAC 2011). Open Cut Mining Operations Plan FY2012 – FY2013*.
- Mt Arthur Coal Complex (2011) Rehabilitation Strategy MAC-ENC-MTP-047*.
- Mt Arthur Coal MAC-ENC-PRO-012 – Clearing and Topsoil Stripping*.
- Mt Arthur Coal MAC-ENC-MTP-034 Site Water Management Plan*
- Mt Arthur Coal MAC-ENC-PRO-060 Erosion & Sediment Control Plan*
- Mt Arthur Coal MAC-ENC-PRO-034- Waste Handling and Disposal*.
- Mt Arthur Coal Archaeology and Cultural Heritage Management Plan*.
- Mt Arthur Coal (2010) Bushfire Management Plan*.
- Mt Arthur Coal Flora and Fauna Management Plan*.
- Mt Arthur Coal Soil Stripping Management Plan*.
- Muswellbrook Shire Council (Aug 2011). *Draft Mining Rehabilitation Policy (Policy No. M40/1)*.
- Muswellbrook Shire Council *Local Environment Plan*.
- 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.
- NSW Department of Mineral Resource (2006) *Emplacement Area Applications – Guidance Notes*.
- NSW Department of Planning (Sept 2010) *Project Approval 09_0062 Hunter Valley Energy Coal Pty Ltd*.
- NSW Department of Trade & Investment *Rehabilitation Cost Estimate Guidelines – ESG1*.
- NSW Department of Trade & Investment *Guidelines to the Mining, Rehabilitation and Environmental Management Process - EDG03*.
- NSW DPI (2006) *Beef Stocking rates and farm size – Hunter Region*.

Tongway, D (2004). *CSIRO Methodology for Ecosystem Function Analysis (EFA)*.

Victorian DPI (2005) *Sustainable Carrying Capacity - Monitoring Tools*.

7.0 Acronyms

ACM	Asbestos-containing material
AEMR	Annual Environmental Management Report
Box-Gum Grassy Woodland	White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland
B&RMP	Biodiversity and Rehabilitation Management Plan
CCC	Mt Arthur Coal Community Consultative Committee
CEEC	Commonwealth EPBC Act listed Critically Endangered Ecological Community
CHPP	Coal Handling Preparation Plant
DP&I	NSW Department of Planning and Infrastructure
DSE	Dry Sheep Equivalent
EA	Environmental Assessment titled <i>Mt Arthur Coal Consolidation Project Environmental Assessment</i> (6 volumes), dated November 2009, including the Response to Submissions
EC	Electrical conductivity
EEC	NSW TSC Act listed Endangered Ecological Community
EFA	Ecosystem Function Analysis
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EMS	Environmental Management System
GIS	Geographical Information System
HVEC	Hunter Valley Energy Coal Pty Ltd
I&I NSW	NSW Department of Industry and Investment
ISO	International Standards Organisation
LEP	Muswellbrook Local Environment Plan
LFA	Landscape Function Analysis
LOI	Landscape Organisation Index
MSC	Muswellbrook Shire Council
NOW	NSW Office of Water, within the Department of Primary Industries
OEH	Office of Environment and Heritage
PCB	Polychlorinated biphenyls
ROM	Run of Mine
TSC Act	<i>Threatened Species Conservation Act 1995</i>
TSF	Tailings Storage Facility
VEC	NSW TSC Act listed Vulnerable Ecological Community

Appendix 1

Alignment to Project Approval Conditions

Project Approval Condition	Requirement	Section/s of the B&RMP																											
Schedule 3, Condition 36	<p>Biodiversity Offsets</p> <p>The Proponent shall implement the biodiversity offset strategy outlined in Table 16 and as generally described in the EA (and shown conceptually in Appendix 8 (of the Project Approval)), to the satisfaction of the Director-General.</p> <p>Table 16: Biodiversity Offset Strategy</p> <table border="1" data-bbox="405 831 1834 1382"> <thead> <tr> <th>Area</th> <th>Offset Type</th> <th>Minimum Size (hectares)</th> </tr> </thead> <tbody> <tr> <td>Mt Arthur Conservation Area</td> <td>Existing Vegetation</td> <td>105</td> </tr> <tr> <td>Saddlers Creek Conservation Area</td> <td>Existing Vegetation</td> <td>295</td> </tr> <tr> <td>Thomas Mitchell Drive Off-site Offset Area</td> <td>Existing vegetation and vegetation to be established</td> <td>495</td> </tr> <tr> <td>Thomas Mitchell Drive On-site Offset Area</td> <td>Vegetation to be established</td> <td>222</td> </tr> <tr> <td>Roxburgh Road 'Constable' Offset Area</td> <td>Existing vegetation and vegetation to be established</td> <td>110</td> </tr> <tr> <td>Additional Off-site Offset Area*</td> <td>Existing vegetation and vegetation to be established</td> <td>165</td> </tr> <tr> <td>Rehabilitation Area**</td> <td>Vegetation to be established</td> <td>1,915</td> </tr> <tr> <td>TOTAL</td> <td></td> <td>3,307</td> </tr> </tbody> </table> <p>* See condition 37 ** See condition 42(f)</p>	Area	Offset Type	Minimum Size (hectares)	Mt Arthur Conservation Area	Existing Vegetation	105	Saddlers Creek Conservation Area	Existing Vegetation	295	Thomas Mitchell Drive Off-site Offset Area	Existing vegetation and vegetation to be established	495	Thomas Mitchell Drive On-site Offset Area	Vegetation to be established	222	Roxburgh Road 'Constable' Offset Area	Existing vegetation and vegetation to be established	110	Additional Off-site Offset Area*	Existing vegetation and vegetation to be established	165	Rehabilitation Area**	Vegetation to be established	1,915	TOTAL		3,307	This B&RMP details how the offsets will be managed.
Area	Offset Type	Minimum Size (hectares)																											
Mt Arthur Conservation Area	Existing Vegetation	105																											
Saddlers Creek Conservation Area	Existing Vegetation	295																											
Thomas Mitchell Drive Off-site Offset Area	Existing vegetation and vegetation to be established	495																											
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Additional Off-site Offset Area*	Existing vegetation and vegetation to be established	165																											
Rehabilitation Area**	Vegetation to be established	1,915																											
TOTAL		3,307																											

Project Approval Condition	Requirement	Section/s of the B&RMP
Schedule 3, Condition 38	<p>The Proponent shall ensure that the offset strategy and/or rehabilitation strategy is focused on the re-establishment of:</p> <p>(a) Significant and/or threatened plant communities, including:</p> <ul style="list-style-type: none"> • Upper Hunter White Box – Ironbark Grassy Woodland; • Central Hunter Box – Ironbark Woodland; • Central Hunter Ironbark – Spotted Grey-Gum Box Forest; • Narrabeen Foothills Slaty Box Woodland; • Hunter Floodplain Red Gum Woodland Complex; and <p>(b) Significant and/or threatened plant species, including:</p> <ul style="list-style-type: none"> • Lobed Blue-grass (<i>Bothriochloa biloba</i>); • Tiger Orchid (<i>Cymbidium canaliculatum</i>); • Weeping Myall (<i>Acacia pendula</i>); and <p>(c) Habitat for significant and/or threatened animal species.</p>	Section 2.0 Performance Criteria, Measures and Indicators
Schedule 3, Condition 40	<p>Biodiversity Management Plan</p> <p>The Proponent shall prepare and implement a Biodiversity Management Plan for the project to the satisfaction of the Director-General. This plan must:</p> <p>a) Be prepared in consultation with OEH, NOW and Council, and be submitted to the Director-General for approval by the end of March 2012;</p> <p>b) Describe how the implementation of the offset strategy would be integrated with the overall rehabilitation of the site (see below);</p> <p>c) Include:</p> <p>i. a description of the short, medium, and long term measures that would be implemented to:</p>	<p>Section 1.0 Introduction</p> <p>Section 2.0 Performance Criteria, Measures and Indicators</p> <p>Section 2.0</p>

Project Approval Condition	Requirement	Section/s of the B&RMP
	<ul style="list-style-type: none"> implement the offset strategy; manage the remnant vegetation and habitat on the site and in the offset areas; 	Performance Criteria, Measures and Indicators
	ii. detailed performance and completion criteria for the implementation of the offset strategy;	Section 2.0 Performance Criteria, Measures and Indicators
	iii. a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for:	
	<ul style="list-style-type: none"> implementing revegetation and regeneration within the disturbance areas and offset areas, including establishment of canopy, sub-canopy (if relevant), understorey and ground strata; 	Section 2.0 Performance Criteria, Measures and Indicators
	<ul style="list-style-type: none"> protecting vegetation and soil outside the disturbance areas; 	
	<ul style="list-style-type: none"> rehabilitating creeks and drainage lines on the site (both inside and outside the disturbance areas), to ensure no net loss of stream length and aquatic habitat; 	
	<ul style="list-style-type: none"> managing salinity; 	
	<ul style="list-style-type: none"> conserving and reusing topsoil; 	
	<ul style="list-style-type: none"> undertaking pre-clearance surveys; 	
	<ul style="list-style-type: none"> managing impacts on fauna; 	
	<ul style="list-style-type: none"> landscaping the site and along public roads (including Thomas Mitchell Drive, Denman Road, Edderton Road and Roxburgh Road) to minimise visual and lighting impacts; 	Landscape Management Plan
	<ul style="list-style-type: none"> collecting and propagating seed; 	Section 2.0 Performance Criteria, Measures and Indicators
	<ul style="list-style-type: none"> salvaging and reusing material from the site for habitat enhancement; 	
	<ul style="list-style-type: none"> salvaging, transplanting and/or propagating threatened flora and native grassland; 	
<ul style="list-style-type: none"> controlling weeds and feral pests; 		

Project Approval Condition	Requirement	Section/s of the B&RMP
	<ul style="list-style-type: none"> • managing grazing and agriculture on site; • controlling access; and • bushfire management; <p>iv. a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;</p> <p>v. 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</p> <p>vi. details of who would be responsible for monitoring, reviewing, and implementing the plan.</p>	<p>Section 3.0 Monitoring and Reporting</p> <p>Section 4.0 Risk Assessment and Contingencies</p> <p>Section 5.0 Review and Implementation</p>
<p>Schedule 3, Condition 42</p>	<p>The Proponent shall prepare a Rehabilitation Strategy for the project to the satisfaction of the Director-General. This strategy must:</p> <p>(a) be prepared by a team of suitably qualified and experienced persons whose appointment has been endorsed by the Director-General, and be submitted to the Director-General for approval by the end of September 2011;</p> <p>(b) be prepared in consultation with relevant stakeholders, including I&I NSW, Council and the CCC;</p> <p>(c) investigate options for the future use of disturbed areas including voids upon the completion of mining;</p> <p>(d) describe and justify the proposed rehabilitation strategy for the site, including the final landform and use;</p> <p>(e) define the rehabilitation objectives for the site, as well as the proposed completion criteria for this rehabilitation; and</p> <p>(f) provide for at least 30% of the disturbance area for open cut operations at the Mt Arthur mine complex to be rehabilitated to woody vegetation.</p> <p><i>Note: The strategy should build on the concept strategy depicted in Appendix 8.</i></p>	<p>Rehabilitation Strategy (MAC, 2011)</p>

Project Approval Condition	Requirement	Section/s of the B&RMP
Schedule 3, Condition 43	Progressive Rehabilitation The Proponent shall:	
	(a) carry out rehabilitation progressively, that is, as soon as reasonably practicable following disturbance (particularly on the face of emplacements that are visible off-site); and	Section 2.0 Performance Criteria, Measures and Indicators
	(b) achieve the rehabilitation objectives in the Rehabilitation Strategy (see condition 42), to the satisfaction of the Director-General of I&I NSW.	Rehabilitation Strategy (MAC, 2011)
Schedule 3, Condition 44	Rehabilitation Management Plan The Proponent shall prepare and implement a Rehabilitation Management Plan for the project to the satisfaction of the Director-General of I&I NSW. This plan must:	
	(a) be prepared in consultation with the Department, OEH, NOW, Council and the CCC, and be submitted to the Director-General of I&I NSW for approval by the end of March 2012;	Section 1.0 Introduction
	(b) be prepared in accordance with the relevant I&I NSW guideline, and be consistent with the Rehabilitation Strategy (see condition 42);	
	(c) build, to the maximum extent practicable, on the existing management plans required under this approval; and	
	(d) include a research program that seeks to improve the understanding and application of rehabilitation techniques and methods in the Hunter Valley.	Section 2.0 Performance Criteria, Measures and Indicators

Project Approval Condition	Requirement	Section/s of the B&RMP
Schedule 5, Condition 4	<p>Revision of Strategies, Plans and Programs</p> <p>Within 3 months of the submission of an:</p> <ul style="list-style-type: none"> (a) annual review under condition 3 above; (b) incident report under condition 7 below; (c) audit under condition 9 below; and (d) any modification to the conditions of this approval, <p>the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.</p> <p>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 project.</p>	Section 5.0 Review and Implementation
Schedule 5, Condition 11	<p>Access to Information</p> <p>From the end of December 2010, the Proponent shall:</p> <ul style="list-style-type: none"> (a) make the following information publicly available on its website: <ul style="list-style-type: none"> • a copy of all current statutory approvals for the project; • a copy of the current environmental management strategy and associated plans and programs; • a summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval; • a complaints register, which is to be updated on a monthly basis; • a copy of the minutes of CCC meetings; • a copy of any Annual Reviews (over the last 5 years); • a copy of any Independent Environmental Audit, and the Proponent’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. 	www.bhpbilliton.com

Project Approval Condition	Requirement	Section/s of the B&RMP
Appendix 3, Statement of Commitments	<p>Ecology</p> <p>15. The mine rehabilitation program will focus on the re-establishment of 500 hectares of White Box – Yellow Box – Blakely’s Red Gum Woodland</p>	Section 2.0 Performance Criteria, Measures and Indicators
	<p>16. Within four years from the date of Project Approval, Mt Arthur Coal will acquire an additional minimum of 165 hectares of land to be permanently conserved as offsets to help compensate for the total ecological impacts of the project. The flora and fauna values on the additional land are to further contribute to the compensation for the ecological impacts of the project. The additional land for the offset package will be surveyed by the proponent to demonstrate its suitability for impacted flora and fauna. When selecting land for the offset, preference will be given to land adjacent to the existing offset package. Management of the additional land will be as prescribed for the other elements of the offset package.</p>	This B&RMP details how the existing offsets will be managed. Future offsets will also be managed in accordance with this plan

Appendix 2

Specification for Assessment of Landscape Function

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 in the mine's progression to closure and lease relinquishment. Monitoring frequency of rehabilitation areas would be undertaken dependent on the maturity and importance of the rehabilitation progress, generally annually but could be less frequent as deemed necessary.

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.

Appendix 3

Monitoring Stages – Visual Assessment of Revegetated Areas

Mt Arthur Coal 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.

Appendix 4

Monitoring Stages – Assessment of Potential Carrying Capacity

The objective of this component of the monitoring program is to evaluate the potential carrying capacity of those lands that have been rehabilitated to a post mining land use of pasture. Monitoring frequency of rehabilitation areas would be undertaken dependent on the maturity and importance of the rehabilitation progress, generally annually but could be less frequent as deemed necessary, especially once the sites are shown to be on a trajectory to the development of a sustainable landscape.

The methodology used to undertake this monitoring is based on the assessment of potential carrying capacity. The potential carrying capacity of a paddock or farm is the number of stock expressed as Dry Sheep Equivalent (DSE) per hectare that can be carried through most years.

In terms of the potential carrying capacity a landscape that is on a trajectory toward self sustainability (in context of vegetative cover and soil stability) would have a carrying capacity aligned to relevant soil types, fertiliser regimes and vegetative species in the pasture mix. The potential carrying capacity is not a recommendation to run the paddocks or farm at this level, but set a benchmark of what is possible. If stocking rates are well below the benchmark, then it is a prompt to ask other questions such as whether there are soil fertility or subsoil constraints that are limiting carrying capacity. The interpretation of this data enables the development of land management recommendations to address those sites having less than preferred carrying capacity rankings.

Additionally, the monitoring tools can be used by themselves, or as part of justifying and improving the environmental performance of the post mined lands, in doing so aligning the monitoring of the site. Where necessary, rehabilitation procedures may be amended accordingly to continually improve rehabilitation standards, or as more data becomes available regarding reference sites or the targeted vegetation community, completion criteria can be updated to ensure rehabilitation is improving on the right trajectory.

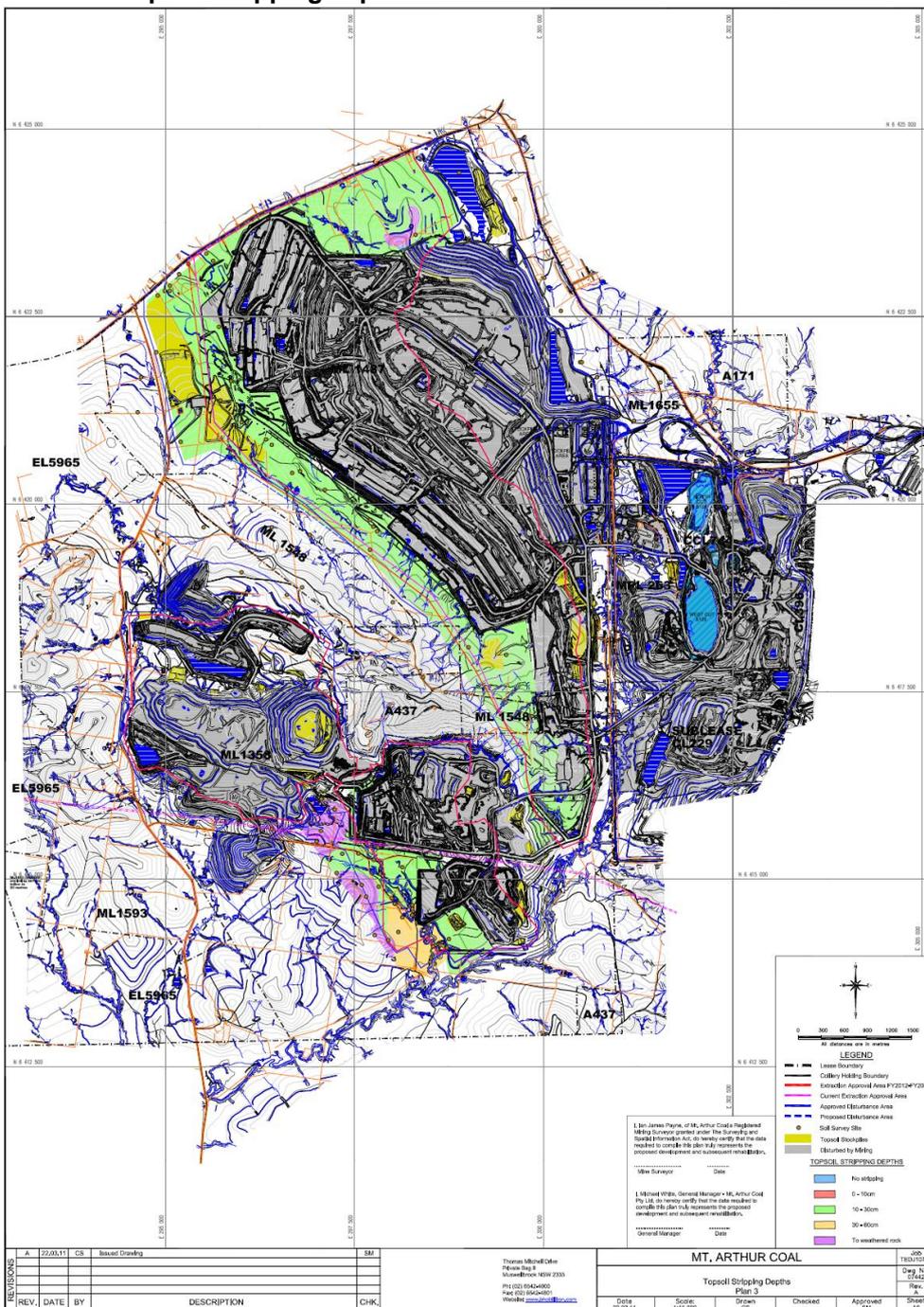
Data to be collected to assess potential carrying capacity may include:

- Calculation of paddock size;
- Percentage ground cover – best undertaken when cover is at its lowest;
- Assessment of the current carrying capacity of the paddock;
- Estimate the length of the growing season;
- Determine the soil P level for the particular paddock; and
- Comparison of the current carrying capacity with the potential values.

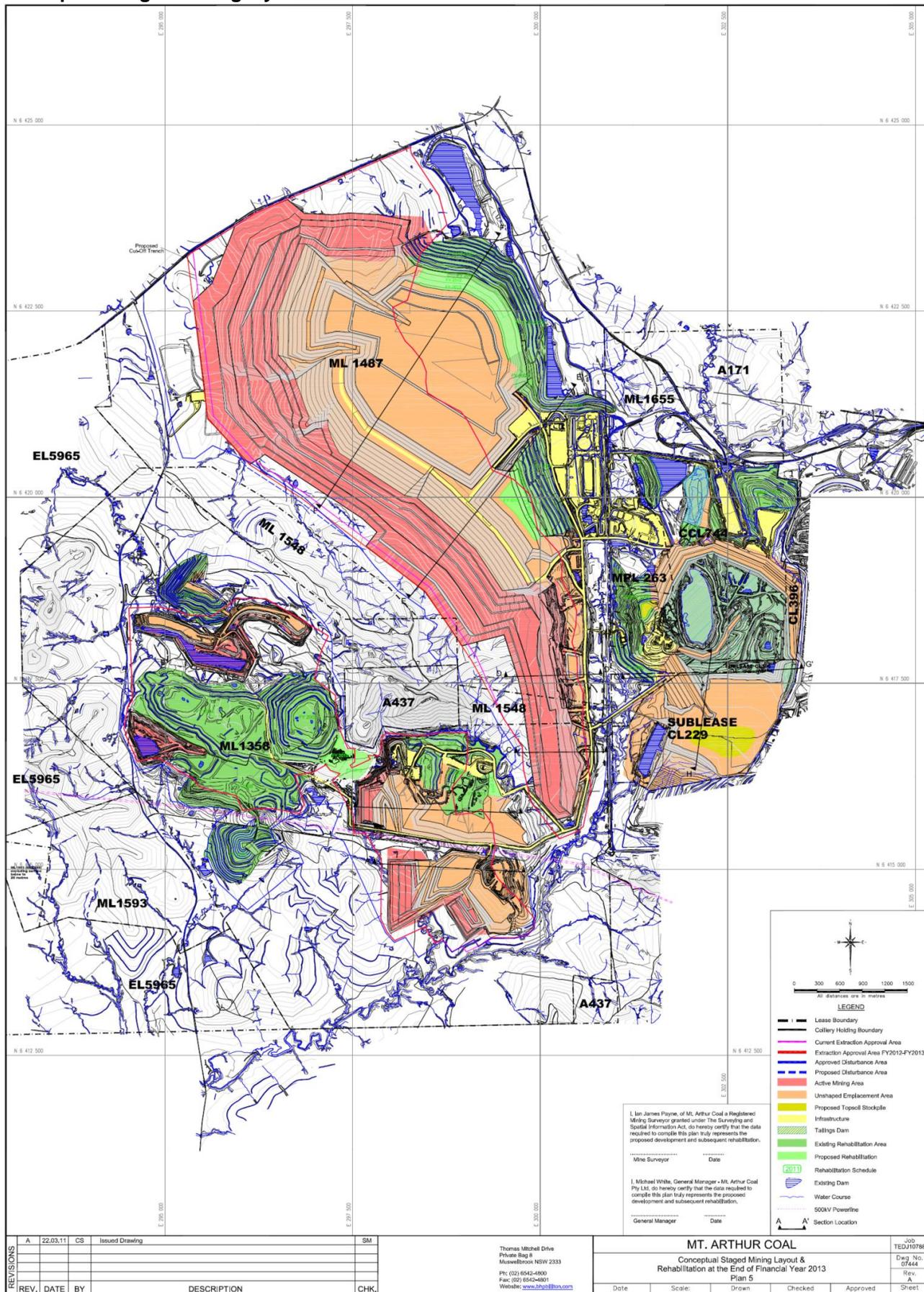
Appendix 5 Mining Operation Plan Figures – end FY13

The following inclusion within Appendix 5 outlines the Mining Operations Plans for FY2011 to end of FY2013. The MOP plans were prepared prior to preparation of the Mt Arthur Coal Rehabilitation and Biodiversity Management Plan. The plans below outline indicative additional details requested following consultation. It should be noted with any inconsistencies between the MOP figures; this management plan and the Environmental Assessment will be revised and addressed as part of the mine planning process in 2013. This MOP is not directly associated with the R&BMP and no separate consultation will occur within the future regarding the Mining Operations Plan.

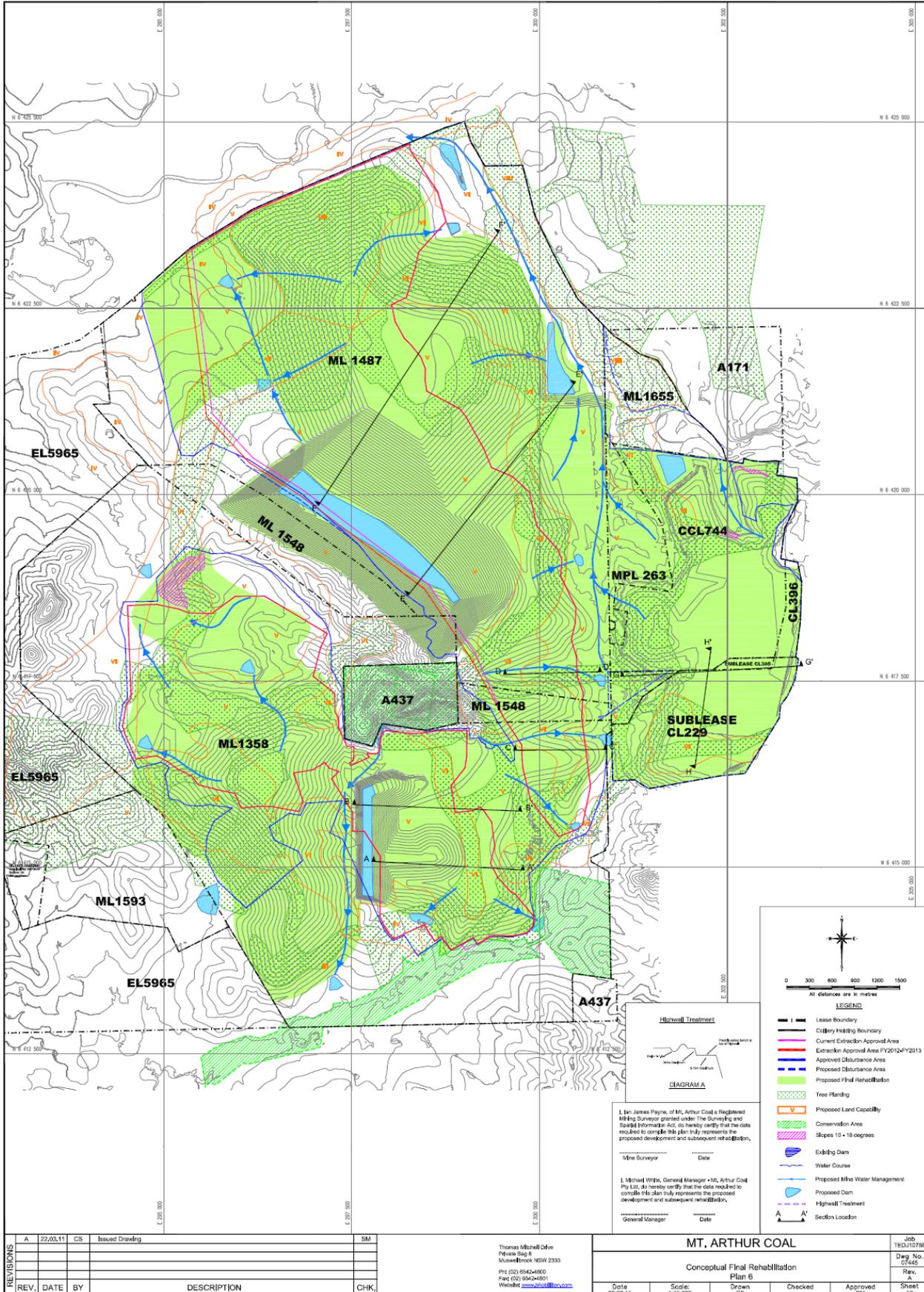
Indicative topsoil stripping depths



Conceptual staged mining layout and rehabilitation FY 2013.



Conceptual final rehabilitation

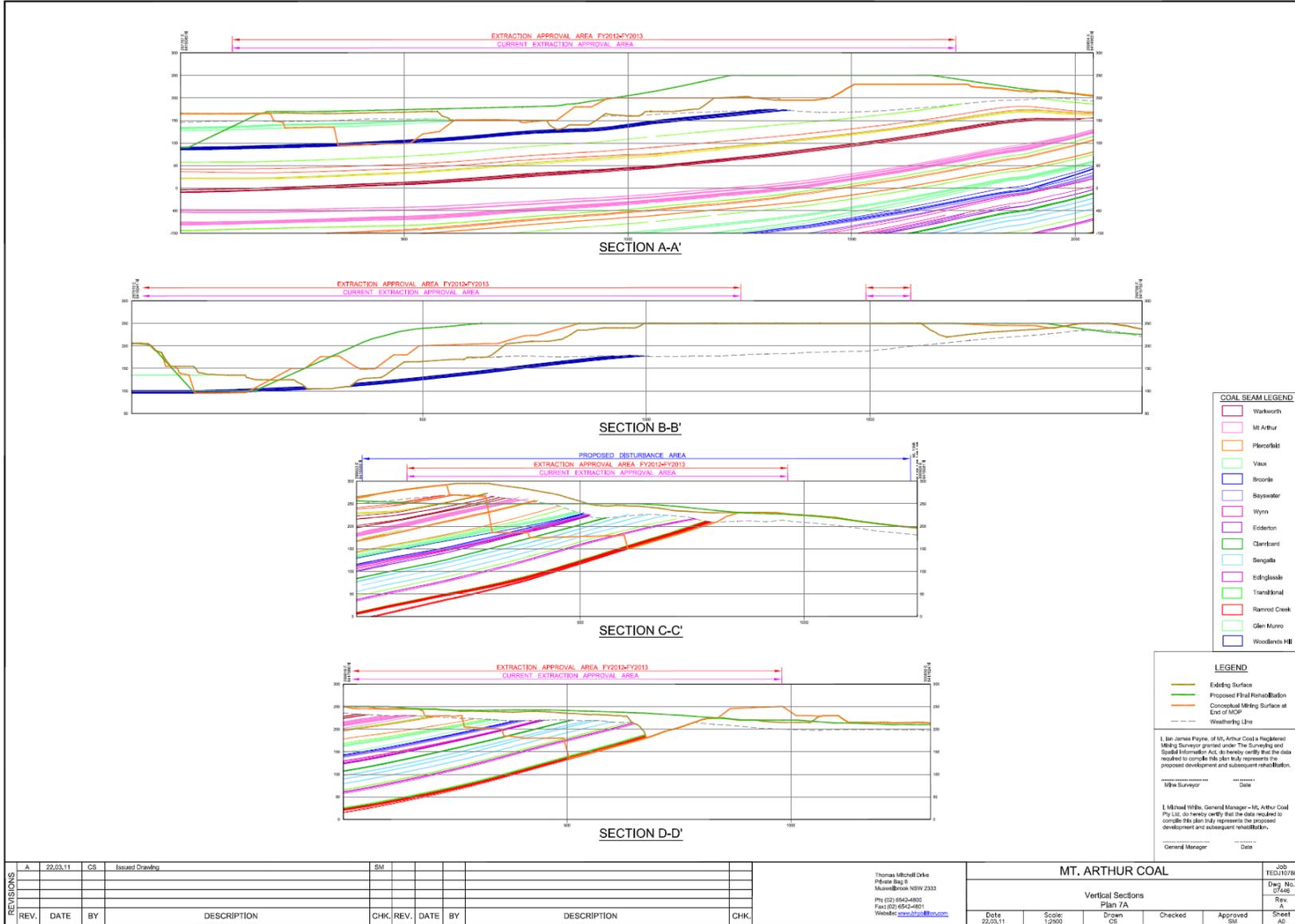


REV.	DATE	BY	DESCRIPTION	CHK.
A	22.03.11	CS	Issued Drawing	SM

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Peterside Way 8
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MT, ARTHUR COAL				Job TBD/10798
Conceptual Final Rehabilitation Plan 6				Dwg. No. 17445
Date 22.03.11	Scale 1:15,000	Drawn CS	Checked	Approved SM
				Sheet AD

Vertical sections 'A'



Appendix 6 Correspondence Records

Consultation with DECCW

Letter sent to OEH on 10 February 2012 seeking feedback on the Draft Rehabilitation and Biodiversity Management Plan.

EPA comments were provided in a letter dated 5 March 2012.

Consultation with NOW

From: Gale, Michael (NSWEC)
Sent: Thursday, 1 November 2012 10:07 AM
To: 'fhancock@dnr.nsw.gov.au'
Subject: Mt Arthur Coal Rehabilitation and Biodiversity Management Plan
Attachments: 121030 RBMP_draft version.pdf; Index to Biodiversity Conditions.docx

Fergus,

Please find attached a copy of Mt Arthur Coal's Rehabilitation and Biodiversity Management Plan (R&BMP) for your review in accordance with the requirements of Mt Arthur Coal's Open Cut Consolidation Project Approval (09_0062) schedule 3, condition 40.

Given that the R&BMP combines the Rehabilitation Management Plan (condition 44) and Biodiversity Management Plan (condition 40) I have attached an index table outlining how the R&BMP aligns with the Schedule 3, Condition 40 (requirements for Biodiversity Management Plan) from the Mt Arthur Coal Consolidation Project Approval 09_0062.

Regards,

Mike.



Michael Gale
Superintendent Environment
Mt Arthur Coal

BHP Billiton
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Please consider the environment before printing this email

Consultation with MSC

Meeting held with MSC in relation to the Draft Rehabilitation and Biodiversity Management Plan on 10 April 2012.

MSC comments were provided in a letter addressed to the Department of Planning and Infrastructure and Mt Arthur Coal dated 11 April 2012.

Consultation with the Mt Arthur Coal Community Consultative Committee (CCC)

The Rehabilitation and Biodiversity Management Plan was discussed at the CCC meetings on the following dates:

- 2/11/11
- 7/12/11
- 1/2/12
- 16/2/12
- 7/3/12
- 14/3/12
- 28/3/12
- 4/4/12



**Resources
& Energy**

File No 11/3613

4 April 2012

General Manager – Operations (Open Cut)
Mt Arthur Coal
PMB 8
MUSWELLBROOK NSW 2333

Attention: Julie McNaughton – Environment & Community Manager

Dear Sir,

Mount Arthur Coal Biodiversity and Rehabilitation Management Plan

I refer to the submission dated 31 March 2012 from Mt Arthur Coal (MAC) of the subject Plan. Resources and Energy (R&E) acknowledges the prior consultation by MAC with R&E and other stakeholders.

Please be advised that the "Mt Arthur Coal Complex Open Cut Mining Operation Plan (MOP) FY2012-FY2013" was approved by Resources and Energy (R&E) on 8 July 2011 and subsequently the Rehabilitation Liability Estimate for Mt Arthur Coal operations has been accepted by R&E to increase the Security Deposit for the consolidated Mining Leases. The Plan is assessed by R&E as being consistent with the approved MOP.

R&E technical officers have reviewed the Plan and in accordance with schedule 3, condition 44 of the MAC Consolidated Project Approval 09-0062 the Plan is approved under delegation of the Director General.

Yours sincerely



Greg Summerhayes
Principal Environment Officer, Team Leader Northern
Environmental Sustainability Branch

Mineral Resources – Environmental Sustainability Unit
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Michael White
General Manager Operations
Mt Arthur Coal
PMB 8
MUSWELLBROOK NSW 2333

Contact: Ben Harrison
Phone: 02 6575 3402
Fax: 02 6575 3515
Email: benjamin.harrison@planning.nsw.gov.au
Our ref: 10/20755

Dear Mr White,

**Mt Arthur Coal Mine – PA 09_0062
Environmental Monitoring and Management Plans**

Thank you for forwarding the following management plans required under project approval 09_0062 for the Department's consideration:

- Blast Management Plan (Condition 17 of Schedule 3);
- Biodiversity and Rehabilitation Management Plan (Condition 40 & 44 of Schedule 3);
- Rehabilitation Strategy (Condition 42 of Schedule 3).

The Department has reviewed these plans (as amended following previous correspondence) and is satisfied that they generally address the requirements set out in the relevant conditions of the project approval. Consequently, I would like to advise you that the Director-General has approved the plans.

Could you please forward finalised copies of the above plans for the Department's records at your earliest convenience.

Should you have any enquiries on this matter please contact me on (02) 6575 3402.



14.11.12

Ben Harrison
A/Team Leader Compliance

As Nominee for the Director-General