## Mt Arthur Coal Rehabilitation Strategy

The Rehabilitation Strategy (the Strategy) is the standard for rehabilitation at Hunter Valley Energy Coal Pty Ltd (HVEC) Mt Arthur Coal Mine. The Strategy provides a framework for landform design and revegetation aligned with Regulator and community expectations.

The goal of the Strategy is to align with the Project Approval requirements, and provide a framework to create a "safe, stable and non-polluting" environment, and develop a sustainable landscape that achieves the intended final land uses which are consistent with key stakeholder agreed social and environmental values.

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## Abbreviations

**ARI** Average Recurrence Interval

**BioMP** Biodiversity Management Plan

**CCC** Community Consultation Committee

**CEEC** Critically Endangered Ecological Community

**DPE** NSW Department of Planning and Environment

**DRG** Division of Resources and Geoscience

**EA** Ecological Assessment

**EIS** Environmental Impact Statement

**FLDP** Future Landscape Design Project

**GIS** Geographic Information System

**HSE** Health, Safety and Environment

**HVEC** Hunter Valley Energy Coal Pty Ltd

**LSC** Land and soil capability

**MAC** Mt Arthur Coal

**MOP** Mining Operations Plan

**OEA** Overburden Emplacement Areas

**PCT** Plant Community Type

**PHES** Pumped Hydro Energy Storage

**RFFET** Regional Flood Frequency Estimation Tool

**RL** Relative Level

**RMP** Rehabilitation Management Plan

**REMP** Rehabilitation and Ecological Monitoring Program

**RR** Resources Regulator

**TARP** Trigger Action Response Plan

**TSF** Tailings Storage Facility

**VS** Visual Dump

# 1 Purpose

The Mt Arthur Coal Rehabilitation Strategy (the Strategy) has been developed to address Schedule 3, Condition 42 of Project Approval 09_0062 MOD 1 for the Mt Arthur Coal Mine – Open Cut Modification Project dated 26 September 2014 (the Project Approval) which was issued to Hunter Valley Energy Coal Pty Ltd (HVEC) by the NSW Department of Planning and Environment (DPE). The requirements of this condition, along with where they have been addressed in the Strategy are included in **Table 1-1**.

The Rehabilitation Strategy provides the high level concepts, justifications and guiding objectives for rehabilitation whereas the detailed objectives, performance measures, monitoring and review processes are contained in the Rehabilitation Management Plan. The Rehabilitation Strategy also complements the Mt Arthur Coal Conceptual Mine Closure Plan and the Biodiversity Management Plan. **Section 2** and **Appendix 1** provides a guide to the relevant Project Approval conditions that pertain to the Strategy.

*Table 1-1. Schedule 3, Condition 42 of Project Approval 09_0062 MOD 1*

| Condition Requirement | Section Addressed |
|---|---|
| The Proponent shall prepare a revised Rehabilitation Strategy for the Mt Arthur mine complex to the satisfaction of the Secretary. This strategy must: | |
| (a) be prepared in consultation with the DPE and Council, and be submitted to the Secretary for approval by the end of September 2015, unless otherwise agreed with the Secretary; | • Section 10<br>• Appendix 3 |
| (b) investigate options for: | |
| • increasing the area to be rehabilitated to woodland on the site; | Section 8 |
| • reducing the size of final voids on site; | • Section 8.1;<br>• Section 8.1.1; and<br>• Section 8.1.2. |
| • beneficial future land use of disturbed areas, including voids; | • Section 8 |
| (c) describe and justify the proposed rehabilitation plan for the site, including the final landform and land use; and | • Section 6;<br>• Section 8; and<br>• Figure 3 |
| (d) include detailed rehabilitation objectives for the site that comply with and build on the objectives in Table 14 (of the Project Approval). | • Section 9<br>• RMP |

The Strategy was developed using guidance from state and Commonwealth government guidelines and stakeholder consultation. The objective of the Strategy is to comply with Schedule 3, Condition 42 of Project Approval (**Table 1-1**), the regulatory conditions listed in **Appendix 1**. The Strategy, provides a framework to create a "safe, stable and non-polluting" environment incorporating a sustainable landscape that achieves the intended final land uses and is consistent with key stakeholder agreed social and environmental values.

The Strategy should be read in conjunction with the Rehabilitation Management Plan which has been prepared to address Schedule 3 Condition 44 of the Project Approval and to meet the requirements of Mt Arthur Coal's mining leases under the Mining Act 1992.

This version (Version 5.0 (refer **Table 11-1**) of the Rehabilitation Strategy has been prepared by Integrated Environmental Management Australia Pty Limited (IEMA).

# 2 Legislation, Standards and Regulations

This Strategy has been prepared in consideration of:

- Mining Act 1992;
- NSW Environmental Planning and Assessment Act 1979 (EP&A Act);
- NSW Biodiversity Conservation Act 2016
- Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999);
- Mt Arthur Coal Open Cut Consolidation Project Approval (09_0062 MOD 1) dated 26 September 2014; and
- Commonwealth EPBC Act Approvals 2011/5866 and 2014/7377.

## 2.1 Landform Design Principals

The geomorphic landform design approach shown in the Strategy will be applied to emplacements where the design meets requirements for stability, rehabilitation and approved land uses. Design and construction of emplacement areas following the Project Approval MOD1 will be continued using the geomorphic approach where appropriate, focusing on external batters of emplacement areas. Emplacements completed prior to the Future Landscapes Design Project (FLDP) are not planned to be retrospectively modified to a geomorphic landform design or other natural relief.

This Strategy has also been prepared to ensure that the post mining landform supports the selected native ecosystem (woodland) and agricultural (grazing) post-mining land uses specified in the Project Approval. It aims to enhance habitat value of the native woodland areas by integrating regional habitat linkages between remnant on site native vegetation communities, offset areas, rehabilitated mined land and off site vegetation areas. This is consistent with the general vegetation strategies found in the Department of Mineral Resources (1999) Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of NSW (Synoptic Plan).

## 2.2 Rehabilitation Management Plan

On 2 July 2021, the Rehabilitation Reforms legislated the Mining Amendment (Standard Conditions of Mining Leases—Rehabilitation) Regulation 2021 (the Amendment) under the Mining Act 1992. The Amendment prescribes new mining lease conditions relating to rehabilitation and sets clear, achievable, and enforceable requirements for rehabilitation.

Under the Amendment, Rehabilitation Management Plans (RMPs) are now required for all New South Wales (NSW) mine sites, in place of the previous Mining Operations Plans (MOPs). The RMP meets the requirements of Schedule 3 Condition 44 the Project Approval which requires the Mt Arthur Coal to prepare and implement a RMP for the Project in accordance with relevant RR guidelines. The RMP covers both the requirement of the Project Approval whilst also being set out in accordance with the RR's Form and Way Document: Rehabilitation Management Plan – Large Mines (RR, 2021).

The purpose of the RMP is to address requirements in Section 3 Condition 44 of the Project Approval.

The RMP includes information on rehabilitation of the Mt Arthur Coal mine site such as:

- Rehabilitation objectives, rehabilitation criteria and relevant performance indicators;
- Phases of rehabilitation and general methodologies;
- Rehabilitation management measures and monitoring programs;
- Project -specific Trigger Action Response Plan (TARP) which outlines the key identified risks to rehabilitation, their trigger and proposed mitigation measures.

The Strategy should be read in conjunction to the RMP which is available on the Mt Arthur Coal's website.

# 3 Project Approval Area

The Mt Arthur Coal mine site is located in the Upper Hunter Valley, NSW, approximately five kilometres south west of Muswellbrook. **Figure 1** shows the site, project approval boundary, and mine lease boundary.

**Figure 4** provides a representation of the post mining landscape of the Project Approval area and surrounding lands which remains generally in accordance with the concept strategy depicted in **Appendix 7** of the Project Approval. **Figure 5** depicts the proposed final land use based on the 2013 Environmental Assessment (EIS).

ML1757
ML1655
ML1487
ML1548
MPL263
CCL744
ML1739
ML1739
CL396
CL395
ML1739
AUTH437
AUTH437
ML1548
CL229
EL5965
ML1739
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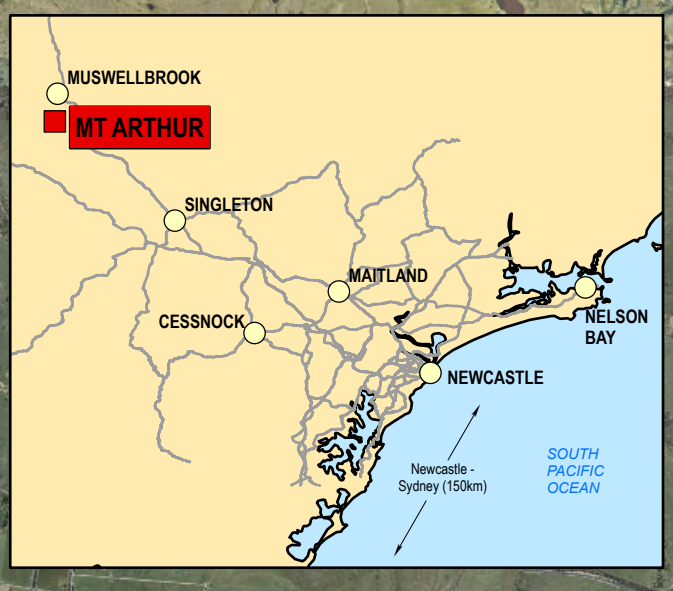


LEGEND
- Approved Ancillary Disturbance
- Mining Lease
- Sub Lease

BHP
Mapping Services Brisbane

0 500 1,000 1,500 2,000 m
Transverse Mercator Projection.
MGA Zone 56. GDA2020 Datum.

MOUNT ARTHUR COAL

# Mt Arthur Coal Rehabilitation Strategy Site Location and Leases

| Drawn: B. Kleinschmidt | Checked: J. Deacon | Date: 29/11/2022 | Version: 1 | Figure 1 |
|---|---|---|---|---|

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LEGEND

Approved Ancillary Disturbance
Mt Arthur Coal Mining Tenements
1 in 100 Year Flood Level
Natural Woodland

Archaeological Sites

Aboriginal Grinding Grooves
European Heritage Sites

Vegetation Communities

White Box - Ironbark Derived Understorey
Central Hunter Box - Ironbark Woodland
Central Hunter Buloak Forest Regeneration
Narrabeen Footslopes Slaty Box Woodland
Upper Hunter White Box - Ironbark Grassy Woodland
Central Hunter Ironbark - Spotted Gum - Grey Box Forest
Upper Hunter Hills Exposed - Ironbark Woodland
Spotted Gum Derived Understorey
Spotted Gum Forest
Exotic Understorey
Planted Areas
Hunter Valley River Oak Forest
Hunter Floodplain Red Gum Woodland
Slaty Box Derived Understorey
Box - Ironbark Derived Understorey
Blakely's Red Gum Woodland
Mt Arthur Forest Complex
Hunter Floodplain Red Gum Woodland Weedy Understorey

0 500 1,000 1,500 2,000 m

Transverse Mercator Projection.
MGA Zone 56. GDA2020 Datum.

BHP
Mapping Services Brisbane

MOUNT ARTHUR COAL

# Mt Arthur Coal Rehabilitation Strategy
# Pre-mining Natural Environment

| Drawn: B. Kleinschmidt | Checked: J. Deacon | Date: 29/11/2022 | Version: 1 | Figure 2 |
|---|---|---|---|---|

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MSW2 MAN Surface Water Monitoring Site

BWW9 Bayswater Surface Water Monitoring Site

COAL Land Boundary

Mining Lease Application Area

Catchment Boundaries

HUNTER RIVER

Racecourse

SOUTH MUSWELLBROOK

Railway

MSW2

MSW6

Denman Road

Thomas Mitchell Drive

Ramrod Creek

Ramrod Creek Catchment Area

Un-named Creek Catchment Area

MSW4

MSW5

MSW1

MSW3

Whites Creek

Fairford Creek

MOUNT ARTHUR NORTH

A1711

Quarry Creek

Fairford Creek Catchment Area

Whites Creek Catchment Area

BWW9

BAYSWATER NO.3 MINE

Quarry Creek Catchment Area

Saddlers Creek Catchment Area

MOUNT ARTHUR

EL 5340

Edderton Road

BWW12

Saddlers Creek

BAYSWATER NO.3 MINE

BHP

Mapping Services Brisbane

0 500 1,000 1,500 2,000 m

Transverse Mercator Projection.
MGA Zone 56. GDA2020 Datum.

MOUNT ARTHUR COAL

# Mt Arthur Coal Rehabilitation Strategy
# Pre-mining Drainage

| Drawn: B. Kleinschmidt | Checked: J. Deacon | Date: 29/11/2022 | Version: 1 | Figure 3 |
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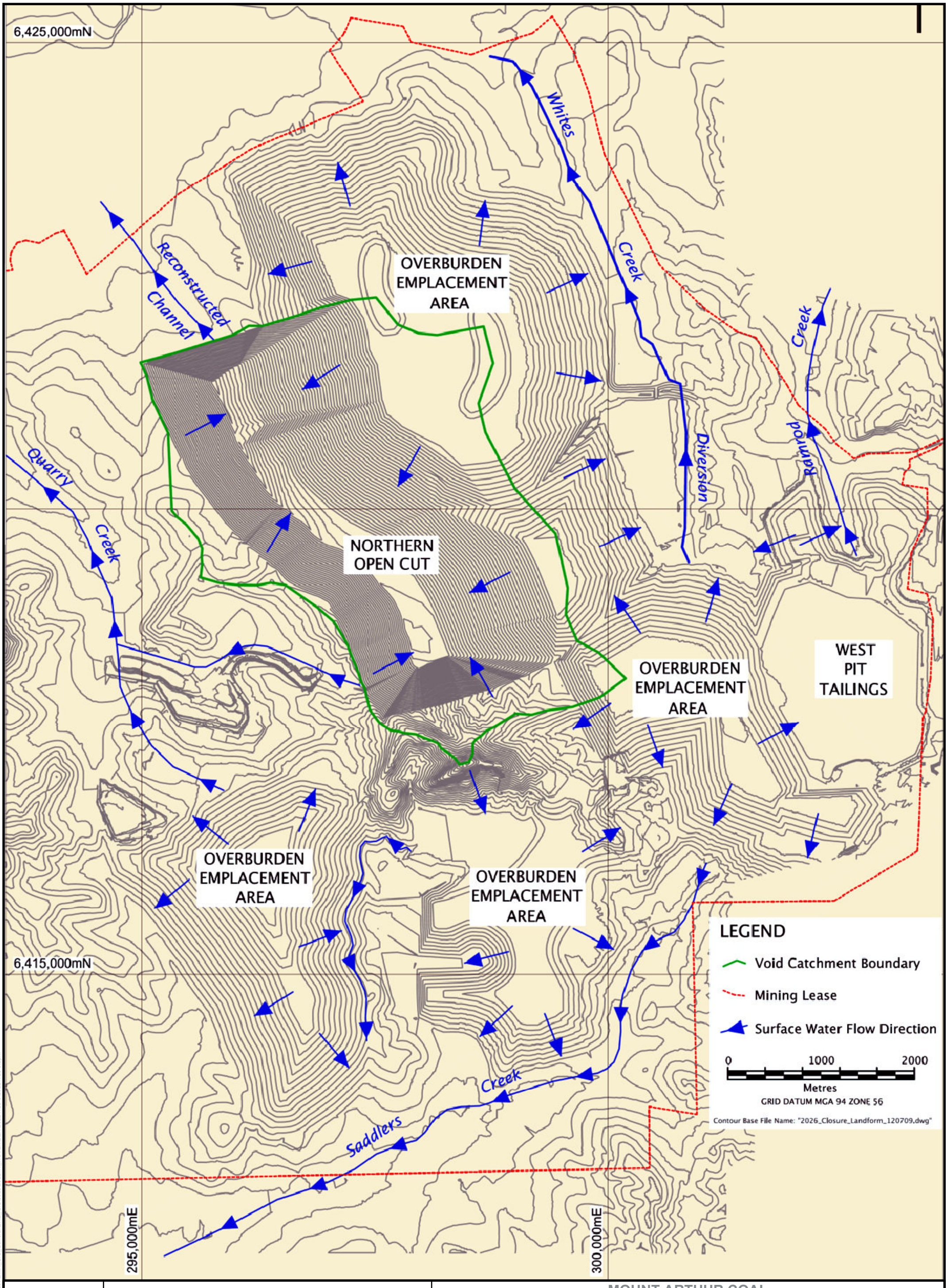


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Mapping Services Brisbane

0 500 1,000 1,500 2,000 m

Transverse Mercator Projection.
MGA Zone 56. GDA2020 Datum.

MOUNT ARTHUR COAL

# Mt Arthur Coal Rehabilitation Strategy - Conceptual Post Mining Landscape and Drainage from 2013 EIS

| Drawn: B. Kleinschmidt | Checked: J. Deacon | Date: 29/11/2022 | Version: 1 | Figure 4 |
|---|---|---|---|---|

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Windmill Void

Belmont Void

McDonalds Void

HUNTER RIVER

Whites Creek

Quarry Creek

Quarry Creek

Ramrod Creek

Ramrod Creek

Saddlers Creek

LEGEND

- Railways
- Watercourses
- Approved Ancillary Disturbance
- Travelling Stock Reserve
- Drayton Wildlife Refuge Area
- Box Woodland Establishment Area
- Remnant Woodland

**Domain**

- Post-Mined Lands - Pasture
- Post-Mined Lands - Woodland
- Water Storage
- Offset/Revegetation Areas

BHP

Mapping Services Brisbane

0 500 1,000 1,500 2,000 m

Transverse Mercator Projection.
MGA Zone 56. GDA84 Datum.

MOUNT ARTHUR COAL

# Mt Arthur Coal Rehabilitation Strategy
# Conceptual Final Land Use based on 2013 EIS

| Drawn: B. Kleinschmidt | Checked: J. Deacon | Date: 4/7/2019 | Version: 1 | Figure 5 |
|---|---|---|---|---|

# 4 Final Landform and Land Use Statement

The high level objectives for the rehabilitated final landform is to create a safe stable and non - polluting landform which are designed to incorporate natural micro-relief and natural drainage lines to integrate with surrounding landforms. Final Voids will be designed minimise their size and depth and their catchment size. The land use objective is to create a mixture of pasture areas suitable for grazing along with large tracts of self - sustaining woodland to improve biodiversity values in the region as presented in **Table 4-1** below.

The concepts for these objectives are described in the following sections.

*Table 4-1 Land use Rehabilitation Types*

| Rehabilitation Type | Area (Ha) | Target Vegetation | Baseline Completion Criteria |
|---|---|---|---|
| Box Woodland | 500 | Refer Table 6-2 | Rehabilitation commitments are included in **Appendix 1**, Table 3. **Sections 7.3** and **7.8** discuss rehabilitation objectives and rehabilitation processes (respectively). |
| Native woodland and additional native woodland | 2,142 | Native woodland typically targeting communities listed in Table 6-2, but included pre-2009 rehabilitation and remnant woodland. | |
| Total native vegetation | 2642 | | |
| Pasture | 33 | 33 ha Class II agricultural capability land.<br>Additional areas identified for agricultural use will be rehabilitated to support grazing. | Rehabilitation commitments are included in **Appendix 1**, Table 3. **Section 7.3** discusses rehabilitation objectives. |

Refer to Malabar Resources Ltd (Maxwell Underground Project) RMP for Malabar Coal final landform design and final land use for the adjacent Malabar Coal mine site and sub-lease areas (eg CL229).

# 5 Final Landform

The geomorphic landform design approach will be applied to emplacements where the design meets requirements for stability, rehabilitation and approved land uses. Design and construction of emplacement areas following the MOD 1 will be continued using the geomorphic approach where appropriate. Emplacements completed prior to the MOD 1 are not planned to be retrospectively modified to a geomorphic landform design or other natural relief.

Post mining landform have been designed to support the selected native ecosystem (woodland) and agricultural (grazing) post-mining land uses. It aims to enhance habitat value of the native woodland areas by integrating regional habitat linkages between remnant on site native vegetation communities, offset areas, rehabilitated mined land and off site vegetation areas. This is consistent with the general vegetation strategies found in The Department of Mineral Resources (1999) Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of NSW (Synoptic Plan).

The geomorphic design method has been adopted on several overburden emplacement areas (OEA) across Mt Arthur Coal as it uses the characteristics of stable natural alluvial landforms in the local environment as an analogue on which to base the design of overburden landforms. Importantly, the approach does not replicate existing landforms, but rather uses the key characteristics that make these landforms stable in a new design. Natural landforms in alluvial materials are characterised by an integrated network of drainage channel, typically with slopes initially convex close to ridge lines, becoming concave and progressively flattening with increasing catchment area.

Substantial work was completed on erosion management in the FLDP (Landloch, 2014). The FLDP report indicates that the areas with slopes of 50% are not necessarily a high erosion risk provided the flow length is limited. Erosion assessment is presented in Appendix 4 of the FDLP report, (Landloch, 2014) showing erosion risk for an un-vegetated landform. Minor erosion support will be added in the form of rock or mulch in the interim before vegetation is established.

The landform design has been checked for erosion risk and where steep areas remain of concern in the longer term once construction experience has been obtained in building these landforms, two possible additional management alternatives that could be considered include:

- flattening some upper slopes if the volume constraints are not critical in these areas; or
- incorporating rock cladding or other materials similar to that originally proposed for the ridge lines in the FLDP report.

Note that rock cladding for a bluff type result may require suitable rock to be brought from another location of the site which may make the process impact the environment elsewhere and or be uneconomical.

The final landform drainage pattern is designed to achieve long-term stability and erosion control, harmonise with more general

rehabilitation and revegetation strategies, and integrate with surrounding catchments.

The geomorphic design considers:

- erosion risk assessments using Global Information System (GIS) methods to ensure that the future landform will be stable;
- sizing of suitable rock required to stabilise the drainage lines;
- options to increase habitat diversity and sediment control within the geomorphic designed drainage lines; and
- erosion modelling to demonstrate long term stability and optimise aspects of the design are incorporated in the design and review process.

## 5.1 Flood Modelling and Flood Risk

Final landform drainage pattern will be designed and revegetated to achieve long-term stability and erosion control and integrate with surrounding catchments. All areas, except for the final void catchments, will be free draining. The aim of this drainage design is to maintain effective catchment contribution and yield to the Hunter River following the cessation of mining.

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, 2013 EIS).

A hydrological assessment determining the peak flows (pre operation and during mining) impact of both the planned and existing dams was completed in 2016 (Jacobs, 2016). Key outcomes from the study were:

- For the pre-mining environment, several of the culverts downstream of MacLean's overburden emplacement area (OEA) on Denman Road are expected to overtop during flood events less extreme than the 1 year Average Recurrence Interval (ARI); and
- The landform design will not worsen peak flows; however, the attenuation effects of the dams may result in longer flow peaks.

The work undertaken for Maclean's OEA includes delineation of the pre-mining and post-rehabilitation catchments, and determination of peak flows using the Regional Flood Frequency Estimation Tool (RFFET), Rational method (East NSW) and XP rafts.

Sediment dam assessments indicate that the provision of storage to meet the requirements of *Managing Urban Stormwater, Soils and Construction Volume 1* (the 'Blue Book', Landcom, 2004) will offset the increase in peak flows associated with the steeper post-rehabilitation catchments compared to pre-mining catchments. Where the sediment dams do not sufficiently mitigate the peak flows, other options will be implemented.

Presently the risk of interaction with a Hunter River flood is mitigated by a levy that has been constructed along the northern boundary of the Windmill Pit. Flood modelling of the Hunter River indicates a 0.1% annual exceedance probability (1,000 year Annual recurrence interval (ARI)) flood level of up to approximately 140 mRL at the northern end of the void along Denman Road. Therefore the backfilled section of Windmill final void will be raised above 140mRL to prevent flooding over the top of the spoil.

A flood protection bund has been constructed between Denman Road and the active mining area where the topography is lower in elevation than the 1955 peak flood level in the Hunter River. The bund options will be assessed to understand if it is required post mining.

Further details on flood controls, such as sediment controls, are included in the RMP.

## 5.2 Visual Amenity

Final landforms designed to incorporate natural microrelief and natural drainage lines to integrate with surrounding landforms. Once rehabilitated these landforms will improve the visual amenity from Muswellbrook and surrounds.

## 5.3 Final Voids

During the life of mine at Mt Arthur Coal, several pits have been excavated from within the active mining areas, as listed in **Table 5-1**. Overburden and interburden is removed from active mining areas and dumped to create the final landforms, which are in turn progressively rehabilitated. Active mining areas are progressively backfilled during the mining process to reduce the extent of the remaining depression below ground level.

Final Voids are discussed further in the RMP.

Active mining pits that aren't intended to be backfilled are currently proposed to be final voids, used for water storage or as a groundwater sink post-mining. Void locations and respective catchment boundaries within the conceptual final landform are shown

in **Figure 4**.

**Table 5-1** details the voids that have been developed during the life of mine, and the proposed management and final status of each void.

*Table 5-1: Final Void Outcomes for Each Mt Arthur Coal Void*

| Former Active Pit/ Final Void | Final Status |
|---|---|
| Windmill | Water Storage – The Calool, Roxborough and Ayredale pits will be incorporated to the (final) Windmill Void. The Windmill Void will be a groundwater sink. This final void provides optionality for future access to resource or a water storage related use. |
| Calool | |
| Roxburgh | |
| Ayredale | |
| McDonalds | Water Storage – Future water storage resource. |
| Macleans | Backfilled, no final void, Native Ecosystem. |
| Belmont | Backfilled, no final void, rehabilitated to Agriculture (Grazing). |
| Saddlers South | Backfilled, no final void, Agriculture (Grazing). |
| Saddlers Central | Backfilled, no final void, Native Ecosystem and Agriculture (Grazing). |
| Saddlers North | Backfilled, no final void, Native Ecosystem and Agriculture (Grazing). |
| West Cut | Backfilled, no final void, rehabilitated to Agriculture (Grazing). |
| East Pit | |
| North Cut | |
| Drayton Void | Backfilled at closure, no final void, rehabilitated to Agriculture (Grazing).<br><br>The Drayton Void will be retained during mining operations for the purpose of de-watering the Tailings Storage Facility. |

Evaluation of other final void post mining land uses are provided below in **Table 5-2**. Implementation of other potential post mining land uses will be subject to agreement with the relevant authorities. Design alternatives and uses for the remaining final voids will continually be evaluated as part of the closure planning process at Mt Arthur Coal.

*Table 5-2: Final Void Post Mining Land Use Alternative Options*

| Final Void Post Mining Land use | Void Name | Alternative Options |
|---|---|---|
| Recreation | MacDonalds | The void could be used recreationally for bushwalking, riding, picnicking. However, these are not specifically synergistic with the grazing land use. |
| | Windmill void | |
| Industrial<br>Pumped Hydro power | MacDonalds | No suitable elevation differential |
| | Windmill void | Potential to be a viable location for Pumped Hydro Energy Storage (PHES). Would require further feasibility study. |
| Water supply | MacDonalds | Potential for stock water or industrial use |
| | Windmill void | Potential for industrial water source. Currently none known in the area. |
| Wildlife conservation<br>Woodland<br>Grassland<br>Wetland / Aquatic | MacDonalds | The primary objective of habitation is to provide habitat through increasing A brackish wetland could be established and added to the recreational land use. The grazing land use may preclude this as a suitable synergistic land use. |
| | Windmill void | A saline wetland could be established in the final void domain, complimenting surrounding woodland and grassland. The grazing land use may preclude this from occurring. |

Current planned Final Land Uses for the Final Voids are Water Storage and Native Ecosystem which align with Wildlife conservation, Woodland, Grassland, Wetland / Aquatic presented options.

Management of the Final Void is discussed in **Section 7.2** below.

# 6 Final Land Uses

To assist in defining the lands requiring rehabilitation under this Strategy, the mine site has been divided into final land use management areas based on current (mining) and intended final land use including:

- Final Voids;
- Rehabilitation Area – Native Ecosystem (including Native Woodland and Box Gum Woodland);
- Rehabilitation Area- Agriculture (grazing); and
- Water Management Areas.

Key rehabilitation strategies for each final land use management area are discussed in the sub sections below. The overall objective of creating a safe, stable and non-polluting final landform is considered in each applicable sub section.

Each final land use management area may require different rehabilitation methods to achieve the intended post-mining land use. A diagrammatic representation of the final landform and land use (2013 EIS) is provided in **Figure 5**. Rehabilitation Biodiversity Offset Areas (on and off site) are managed under Biodiversity Management Plan (BioMP) and are not addressed further in this document.

The RMP provides specific details for management of rehabilitation aspects at Mt Arthur Coal.

## 6.1 Rehabilitation Area – Native Ecosystem

In order to fulfill both the State Project Approval (06_0092) and Commonwealth Project Approval (EPBC-2014/7377), rehabilitation on open cut mining (disturbed) land should comprise 2,642 hectares (ha) of woodland vegetation including the establishment of 500 ha of White Box – Yellow Box – Blakely's Red Gum Grassy Woodland (Box Gum Woodland), in addition to the offset and conservation areas. Some areas within the mining lease were rehabilitated prior to the Mt Arthur Coal Mine (pre-2000) and pre-date the above objectives.

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland (also often referred to as 'Box Gum Woodland') is a Critically Endangered Ecological Community (CEEC) under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), as well as the NSW Biodiversity Conservation Act 2016 (BC Act).

In accordance with Schedule 3, Condition 38 of the Project Approval, the Mt Arthur Coal shall ensure that the offset strategy and/or Rehabilitation Strategy is focused on the re-establishment of:

a) Significant and or threatened plant communities, including:
   - Upper Hunter White Box – Ironbark Grassy Woodland;
   - Central Hunter Box – Ironbark Woodland;
   - Central Hunter Ironbark – Spotted Grey-Gum Box Forest;
   - Narrabeen Footslopes Slaty Box Woodland;
   - Hunter Floodplain Red Gum Woodland Complex;
   - White Box Yellow Box Blakely's Red Gum Woodland; and
b) Significant and or/ threatened plant species, including:
   - Pine Donkey Orchid (*Diuris tricolor*);
   - Lobed Blue-grass (*Bothriochloa biloba*);
   - Tiger Orchid (*Cymbidium canaliculatum*);
   - Weeping Myall (*Acacia pendula*); and
c) habitat for significant and/or threatened animal species.

Subsequent approvals which pre-date the communities listed Schedule 3, Condition 38 of the Project Approval (pre-2009) included limited areas of woodland, and a focus on native species and the provision of habitat and pasture, without any plant communities to be targetted. **Appendix 1**, tabulates and visually presents the progression of rehabilitation objectives and final land use at the Mt Arthur Coal mine.

During 2022, Cumberland Ecology undertook an assessment of vegetation communities to be rehabilitated under State and Commonwealth project approvals. The assessment identified inconsistent vegetation names between project approvals, as well as those referenced in the ecological assessments prepared to support the approvals (Cumberland Ecology, 2022). Further, the approvals were granted prior to the implementation of the revised Plant Community Types (PCTs) classification by the NSW government.

Cumberland Ecology classified all vegetation communities into PCTs and identified the most appropriate or 'best-fit' PCTs for the vegetation communities included in the Project Approval, as listed in **Table-6-1**. Mt Arthur Coal will not re-create the PCTs listed in **Table-6-1**. These PCT's will be used to inform the rehabilitation objectives to guide how to target the communities listed in Schedule 3, Condition 38 of the Project Approval, the intent is not to recreate these PCT's.

It is noted that numerous surveys of Box Gum Woodland in various regions of NSW have revealed that the understorey vegetation will invariably contain numerous herbaceous weed species which do not lessen the ecological value of the woodland or inhibit the regeneration potential or long term survival of the woodland. Furthermore, the listing advice for the community states that only 8% of the remaining Box Gum Woodland in Australia contains more than 50% native species.

A summary of vegetation communities which have been cleared (and to be re-established) is included as **Table-6-1**. **Table 6-2** describes the pre-clearance condition and species composition to be considered as a baseline when comparing against completion criteria.

*Table-6-1: Summary of Project Approval Vegetation Communities*

| State Project Approval Vegetation Community | Total Area to be Rehabilitated for Commonwealth Approval (EPBC 2014/7377) | BC Act Status | EPBC Act Status | Corresponding Umwelt (2014) Vegetation Community | Best-Fit PCT | PCT Name |
|---|---|---|---|---|---|---|
| **Upper Hunter White Box – Ironbark Grassy Woodland** | 299.20 ha<br>Upper Hunter White Box – Ironbark Grassy Woodland | CEEC | CEEC | Upper Hunter Hills Box – Ironbark – Red Gum Woodland | 1606 | White Box – Narrow-leaved Ironbark – Blakely's Red Gum shrubby open forest of the central and upper Hunter |
| **White Box Yellow Box Blakely's Red Gum Woodland** | - | CEEC | CEEC | Central Hunter Box – Ironbark Woodland | 1606 | White Box – Narrow-leaved Ironbark – Blakely's Red Gum shrubby open forest of the central and upper Hunter |
| **Central Hunter Box – Ironbark Woodland** | 76.41 ha<br>Upper Hunter Hills Exposed – Ironbark Woodland | EEC | - | Central Hunter Box – Ironbark Woodland | 1691 | Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter |
| **Narrabeen Footslopes Slaty Box Woodland** | 92.13 ha<br>Narrabeen Footslopes Slaty Box Woodland | EEC | - | Western Hunter Narrabeen Footslopes Ironbark – Cypress Pine Woodland | 1691 | Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter |
| **Central Hunter Ironbark – Spotted Grey-Gum Box Forest** | 1.8 ha<br>Spotted Woodland Gum Forest | EEC | - | Central Hunter Ironbark – Spotted Gum – Grey Box Forest | 1604 | Narrow-leaved Ironbark – Grey Box – Spotted Gum shrub – grass woodland of the central and lower Hunter |
| **Hunter Floodplain Red Gum Woodland Complex** | - | CEEC | CEEC | Hunter Floodplain Red Gum Woodland Complex | 1608 | Grey Box – Grey Gum – Rough-barked Apple – Blakely's Red Gum grassy open forest of the central Hunter |
| **Hunter Lowlands Red Gum Forest** | - | CEEC | CEEC | Red Gum Grassy Forest | 1608 | Grey Box – Grey Gum – Rough-barked Apple – Blakely's Red Gum grassy open forest of the central Hunter |
| **-** | 30.46 ha<br>Central Hunter Bull Oak Forest Regeneration* | EEC | - | - | 1692 | Bull Oak grassy woodland of the central Hunter Valley |

*Notes:*
**Only listed under the Commonwealth approval (EPBC (2014/7377).*

*Table 6-2: Summary of Pre-mining condition and Vegetation Communities Cleared and to be Re-established*

| Best-fit PCT | Vegetation Community | Impact Area (ha) | EPBC Approval (2014/7377) - Rehabilitation Area Requirement (ha) | Description of Pre-Mining Condition and Species Composition in Cleared Areas |
|---|---|---|---|---|
| 1606 | Upper Hunter White Box – Ironbark Grassy Woodland | 116.45 | 299.20 | **Pre- mining Condition**<br>The Upper Hunter White Box – Ironbark Grassy Woodland present has been historically cleared, predominately for grazing. The vegetation lacks 'old-growth' vegetation, but does include mature large trees. Weed cover in the assessed community is generally low. The native groundcover diversity is high and is generally dominated by native grasses and forbs. [1]<br><br>**Species Composition in Assessment Area**<br>This is an open woodland community that occurs on gently undulating slopes and hills on clay and earth soils. Canopy species that are characteristic of this community include *Eucalyptus crebra, E. albens* and/or *E. albens* x *E. moluccana*. Other canopy species that can occur in this community include *Eucalyptus dawsonii, E. blakelyi, Brachychiton populneus* ssp. *populneus* and *Corymbia maculata*. Common understorey species include *Notelaea microcarpa* var. *microcarpa, Myoporum montanum* and *Acacia decora*. The groundcover is diverse and is generally dominated by grasses and forbs, such as *Aristida ramosa, Cymbopogon refractus, Austrostipa verticillata, Chloris ventricosa*, *Austrodanthonia fulva, Cynodon dactylon, Calotis lappulacea, Dichondra repens, Desmodium varians* and *Einadia nutans*.[1] |
| | Upper Hunter Hills Exposed - Ironbark Woodland | 38.2 | 76.41 | **Pre- mining Condition**<br>The Upper Hunter Hills Exposed – Ironbark Woodland present has been historically cleared, predominately for grazing. The vegetation lacks 'old-growth' vegetation, but does include a mature large trees. Weed cover in the community is generally low. The native herb diversity is high while native shrub cover is relatively dense. [1]<br><br>**Species Composition in Assessment Area**<br>This is an open forest community that often occurs on drier north-facing slopes receiving high solar radiation and is characterised by the ubiquitous presence of *Eucalyptus crebra*. Other canopy species that can occur in low numbers include *E. blakelyi, E. albens, E. moluccana, Angophora floribunda* and *Brachychiton populneus* ssp. *populneus*. This community can grade into Upper Hunter White Box – Ironbark Grassy Woodland as the proportions of *E. crebra, E. albens* and *E. albens* x *moluccana* vary with aspect. Therefore, it is not uncommon to find these two communities occurring adjacent to each other. This community often has a shrub layer that commonly comprises species like *Acacia paradoxa*, *Notelaea microcarpa* var. *microcarpa, Breynia oblongifolia* and *Spartothamnella juncea*. It has a similarly diverse understorey as Upper Hunter White Box – Ironbark Grassy Woodland, with an abundant herbaceous component. Typical forbs include *Dichondra repens, Daucus glochidiatus*, *Senecio quadridentatus, Desmodium varians, Glycine clandestina, G. tabacina, Clematis glycinoides* and *Desmodium brachypodum*. Abundant grasses include *Dichelachne micrantha* and *Microlaena stipoides*. *Cheilanthes sieberi* and *C. distans* are also common fern species.[1] |
| 1691 | Central Hunter Box - Ironbark Woodland | 2 | - | **Pre- mining Condition**<br>The Central Hunter Box – Ironbark Woodland present has been historically cleared, predominately for grazing. The vegetation lacks 'old-growth' vegetation[1], but does include mature large trees up to 30 m high in areas. Weed species are common throughout the community. The native herb diversity is high while native shrub cover ranges from low to medium density. [4]<br><br>**Species Composition in Assessment Area**<br>Canopy species include *Eucalyptus crebra* and *E. albens* x *E. moluccana*. Common co-occurring canopy and small tree species include *Allocasuarina luehmannii*, *Angophora floribunda*, *Callitris endlicheri*, *Acacia implexa, A. salicina* and *Canthium odoratum*.<br>Common understorey species include *Notelaea microcarpa* var. *microcarpa*, *Myoporum montanum, Acacia decora and Maireana microphylla*. It can also include *Breynia oblongifolia*, *Cassinia quinquefaria* and *Dodonaea viscosa*.<br>Subshrubs are common and can include *Solanum cinereum* and *Phyllanthus virgatus*.<br>The groundcover is characterised by a variety of forbs, grasses, ferns and twiners. Abundant species include A*ristida ramosa, Cymbopogon refractus, Austrostipa scabra*, *Bothriochloa decipiens*, *Chloris ventricosa, Cheilanthes sieberi* ssp. *Sieberi, Cheilanthes distans, Calotis lappulacea*, *Vittadinia cuneata*, *Chrysocephalum apiculatum*, *Eremophila debilis, Brunoniella australis*, *Ajuga australis*, *Lomandra multiflora* ssp. *multiflora*, *Dichondra repens*, *Desmodium varians, Sida corrugata, Einadia nutans* and *Einadia trigonos*. [1] |
| | Narrabeen Footslopes Slaty Gum Woodland | 24.21 | 92.13 | **Pre- mining Condition**<br>The Narrabeen Footslopes Slaty Gum Woodland present has been historically cleared, predominately for grazing, but includes mature trees. Weed cover in the community is generally low, but dense areas of *Lycium ferocissimum* (African Boxthorn) and *Galenia pubescens* (Galenia) are present. The shrub layer is sparse while the ground layer is dominated by native species, but contains a low native species diversity.[1]<br><br>**Species Composition in Assessment Area**<br>This open woodland is dominated by Eucalyptus dawsonii and E. moluccana. Other tree species that may be present include *Brachychiton populneus* ssp. *populneus, Allocasuarina luehmannii, Callitris endlicheri, Acacia salicina, E. crebra* and *E. punctata.*<br>Common shrub storey species include *Canthium odoratum, Geijera salicifolia var. salicifolia, Notelaea microcarpa* var. *microcarpa, Myoporum montanum* and<br>*Dodonaea viscosa* var. *cuneata*.<br>The groundcover has relatively low species richness and is generally sparse. It is characterised by *Dichondra repens, Aristida ramosa, Lomandra multiflora* ssp. *multiflora, Brunoniella australis, Cymbopogon refractus, Desmodium brachypodum*, *Eremophila debilis*, *Fimbristylis dichotoma* and *Sida corrugata*. [1] |
| 1604 | Central Hunter Ironbark-Spotted Gum-Grey Box Forest | 55.1* | - | **Pre- mining Condition**<br>The Central Hunter Ironbark-Spotted Gum-Grey Box Forest has been historically cleared, predominately for grazing. The vegetation lacks 'old-growth' vegetation, but does include mature large trees. Weed cover in the community is moderate. The native shrub and groundcover layers are generally dense. Overall, the community is considered to be in poor to moderate condition as a result of grazing, weed invasion and past clearing.[2]<br><br>**Species Composition in Assessment Area** |

| Best-fit PCT | Vegetation Community | Impact Area (ha) | EPBC Approval (2014/7377) - Rehabilitation Area Requirement (ha) | Description of Pre-Mining Condition and Species Composition in Cleared Areas |
|---|---|---|---|---|
| | | | | This community includes a canopy of *Corymbia maculata, Eucalyptus punctata, E. moluccana* and *E. crebra*. The shrub layer present includes *Acacia salicina, A. genistifolia, A. implexa, Pimelea linifolia, Eremophila debilis, Cassinia quinquefaria, Indigofera australis, Notelaea microcarpa var. microcarpa, Brachychiton populneus* subsp. *populneus*, and *Allocasuarina luehmannii*. Common groundcovers include *Cheilanthes sieberi* subsp. *sieberi, Cymbopogon refractus, Pratia purpurascens, Lomandra multiflora* subsp. *multiflora, Pomax umbellata, Glycine tabacina, Dichondra repens, Chrysocephalum apiculatum* and *Themeda australis*.[2] |
| | Spotted Gum Forest | 0.9 | 1.8 | **Pre- mining Condition**<br>The Spotted Gum Forest present has been historically cleared, predominately for grazing. The vegetation lacks 'old-growth' vegetation, but does include a high number of mature large trees. Weed cover in the community is low. The native herb diversity is high while native shrub cover is sparse. [1]<br><br>**Species Composition in Assessment Area**<br>This is a tall open forest dominated by *Corymbia maculata*, with occasional occurrences of *Brachychiton populneus*, *Eucalyptus crebra* and in gully areas, *E. tereticornis* and *E. dawsonii*.<br>The understorey layers contain shrub species *Notelaea microcarpa* var. *microcarpa*, *Acacia decora*, *Cassinia arcuata*, *Breynia oblongifolia* and *Dodonaea viscosa*. Typical forbs and grasses include *Goodenia paniculata*, *G. ovata*, *Ozothamnus diosmifolius*, *Brunoniella australis*, *Glycine tabacina*, *Wahlenbergia stricta*, *Calotis cuneifolia*, *Dianella longifolia* (syn. *D. laevis*), *Sida corrugata, Swainsona galegifolia*, *Bothriochloa macra, Aristida ramosa, Chloris truncata, Lomandra filiformis, Themeda australis* and *Dichelachne micrantha*.[1] |
| 1608 | Hunter Floodplain Red Gum Woodland Complex | 0.3 | - | **Pre- mining Condition**<br>Hunter Floodplain Red Gum Woodland Complex is highly disturbed as a result of erosion and grazing. Tree canopy is dense in areas with a very sparse shrub layer. The ground layer is dense and contains a high number of introduced species (i.e. moderate to high weed invasion).[2]<br><br>**Species Composition in Assessment Area**<br>Dominant canopy species include *Eucalyptus crebra, E. tereticornis, E. moluccana* and *Angophora floribunda*. Shrub species present include *Acacia salicina*, *Cassinia quinquefaria*, *Notelaea microcarpa* var. *microcarpa* and *Maireana microphylla*. A diverse ground layer is present that includes *Sporobolus creber, Chloris ventricosa, Cynodon dactylon, Panicum effusum, Themeda australis, Sida corrugata, Einadia hastata, Commelina ensifolia, Dichondra repens*, *Lomandra multiflora* subsp. *multiflora* and *Chrysocephalum apiculatum*.[2] |
| | Hunter Lowlands Red Gum Forest | 1.7 | - | **Pre- mining Condition**<br>The Hunter Lowlands Red Gum Forest has been historically cleared, predominately for grazing. The vegetation lacks 'old-growth' vegetation, but does include mature large trees. The shrub layer is generally sparse, while a dense native ground layer is present. Weed cover in the community is moderate.[2, 3]<br><br>**Species Composition in Assessment Area**<br>This community includes a canopy of *Corymbia maculata, Eucalyptus punctata, E. moluccana* and *E. crebra*. The shrub layer present includes *Acacia salicina, A. genistifolia, A. implexa, Pimelea linifolia, Eremophila debilis, Cassinia quinquefaria, Indigofera australis, Notelaea microcarpa var. microcarpa, Brachychiton populneus* subsp. *populneus*, and *Allocasuarina luehmannii*. Common groundcovers include *Cheilanthes sieberi* subsp. *sieberi, Cymbopogon refractus, Pratia purpurascens, Lomandra multiflora* subsp. *multiflora, Pomax umbellata, Glycine tabacina, Dichondra repens, Chrysocephalum apiculatum* and *Themeda australis*.[2] |
| 1692 | Central Hunter Bulloak Forest Regeneration | 58.14 | 30.46 | **Pre- mining Condition**<br>Central Hunter Bulloak Forest Regeneration present has been historically cleared, predominately for grazing. The vegetation lacks 'old-growth' vegetation, but does include mature large trees. Weed cover in the community is generally low. The native shrub and groundcover layers are generally low in coverage due to the high density of fallen branchlets present. [1, 2]<br><br>**Species Composition in Assessment Area**<br><br>This community occurs on degraded land with poor soils, particularly in pasture areas where grazing has been removed. It is a variable community and can range from a closed to open forest, with heights varying from mid-level to tall. Typically, this community contains a very sparse to absent shrub understorey and is dominated by *Allocasuarina luehmannii*. Occurrences of other tree species are uncommon but can include *Eucalyptus crebra, E. moluccana, Angophora floribunda* and *Casuarina glauca*.<br>The groundcover is also variable but is generally sparse. It typically comprises tussock grasses like *Aristida vagans, Cynodon dactylon, Eragrostis leptostachya, Austrostipa verticillata, Cymbopogon refractus, Panicum effusum, Paspalidium aversum, Digitaria divaricatissima* and *Microlaena stipoides*. Forbs, sedges and ferns can also be present and include *Fimbristylis dichotoma, Commelina cyanea*, *Laxmannia gracilis, Lomandra multiflora, Cheilanthes sieberi, Cheilanthes distans, Chrysocephalum apiculatum, Glycine tabacina*, *Goodenia hederacea* ssp. *hederacea* and *Lomandra filiformis*.[1] |

*Note: listing status identified represents listing status for the community at the time the EIA was prepared*
**55.1ha=48ha identified in Proposed South Extension Project (Umwelt, October 2006) and 7.1ha identified in Mt Arthur Open Cut Modification (Hunter Eco, January 2013)*
*1 EIA = Mt Arthur Coal Consolidation Project (Cumberland Ecology 2009)*
*2 EIA = Proposed South Pit Extension Project (Umwelt 2006)*
*3 EIA = Mt Arthur Open Cut Modification (Hunter Eco 2013)*
*4EIA = Proposed Mt Arthur Underground Project (Umwelt 2007)*

### 6.1.1 Species Selection

In general, species selection process ensures that a cross section of nitrogen fixers, early colonisers, long lived, long term shade tolerant and short lived species to provide a sustainable outcome.

The Box Gum Woodland area is mainly on visual dump (VD) 1 and VD5 in the MacLeans emplacement area to the north east on site. The species listed for both Woodland Areas and Box-Gum Areas is subject to change as monitoring data is collected and analysed for improvements. However, the species list is also designed to give flexibility to account for variations needed in the future. The native ecosystem areas will cover all other woodland areas of rehabilitation other than offset areas which have specific requirements. All species mixes are indicative only and are provided in detail in the RMP.

Mt Arthur utilises a broad list of species that will be selected for establishment to be achieved by either seed broadcasting or tubestock planting. This will provide Mt Arthur greater flexibility to:

- Allow for topographical and aspect variations;
- Utilise different application methodology and rates; and
- Allow for staged approach to seeding – i.e. seeding early colonisers to establish ground cover and enhance the substrate followed by longer term and shade tolerant species established through either seeded or tube stock.

The detailed program of rehabilitation works is included in the RMP.

## 6.2 Rehabilitation Area – Agriculture (Grazing)

Rehabilitated pasture (grazing) landscapes will aim to support a financially viable and environmentally sustainable livestock grazing operation. Post-mining land uses will be consistent with surrounding land uses, and not impact on biodiversity values of adjacent woodland and offset and conservation areas. During the life of mine grazing trials will be used to ensure that the land performs as required to meet the criteria for pastures equivalent to surrounding lands.

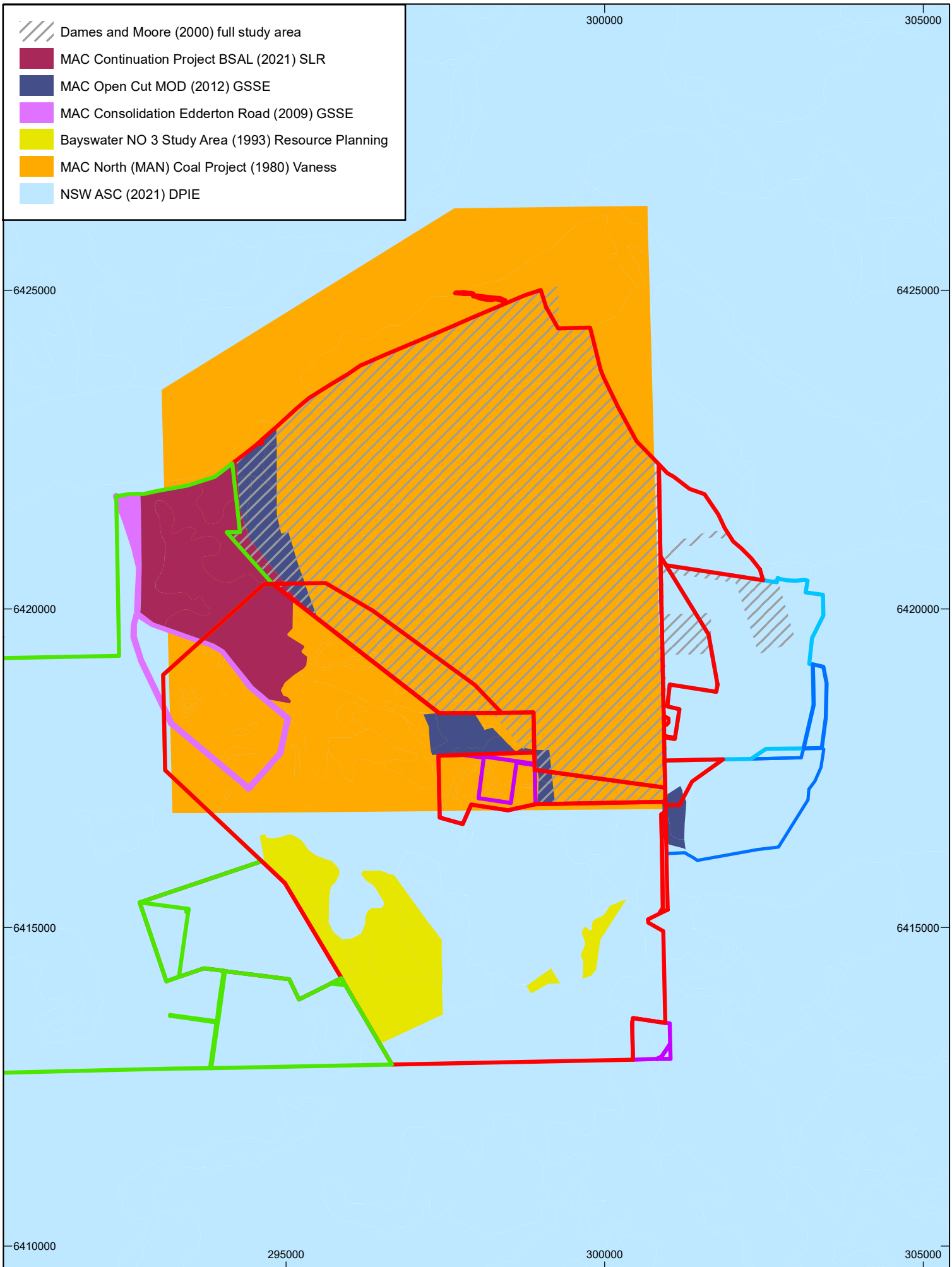
Land and soil capability (LSC) assessment is the preferred agricultural land evaluation scheme for NSW. It refers to the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources. LSC assessment uses the biophysical features of the land and soil to derive detailed rating tables for a range of land and soil hazards. Each hazard is given a rating between 1 (best, highest capability land) and 8 (worst, lowest capability land), and the final LSC class of the land is based on the most limiting hazard.

A soil assessment has been completed for Mt Arthur Coal (SLR, 2022) which included a review of previous soil and LSC studies (see Figure 6). The assessment identified the dominant soil types are sodosols and chromosols.

Sodosols generally classify as Class V as a result of elevated exchangeable sodium percentage (ESP) which is a distinguishing parameter of this soil type. Sodosols have an ESP in the B horizon which is ≥ 6%. LSC Class V is considered to have moderate-low agricultural capability and has severe limitations for high impact land management uses such as cropping. This land is generally more suitable for grazing with some limitations or very occasional cultivation for pasture establishment. LSC Class V is associated with the Sodosols found on areas of greater than or equal to 10%.

Chromosols generally classified as LSC Class IV. Class IV is considered to have moderate agricultural capability with moderate to high limitations for high-impact land uses which restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture;

- Minor areas to the north and west of the site and a larger area to the south east is rated as Class III with a minor area in the north west rated as Class II (GSSE, 2012).

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MT ARTHUR MINE

# SOIL STUDY REFERENCES

| | | | |
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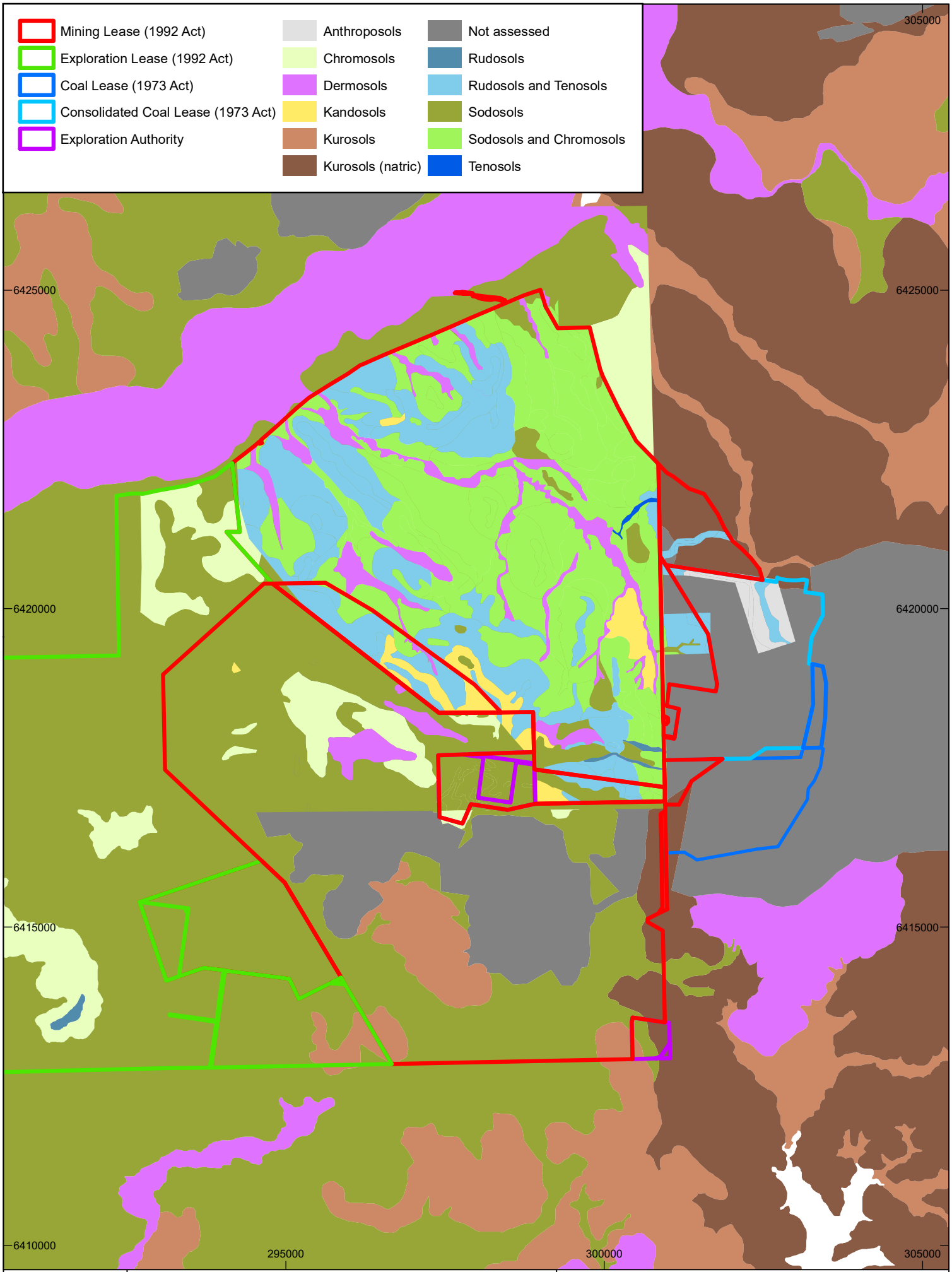
| Drawn: P. Watts | Date: 22/11/2022 | Revision: | FIGURE 6 |
| Checked: J. Deacon | Filename: 20221121-3a.mxd | | |

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MT ARTHUR MINE

# PRE-MINING ASC SOIL TYPES

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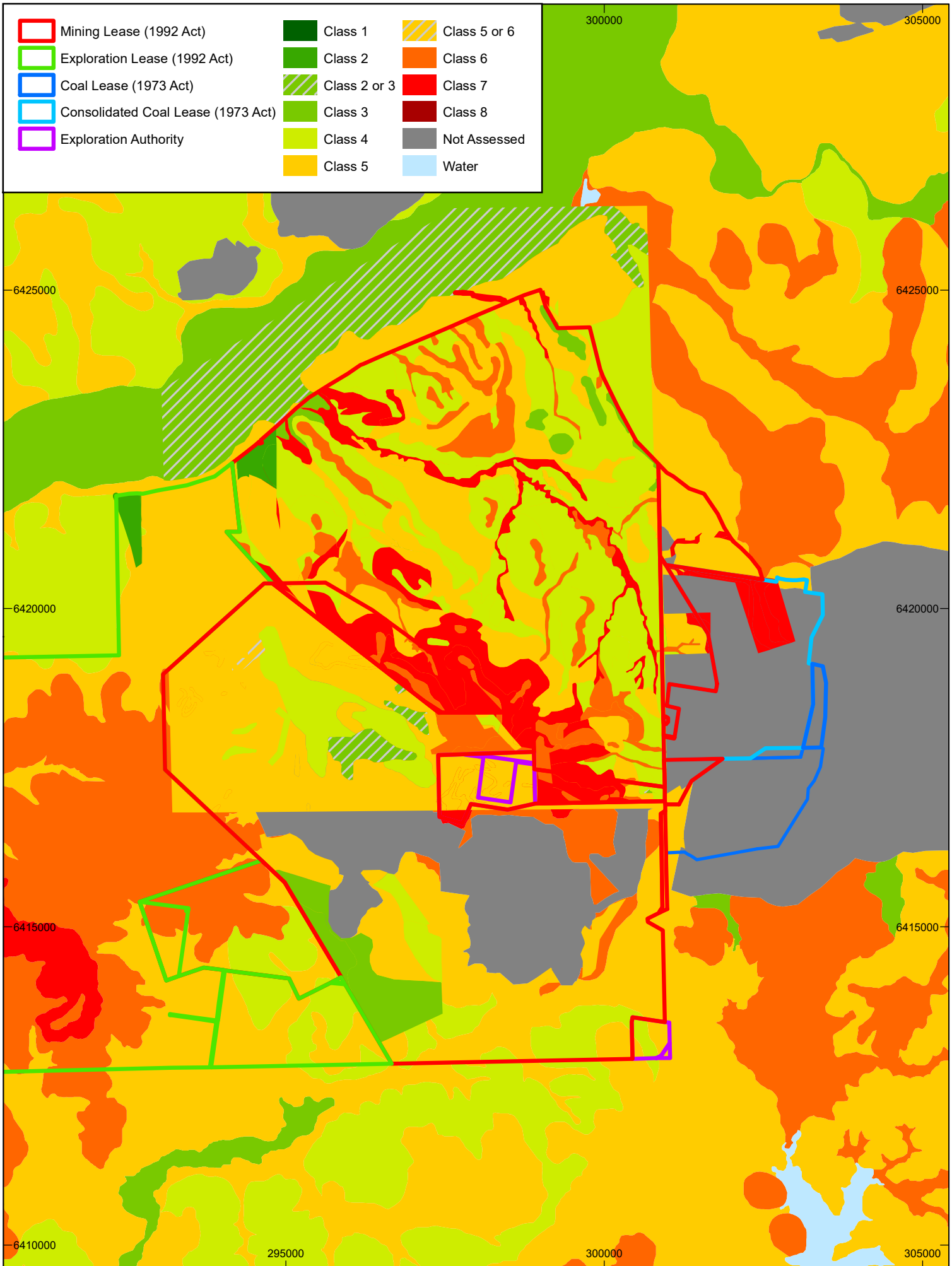


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MT ARTHUR MINE

# PRE-MINING LAND SUITABILITY

| | | | |
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| Drawn: P. Watts | Date: 22/11/2022 | Revision: | FIGURE 8 |
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## 6.3 Water Management Areas

Water management areas at Mt Arthur Coal include the reinstatement of Fairford Creek, Whites Creek diversion, drainage structures, drainage lines from the landforms and water storages. The final landform drainage pattern will be designed and revegetated to achieve long-term stability and erosion control, and integrate with surrounding catchments.

The water management system for Mt Arthur Coal requires water to be 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.

### 6.3.1 Creek Diversions

Whites Creek diversion will be largely retained in its current state and integrated into post-mine landscape, and the redundant section reinstated and rehabilitated.

The natural Fairford Creek was an ephemeral creek. Engeny (2016) undertook a baseline assessment of the main reach of Fairford Creek. The assessment contained a desktop study including geological setting, hydrological condition, channel geometry, stream gradients, sinuosity and a field investigation to describe the bank condition, vegetation and bed sediments. The study found that the reach of the natural Fairford Creek similar to where the reinstated Fairford Creek is to be located had:

- Channel Geometry with an average base width of 4 metres (m), an average low flow depth of 1m, a bank profile of 1V:6H and a bankfull area of 16m$^2$;
- Stream Gradients including a Floodplain gradient of 0.012 m/m with a low flow gradient of 0.008 m/m; and
- Sinuosity Ratio 1.22.

The field investigation found that the Fairford Creek Main Reach varies in channel characteristics and channel planform in the downstream direction towards the Hunter River. Where the channel begins to encroach on the Hunter River floodplain the gradient decreases and sinuosity increases significantly compared to the headwaters. The riparian vegetation along the main reach is highly modified lacking continuity and is mainly a mix of grasses with occasional trees. Bed sediments are dominated by clay and silt particles. The final rehabilitation and post mining land use surrounding the reinstated Fairford Creek channel is pasture with a native woodland corridor bisecting the realigned creek.

### 6.3.2 Water Storage

Water storage areas include final water storages (dams). Discussion on water management infrastructure and water management system components, such as drainage and dams, is included in the RMP. Water storage areas proposed to be retained the project approval include:

- Mine voids; and
- Water dams such as the Environment Dam.

Sediment dams constructed over the course of the operation may also be retained following consultation if a beneficial reuse can be identified.

### 6.3.3 Erosion Management

Temporary sediment detention features may be designed into the channels during construction periods. These features will provide protection of receiving waters' quality during construction.

Further details on the construction and components of erosion and sediment controls, and completion criteria, are included in the RMP.

# 7 Rehabilitation Objectives

The Project Approval objectives state the overarching rehabilitation requirements to be met in order for Mt Arthur Coal to achieve recognisable and sustainable vegetation communities. Schedule 3, Condition 41A of the Project Approval includes Table 14 (**Table 7-1** below) which describes the required rehabilitation objectives. A full list of regulatory conditions relating to rehabilitation is included as **Appendix 1**.

*Table 7-1: PA 09-0062, Schedule 3, Condition 41A, Table 14*

| Feature | Objective |
|---|---|
| Mine site (as a whole) | • Safe, stable and non-polluting<br>• Final landforms designed to incorporate natural micro-relief and natural drainage lines to integrate with surrounding landforms |
| Final voids | • Designed as a long term groundwater sinksand to maximise groundwater flows across backfilled pits t the final void<br>• Minimise to the greatest extent practicable:<br>- the size and depth of final voids<br>- the drainage catchment of voids<br>- any highwall instability risk<br>- risk of flood interaction |
| Agricultural land | • Rehabilitate at least 33 hectares of Class II agricultural capability land in the area identified in the rehabilitation plan (see Appendix 7)<br>• Rehabilitate other areas identified for agricultural use in the rehabilitation plan to sufficient agricultural capability to support grazing |
| Revegetation areas | • Restore at least 2,642 hectares of self-sustaining woodland ecosystems in accordance with the rehabilitation plan, including at least 500 hectares of White Box Yellow Box Blakely's Red Gum Woodland |
| Creek diversions and realignments | • Flows mimic pre-development flows for all flood events up to and including the 1 in 100 year ARI<br>• Incorporate erosion control measures based on vegetation and engineering revetments<br>• Incorporate structures for aquatic habitat<br>• Revegetate with suitable native species |
| Surface Infrastructure | • To be decommissioned and removed, unless DRE agrees otherwise |
| Community | • Ensure public safety<br>• Minimise the adverse socio-economic effects associated with mine closure |

Rehabilitation objectives and completion criteria have been developed based on conditions in the Project Approval, relevant tenures, and procedures relevant to each mining and final land use domain. In addition to Table 14 (shown as above), **Appendix 1** provides a summary of rehabilitation commitments as described in the relevant Environmental Impact Assessments.

Detailed rehabilitation objectives, rehabilitation completion criteria and performance indicators are included in the RMP. These have been prepared in accordance with the *Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines* (RR, 2021). The rehabilitation objectives, rehabilitation completion criteria and performance indicators have been prepared to comply with and build on the objectives in Schedule 3 Condition 41A of the Project Approval.

## 7.1 Final Landform

All landforms across site will be safe, stable and non-polluting. Final landforms constructed post 2014 are designed to incorporate natural microrelief and natural drainage lines to integrate with surrounding landforms.

Characterisation of soils and overburden will be undertaken throughout the development of the mine in order to:

- Identify any physical or chemical deficiencies or toxicity (particularly alkalinity, salinity and sodicity) which may affect such things as vegetation establishment, landform stability;
- Identify materials which may contaminate surface or ground water, and hence may require special handling, treatment or disposal; and
- Identify any propensity for spontaneous combustion and potential acid forming materials.

Characterisation and management of soils and overburden is discussed further in the RMP.

Rehabilitation of the overburden emplacement areas will continue to be established and managed in accordance with methods currently in place at Mt Arthur Coal under the RMP.

## 7.2 Final Void Management Plan

To manage landform stability and meet with the objectives in the Project Approval, the final voids are either:

- Backfilled and rehabilitated to native ecosystem which is integrated into the landscape, providing connected habitat for native flora and fauna species;
- Backfilled and rehabilitated to agricultural (grazing) land use which is aligned with the predominant land use in the hunter valley; and
- Not backfilled and use as water storage and groundwater sink to minimise risk of pollution off site.

Relevant aspects of the final void design and management in relation to the rehabilitation objectives and closure criteria for a safe, stable, non-polluting landform are described in the following sub-sections.

The proposed final land use for the final voids is defined in the Project Approval as “long term groundwater sinks”. Final voids need to be considered safe for humans and wildlife in the context of the intended final void land use and associated risks. Therefore, the safety controls listed below would be implemented to manage both people and stock interaction with the final voids.

Where a plausible safety hazard is identified the mitigation strategies that Mt Arthur Coal will implement include:

- Erection of fencing, potentially including a trench and berm;
- Placement of warning signs;
- Cutting off access infrastructure such as tracks and roads, where compatible with final land use;
- Elimination of features that could promote recreational attraction, where compatible with final land use; and
- Maintenance agreements for the above mitigation measures.

Expert assessment of safety risk will be undertaken to verify that appropriate risk controls are implemented and demonstrate that all reasonable and practicable measures have been applied and meet the overall project objective (**Table 1-1**).

There are two different types of stability that Mt Arthur Coal considers for final voids:

1) The rock mass failure risk that would pose a safety risk to those nearby and could change how the final void and adjacent land is used. Mt Arthur Coal manages this risk during the operational (active mining) phase when people are working below walls in the pit. For final voids, geotechnical engineers assess the rock properties and geological structures at closure to determine controls that are appropriate for long term stability; and
2) Erosional stability around the crest of the final void.

The following controls are implemented to manage stability for final voids:

- Surface water drainage is designed in accordance with the exact location of the final void;
- Consideration of setbacks will be undertaken where the balance between risk and land use will demarcate safe proximity of people and infrastructure to the final void highwalls;
- Catchment areas of the final voids will be minimised post-mining to protect against flooding from the lease area, refer to **Section 5.1**; and
- Erosion controls of final voids is dependent on the geology and water management at, and immediately behind, the pit crest. Erosion controls implemented by Mt Arthur Coal are discussed in the RMP.

A stability assessment of key final landforms should be undertaken during the post-closure phase to confirm that landforms and structures are operating as designed and are stable in the long-term.

One of Mt Arthur Coal’s objectives is to minimise impacts to surface water and groundwater quality beyond the final void. The current final void design aims to mitigate the risk of contaminants migrating via groundwater pathways, thus improving the environmental outcomes for the mine site.

Spontaneous combustion is identified as an ongoing risk managed by site, with controls in place to meet the closure objective of “non-polluting”. Learnings from operational management will be applied to closure designs where there is evidence to suggest spontaneous combustion may occur. The management of material prone to spontaneous combustion is in the RMP.

### 7.2.1 Minimise void extent and depth to the greatest extent practicable

Mt Arthur Coal has considered the mine plan options within the constraints of the current approval and taken the following actions to minimise the extent and depth of final voids. Within the site there are 3 pits (voids), with some pit areas clustered together and made up of smaller discrete pit sections, whilst others are stand-alone. Currently, four pits have already been filled or repurposed (East, West and North Cuts and Macleans pit). The mine plan achieves further reduction in voids by continued mining and waste rock dumping to backfill where practicable.

## 7.3 Rehabilitation Areas – Native Ecosystem

Rehabilitation at Mt Arthur Coal is generally divided into areas for biodiversity outcomes and areas of pasture (the predominant pre mining site use). Post mining land use objectives will determine the generic form of vegetation required e.g. native ecosystem (native woodland /box gum woodland) and agricultural (grazing). In accordance with Schedule 3, Condition 41A of the Project Approval, Mt Arthur Coal shall:

- Restore at least 2,642 ha of self-sustaining woodland ecosystems in accordance with the rehabilitation plan, including at least 500 ha of White Box Yellow Box Blakely's Red Gum Woodland (refer **Table-6-1**); and
- Rehabilitate other areas identified for agricultural use in the rehabilitation plan to sufficient agricultural capability to support grazing.

The landscape and revegetation management strategies at Mt Arthur Coal Mine are described in the 2013 EIS and have been designed to incorporate the objectives of the Synoptic Plan. It should be noted that the offsite rehabilitation corridors including Edderton Road Revegetation Area were moved to disturbed mine areas in the 2013 EIS and included in the 2642 ha rehabilitation area.

The regional habitat links are designed to provide linkages between areas of existing native vegetation, offset areas, rehabilitation areas and off site vegetation areas. The establishment of ecological corridors with a minimum with of 500m, will enhance flora and fauna integrity both locally and regionally. Separate native vegetation strategies will apply to specific domains including:

- Rehabilitation Area – Native Ecosystem including:
    - Native Woodland;
    - Box Gum Woodland; and
- Offset Areas (managed under BioMP).

Native Ecosystem (Native Woodland) will incorporate different species combinations selected from Project Approval Condition 38 (a) and (b) with the aim developing habitat corridors in line with the synoptic plan. Native Ecosystem (Box Gum Woodland) establishment will incorporate different species combinations in accordance with the Project Approval Condition 38 (a) and (b), which focus on the establishment of significantly threatened plant communities and species. Native Ecosystem (Box Gum Woodland) described in the 2013 EA incorporates remnant vegetation, which has been included in the 500 ha of White Box Yellow Box Blakely's Red Gum Woodland.

Revegetation techniques that may be used in the rehabilitation of mined land to achieve land use objectives are discussed in the RMP. Where necessary, research and trials will be undertaken to test alternative techniques and refine methodologies.

The 2014 Environmental Assessment for the Mt Arthur Coal Mine Open Cut Consolidation 2014 (PA 09_0062 (MOD1)) (Section 2.9 and Section 5.1.1) describe one of the key objectives of the Mt Arthur Coal Mine rehabilitation programme to increase the average percentage of native woodland to improve habitat value (i.e. at least 30% of rehabilitation areas will be returned to native woodland). In addition, Schedule 3, Condition 42 of PA 09_0062 stated in part that the Proponent shall investigate options for increasing the area to be rehabilitated to woodland on site. It is noted that, in accordance with general requirements of PA 09_0062 the *Proponent shall carry out the project generally in accordance with the:*

*(a) EA; and*

*(b) conditions of this approval*

To meet with the above requirements, Mt Arthur Coal considers the following options:

- Enhance sustainable vegetation communities by consolidating the woodland corridors where possible. The current final landform design depicts the minimum corridor requirement of 500m, which has the potential to increase the probability of exotic perennial grasses encroaching from adjacent pasture areas;
- Adjusting woodland corridors to capture woodland established pre-2009 and remnant native woodlands;
- Maintain connectivity in line with the synoptic plan, increase the expanse of woodland proposed and reduce the amount of tapering corridors; and

- Define access to uniform areas to accommodate potential alternative future land use.

Refer to Figure 9 for the final land use plan to help achieve the above objectives. As part of minimising disturbance remnant woodland may be incorporated into the woodland corridors as part of the overall 2,642 ha of self-sustaining woodland ecosystems, with restoration works focussed on weed treatment.

BHP

Geospatial Team
Brisbane

Scale: 1: 47,000

0 1 2 km

Transverse Mercator Projection
GDA94 MGA Zone 56

# MT ARTHUR COAL

## Mt Arthur Coal Rehabilitation Strategy
## Conceptual Final Land Use Plan

| | | | |
|---|---|---|---|
| Drawn: A. Johnston | Date: 03/07/2023 | Revision: 3 | **Figure 9** |
| Checked: J. Deacon | Filename: 20230703-6 | | |

ML1757
ML1487
ML1655
ML1548
MPL263
CCL744
CL396
ML1739
ML1739
CL395
ML1739
ML1358
ML1548
CL229
ML1739
ML1593
AUTH 437
EL5965

Thomas Mitchell Drive Offsite Conservation Area
Thomas Mitchell Drive Onsite Conservation Area
Northern Void
Mount Arthur Conservation Area
AUTH437
McDonalds Void
Edderton Road Revegetation Area
Saddlers Creek Conservation Area

300000
305000
6425000
6420000
6415000
295000

- Edderton Road Revegetation Area
- Box Woodland Establishment Area
- Alluvial Cut Off Wall
- Whites Creek Diversion
- Potential Class 2 Pasture Areas
- Conservation Agreement Areas
- Approved Disturbance Boundary
- Mining Lease
- Authorisation
- Coal Lease
- Consolidated Coal Lease
- Exploration Lease
- Surface Area
- Coal Lease (sublease)

As discussed in **Section 6.1** some areas within the mining lease were rehabilitated prior to the Mt Arthur Coal Mine and objectives did not specify ecological communities. Rehabilitation augmentation may be considered in these locations to meet with the current rehabilitation objectives and final land use for Mt Arthur Coal mine. In addition, the 2014 project approval (09-0062) stated that an additional 727 ha of self sustaining woodland established during rehabilitation phase.

**Appendix 1, Table 1** summarises the development of rehabilitation objectives and final land use at the Mt Arthur Coal mine. **Appendix 1, Figures 6 – 9** depict the progression of rehabilitation in accordance with rehabilitation objectives for 2000, 2007, 2009 and 2014 (respectively).

## 7.4 Rehabilitation Area – Agriculture (Grazing)

Objectives for Agriculture (Grazing) include:

- Rehabilitate at least 33 ha of Class II agricultural capability land in the area identified in the rehabilitation plan;
- Rehabilitate the remaining Agriculture (Grazing) areas to Class V-VI capability or better; and
- Native grass species typical of the local area will be used in pastoral grassland establishment.

The proposed pasture seed mix generally used by Mt Arthur Coal is referred to in the RMP and will utilise a mixture of native and exotic grasses.

## 7.5 Water Management Areas

Water storage areas and sediment dams proposed to be retained following mine closure, will be:

- integrated into final rehabilitation catchment;
- reinstated or decontaminated (where required); and
- converted to clean water dams.

### 7.5.1 Creek Reinstatement

Reconstructed creek designs will:

- Be vegetated with species prevalent within the existing creek channels where this doesn't impact on the stability of the reconstructed creek;
- 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 Mt Arthur Coal Open Cut Modification Environmental Assessment 2013 (2013 EA);
- Flows to mimic pre-development flows for all flood events up to and including the 1 in 100 year ARI;
- Incorporate erosion control measures based on vegetation and engineering revetments;
- Incorporate structures for aquatic habitat; and
- Revegetate with suitable native species.

Creek reinstatement works are discussed further in the RMP.

## 7.6 Infrastructure Areas

All surface infrastructure at the Mt Arthur Coal Complex will be removed from the site unless a post-mining land use has been identified and approved by the Resources Regulator (per Schedule 3, Condition 41A of the Project Approval). Disturbed areas associated with existing infrastructure will be managed and revegetated in accordance with the techniques discussed in the RMP.

Pursuant to Schedule 2, Condition 10 of PA 09_0062, demolition activities will be conducted in accordance with *AS 2601-2001: The Demolition of Structures*, or its latest version.

## 7.7 Tailings Storage Facility

The rehabilitated Tailings Storage Facility (TSF) will be integrated into the final landform and revegetation process. The TSF 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. Revegetation of TSFs will be completed after final capping is complete. The design of the capping layer will focus on both sealing the underlying material and creating suitable conditions (based on the characterisation of

the tailings and capping materials) for sustainable vegetation establishment. TSFs will be protected from incompatible land use activities.

Tailings dam capping and rehabilitation is designed to achieve a landform that integrates with the surrounding final land use(s), and will have similar safety protocol to comparable land uses. Tailings dams are unique and therefore, require a unique engineering design for remediation and rehabilitation. Safety considerations with tailings dams include:

- Future access and land use;
- Potentially acid forming material;
- Spontaneous combustion;
- Physical contact with tailings material;
- Differential settlement;
- Erosion; and
- Stability.

The approved final land use for TSFs includes native ecosystem and agriculture (grazing). The Rehabilitation Strategy Final Land Use Plan **(Figure 5**) has agricultural (grazing) as the only landuse in this area. The native ecosystem final land use has been relocated to other areas of rehabilitation. This maximises opportunities for retaining existing infrastructure for future potential land uses without potential loss of native ecosystem. The final landform of the TSF areas also tend to be flatter, increasing capability of the land for use in grazing.

TSF closure is required to meet a Factor of Safety of >1.5. Settlement. Capping design will have a 4-5% slope for drainage and batter slopes generally up to 25% with some areas steeper where slope lengths are suitable. Slope design also incorporates geomorphic principles similar to other rehabilitation design across Mt Arthur Coal.

To achieve a non-polluting landform with the final capped TSF the items above are considered and additionally groundwater interaction. To achieve non-polluting the capping design incorporates sufficient growth medium, integrated cap and vegetation design grasses for initial coverage. Trees and shrubs may be incorporated into the vegetation mix based on the outcomes of monitoring results. Vegetation (grass) to be established quickly and maintained to stabilise surface. Sediment ponds designed for 1:20 year 24-hour storm event and these will be removed from the final landform similar to standard rehabilitation at Mt Arthur Coal.

## 7.8 Process to Achieve Rehabilitation Success

Mt Arthur Coal has proven experience in achieving successful mine rehabilitation with rehabilitation works being completed in various mining areas. Rehabilitated areas will continue to be established and managed in accordance with methods currently in place at Mt Arthur Coal under the RMP, which includes commitments to progressive rehabilitation and monitoring.

The rehabilitation process uses metrics that can quantitatively demonstrate the progress towards completion criteria and therefore achievement of the rehabilitation objectives. The development of suitable criteria is an iterative process and acceptable values or levels may change over time aligned with monitoring results, research and technology.

Rehabilitation objectives, completion criteria and performance indicators provide a quantitative evaluation point of rehabilitation at Mt Arthur Coal, and are presented in RMP. The performance indicators have been designed to provide a benchmark or guide against which to assess the rehabilitation management of project lands and the resulting improvements. These performance indicators will be analysed regularly through the annual review process so that improvements can be incorporated into the rehabilitation process.

Mt Arthur Coal implements a Rehabilitation and Ecological Monitoring Procedure (MAC-ENC-PRO-080) (REMP), which details the assessment method, data collection and frequency of measurement using performance/leading indicators. The REMP uses the ‘rapid assessment process’ which is, assessment within six months of rehabilitation planting/seeding and then annually for at least five years or until the rehabilitated area is determined to have achieved a stable, self-sustaining targeted vegetation community, by an independent expert assessment. Rehabilitation maintenance and improvement works are undertaken based on recommendations in REMP to continually improve the standard of rehabilitation.

Completion criteria are measured in the REMP which is used for the collection of on ground data and to inform the assessment of performance. Data and analysis of the progress is reported in the Annual Review and will include opportunities for improvement.

# 8 Consultation with Stakeholders

Mt Arthur Coal regularly engages with local stakeholders regarding proposed operations, including community engagement programs and opportunities.

Mt Arthur Coal will continue consultation throughout the life of the mine with neighbouring operations, agency and community stakeholders (Coal Community Consultative Committee (CCC)), to optimise landscape and land use outcomes through implementation of this Strategy. Consultation with registered Aboriginal parties is discussed in the Aboriginal Cultural Heritage Management Plan (ACHMP). Mt Arthur Coal commits to engage with local stakeholders regarding proposed operations, potential impacts and management, and opportunities.

Additionally, and in relation to the Pathway to Closure and MOD 2030 outlined within Section 2.2 of this document, Mt Arthur Coal will be implementing a comprehensive engagement program with a broad spectrum of interested stakeholders. This will include a Social Impact Assessment (SIA) conducted specifically for the MOD 2030.

Stakeholder consultation is further discussed in the RMP.

# 9 Socio-economic

Socio-economic impacts from mine closure are generally associated with the ongoing sustainability of utilities (electricity, water, communications), social progress (health, education, justice), infrastructure (roads, airstrip) and business opportunity. All comparisons of socio-economic benefit or risk need to be made against socio-economic baseline studies and social impact assessments completed for Environmental Assessments used for development of Approvals. Consultation that has been undertaken in relation to post mining land use, rehabilitation objectives and completion criteria are, and measures to minimise the adverse effects associated with mine closure are discussed in the RMP.

# 10 Review of the Strategy

In accordance with Schedule 5, Condition 4 of the Project Approval this Strategy will be reviewed, and if necessary revised, within 3 months of:

(a) the submission of an annual review;

(b) the submission of an incident report;

(c) the submission of an audit; or

(d) any modification to the conditions of the approval,

Where this review leads to revisions the Strategy, the revised document must be submitted to the Secretary for approval within four weeks of the review.

Any required amendments identified during the review will be consulted with relevant stakeholders and updated in a revision of the Strategy and resubmitted to the DPE for approval.

Longer term design will not be completed in detailed design due to the dynamic nature of expectations and technology. Any other major amendments to the Strategy that affect its application, or that of the RMP, will be undertaken in consultation with the appropriate regulatory authorities and stakeholders.

# 11 References

Andrews, N, (1999) Synoptic Plan – Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales, Prepared for the NSW Department of Mineral Resources.

ANZMEC and Minerals Council of Australia (2000) Strategic Framework for Mine Closure.

Commonwealth of Australia 2006: Leading Practice Sustainable Development Program for the Mining Industry, Mine Closure and Rehabilitation.

Cumberland Ecology (2022), Mt Arthur Rehabilitation Strategy.

DIIS (Department of Industry, Innovation and Science) (2016c), Mine rehabilitation, Australian Government, Canberra.

GSSE, (2012), Mt Arthur Coal Open Cut Modification – Soil and Land Resource Assessment.

Hansen Bailey (2009) Mt Arthur Coal Consolidation Project Environmental Assessment. Prepared for Hunter Valley Energy Coal Pty Ltd.

Landcom (2004) Managing Urban Stormwater, Soils and Construction Volume 1 (the 'Blue Book')

Landloch Pty Ltd (2014) Future Landform Design Project – Final Report. Report prepared for BHP Billiton Mt Arthur Coal

McCullough, C.D.; Schultze, M.; Vandenberg, J. Realizing Beneficial End Uses from Abandoned Pit Lakes. *Minerals* **2020**, *10*, 133.

Mt Arthur Coal: Forward Program (MAC-ENC-MTP-052)

Muswellbrook Shire Council (Aug 2011) Draft Mining Rehabilitation Policy (Policy No. M40/1)

NSW Department of Planning & Environment (DPE), NSW Resources Regulator (2021), Form and Way: Rehabilitation management plan for large mines.

NSW DPE (Sept 2014) Project Approval 09_0062 MOD 1 Hunter Valley Energy Coal Pty Ltd

Resource Strategies (2013) Mt Arthur Coal Open Cut Modification Environmental Assessment. Prepared for Hunter Valley Energy Coal Pty Ltd.

SLR (2022), Mt Arthur Coal Pre-Mining Land Capability and Soil Type Summary.

## Version Management

*Table 11-1 Rehabilitation Strategy Version History*

| Date | Version Control | | Page(s) | Details |
|---|---|---|---|---|
| | *Major* | *Minor* | | |
| 30/9/11 | 1.0 | | | Final draft – submitted for approval to DP&I. |
| 20/9/12 | 2.0 | | | Minor amendments following DP&I comment |
| 14/11/12 | Final | | | Approved by the Department of Planning & Infrastructure on 14/11/12. |
| 30/06/2016 | 3.0 | | | Amendments following Modification Project Approval for submission to DP&E |
| 26/05/2017 | 4.0 Final | | | Amendments following regulator engagement and consultation, including update from the FLDP |
| 29/06/2018 | | 4.1 | Whole doc | Amendments to the emplacement design and addition of Final Void Management Plan. Submitted June 2018 to DPE. |
| 20/07/2020 | | 4.2 | Whole doc | Updates at the request of DPE. |
| 02/02/2023 | 5.0 | | Whole doc | Draft – Submitted for Consultation |
| 07/07/2023 | | 5.1 | Minor edits | TO respond to consultation feedback. |
| 27/02/2025 | | 5.2 | Minor edits | Update to Table 5-2. |

# Appendix 1 - Regulatory Conditions

***Appendix 1, Table 1 – Project Approval (09-0062 MOD 1) Conditions and Relevant Section(s) of the Rehabilitation Strategy***

| Project Approval Condition | Requirement | Section/s of the Rehabilitation Strategy |
|---|---|---|
| 38 | The Proponent shall ensure that the offset strategy and/or rehabilitation strategy is focused on the re-establishment of: | |
| | (a) significant and/or threatened plant communities, including:<br>• Upper Hunter White Box – Ironbark Grassy Woodland;<br>• Central Hunter Box – Ironbark Woodland;<br>• Central Hunter Ironbark – Spotted Grey-Gum Box Forest;<br>• Narrabeen Footslopes Slaty Box Woodland;<br>• Hunter Floodplain Red Gum Woodland Complex;<br>• White Box Yellow Box Blakely's Red Gum Woodland;<br>• Hunter Lowlands Red Gum Forest; and | Section 6.1 |
| | (b) significant and/or threatened plant species, including:<br>• River Red Gum (*Eucalyptus camaldulensis*);<br>• Pine Donkey Orchid (*Diuris tricolor*);<br>• Tiger Orchid *(Cymbidium canaliculatum)*;<br>• Weeping Myall (*Acacia pendula*); and | Section 6.1 |
| | (c) habitat for significant and/or threatened animal species | Section 6.1 |
| 40 | The Proponent shall prepare and implement a Biodiversity Management Plan for the project to the satisfaction of the Secretary. This plan must: | |
| | (b) describe how the implementation of the offset strategy would be integrated with the overall rehabilitation of the site (see below); | • Section 6;<br>• Section 7.3; and<br>• BioMP |
| 41A | The Proponent shall rehabilitate the site to the satisfaction of the DPE. The rehabilitation must comply with the objective in Table 14, and be consistent with the rehabilitation plan shown in Appendix 7 and the final landform plan shown in Appendix 8. | • Section 4;<br>• Section 8; and<br>• Section 9. |

<table>
<tr><th>Project Approval Condition</th><th>Requirement</th><th>Section/s of the Rehabilitation Strategy</th></tr>
<tr><td></td><td>
Table 14: Rehabilitation Objectives
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>Mine site (as a whole)</td><td>• Safe, stable and non-polluting<br>• Final landforms designed to incorporate natural micro-relief and natural drainage lines to integrate with surrounding landforms</td></tr>
<tr><td>Final voids</td><td>• Designed as long term groundwater sinks and to maximise groundwater flows across back-filled pits to the final void<br>• Minimise to the greatest extent practicable:<br>○ the size and depth of final voids<br>○ the drainage catchment of final voids<br>○ any high wall instability risk<br>○ risk of flood interaction.</td></tr>
<tr><td>Agricultural land</td><td>• Rehabilitate at least 33 hectares of Class II agricultural capability land in the area identified in the rehabilitation plan (see Appendix 7)<br>• Rehabilitate other areas identified for agricultural use in the rehabilitation plan to sufficient agricultural capability to support grazing</td></tr>
<tr><td>Revegetation areas</td><td>• Restore at least 2,642 hectares of self-sustaining woodland ecosystems in accordance with the rehabilitation plan, including at least 500 hectares of White Box Yellow Box Blakely's Red Gum Woodland.</td></tr>
<tr><td>Creek diversions and realignments</td><td>• Flows to mimic pre-development flows for all flood events up to and including the 1 in 100 year ARI<br>• Incorporate erosion control measures based on vegetation and engineering revetments<br>• Incorporate structures for aquatic habitat<br>• Revegetate with suitable native species</td></tr>
<tr><td>Surface infrastructure</td><td>• To be decommissioned and removed, unless DRE agrees otherwise.</td></tr>
<tr><td>Community</td><td>• Ensure public safety<br>• Minimise the adverse socio-economic effects associated with mine closure.</td></tr>
</table>
Note: The rehabilitation plan for the site is shown in Appendix 7.
</td><td></td></tr>
<tr><td>42</td><td colspan="2">The Proponent shall prepare a revised Rehabilitation Strategy for the Mt Arthur mine complex to the satisfaction of the Secretary. This strategy must:</td></tr>
<tr><td></td><td>(a) be prepared in consultation with the DPE and Council, and be submitted to the Secretary for approval by the end of September 2015, unless otherwise agreed with the Secretary;</td><td>• Section 10; and<br>• Appendix 3</td></tr>
<tr><td></td><td>(b) investigate options for:<br>• increasing the area to be rehabilitated to woodland on the site;<br>• reducing the size of final voids on site; and<br>• beneficial future land use of disturbed areas, including voids;</td><td>Section 4;</td></tr>
<tr><td></td><td>(c) describe and justify the proposed rehabilitation plan for the site, including the final landform and land use; and</td><td>• Section 6;<br>• Section 4; and<br>• Figure 3</td></tr>
<tr><td></td><td>(d) include detailed rehabilitation objectives for the site that comply with and build on the objectives in Table 14.</td><td>Section 0</td></tr>
<tr><td></td><td colspan="2">Note: The strategy should build on the rehabilitation plan in Appendix 7.</td></tr>
<tr><td>43</td><td>The Proponent shall carry out rehabilitation progressively, that is, as soon as reasonably practicable following disturbance (particularly on the face of emplacements that are visible off-site). Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation.</td><td>• Sections 8.1; and<br>• Section 9</td></tr>
<tr><td></td><td colspan="2">Note: It is accepted that parts of the site that are progressively rehabilitated may be subjected to further disturbance in future.</td></tr>
<tr><td>44</td><td colspan="2">The Proponent shall prepare and implement a Rehabilitation Management Plan for the Mt Arthur mine complex to the satisfaction of the DPE. This plan must:</td></tr>
<tr><td></td><td>(a) submitted to DPE for approval by 30 September 2015;<br>(b) be prepared in consultation with the Department, NOW, OEH and Council;</td><td>• Covered by</td></tr>
</table>

| Project Approval Condition | Requirement | Section/s of the Rehabilitation Strategy |
|---|---|---|
| | (c) be prepared in accordance with relevant DPE guidelines;<br>(d) describe how the rehabilitation of the site would be integrated with the implementation of the biodiversity offset strategy;<br>(e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary);<br>(f) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final landform including final voids, and final land use;<br>(g) include interim rehabilitation where necessary to minimise the area exposed for dust generation;<br>(h) include a research program that seeks to improve the understanding and application of rehabilitation techniques and methods in the Hunter Valley;<br>(i) include a program to monitor, independently audit and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria; and<br>(j) build to the maximum extent practicable on other management plans required under this approval. | RMP; and<br>• Section 2.2 |

***Appendix 1, Table 2 – Mt Arthur Coal Mine DRAFT Project Approval(s) Summary of Rehabilitation Commitments***

| Project Approval Source | Consent Condition Number | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|---|
| **Consolidated Project Approval MOD 1 (09_0062) DPIE Approval 26/10/2014** | General | General | MOD1 conditions are required to:<br>• Prevent, minimise, and/or offset adverse environmental impacts;<br>• Set standards and performance measures for acceptable environmental performance;<br>• Require regular monitoring and reporting; and<br>• Provide for the ongoing environmental management of the project.<br>The Proponent shall carry out the project generally in accordance with the:<br>(a) EA; and<br><br>(b) Conditions of this approval. | Rehabilitation Strategy document as a whole. |
| | Schedule 3 Condition 36. | Biodiversity offset and Rehabilitation Species | Biodiversity offset strategy as outlined below and as generally described in the EA (and shown in Appendix 7), to the satisfaction of the Secretary.<br>**• Mt Arthur Conservation Area / Existing Vegetation / 105 Ha.**<br>**• Saddlers Creek Conservation Area / Existing Vegetation and vegetation to be established / 131 Ha.**<br>**• Thomas Mitchell Drive Off-site Offset Area / Existing Vegetation and vegetation to be established / 495 Ha.**<br>**• Thomas Mitchell Drive On-site Offset Area / Existing Vegetation and vegetation to be established / 222 Ha.**<br>**• Roxburgh Road 'Constable' Offset Area / Existing Vegetation and vegetation to be established / 110 Ha.**<br>**• Additional Offset Area / Existing Vegetation and vegetation to be established / 250 Ha (TBC Established by EOY 2014).**<br>**• Middle Deep Creek Offset Area / Existing Vegetation and vegetation to be established / 410 Ha.**<br>**• Rehabilitation Area / Vegetation to be established / 2642 Ha (TBC Established by EOY 2014).**<br><br>• Re-established woodland in the Rehabilitation Area at least 2 years prior to the completion of open cut mining activities associated with the project. | • Section 2.1<br>• Section 5<br>• Section 6<br>• Section 7.3<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP). |
| | Schedule 3 Condition 38 | Rehabilitation Objectives | **The Proponent shall ensure that the offset strategy and/or rehabilitation strategy is focused on the reestablishment of**:<br>**(a) significant and/or threatened plant communities, including**:<br>• Upper Hunter White Box – Ironbark Grassy Woodland;<br>• Central Hunter Box – Ironbark Woodland;<br>• Central Hunter Ironbark – Spotted Gum - Grey Box Forest;<br>• Narrabeen Foot slopes Slaty Box Woodland;<br>• Hunter Floodplain Red Gum Woodland Complex;<br>• White Box Yellow Box Blakely's Red Gum Woodland;<br>• Hunter Lowlands Red Gum Forest; and<br><br>**(b) Significant and/or threatened plant species, including:**<br>• River Red Gum (Eucalyptus camaldulensis);<br>• Pine Donkey Orchid (Diuris tricolor);<br>• Tiger Orchid (Cymbidium canaliculatum);<br>• Weeping Myall (Acacia pendula); and<br><br>**c) Habitat for significant and/or threatened animal species.** | • Section 7.2<br>• Section 7.3<br>• Section 7.4<br><br>Biodiversity offset areas are managed under the BioMP. |
| | Section 3 Condition 39 (b) | Rehabilitation (repeat aspect) | **The Proponent shall make suitable arrangements to provide appropriate long term security for the re-established woodland in the Rehabilitation Area at least 2 years prior to the completion of open cut mining activities** associated with the project, to the satisfaction of the Secretary and, with respect to the Thomas Mitchell Drive off-site offset area identified in Table 13 (**see condition 36**), consult with Council. | Section 6.1 |
| | Schedule 3 Condition 40 | Biodiversity Management Plan | The biodiversity management plan should describe how the implementation of the offset strategy would be integrated with the overall rehabilitation of the site (see below); including a description of short, med, long term measures used to:<br>• Implement the biodiversity offset strategy and ,manage the remnant vegetation and habitat **on site and in the offset areas;**<br>• Detailed performance and completion criteria for the implementation of the offset strategy;<br>**• Implement revegetation and regeneration within the disturbance areas and offset areas, including establishment of canopy, sub-canopy (if relevant), understorey and ground strata**<br>• Protection of vegetation and soil outside the disturbance areas;<br>**• Rehabilitating creeks and drainage lines that occur on the site, both inside and outside the disturbance areas (such as the White's Creek Diversion), to ensure no net loss of aquatic habitat**;<br>**• Conserving and reusing topsoil;**<br>• Managing impacts on fauna;<br>**• Collecting and propagating seed and salvaging, transplanting and/or propagating threatened flora and native grassland, in accordance with the Guidelines for the Translocation of Threatened Plants in Australia (Vallee et al., 2004);**<br>• Controlling weeds and feral pests; and<br>• Bushfire management.<br>In addition, it should include:<br>• A program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;<br>**• 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<br>• Details of who would be responsible for monitoring, reviewing, and implementing the plan. | • Section 7.2<br>• Section 7.4<br>• Section 7.5<br>• Section 8.1<br><br>Biodiversity offset areas are managed under the BioMP. |

| Project Approval Source | Consent Condition Number | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|---|
| | Schedule 3 Condition 41A | Rehabilitation Objectives | The site is required to be rehabilitated to the satisfaction of the DRE. The rehabilitation must comply with the objectives in Table 14, and be consistent with the rehabilitation plan shown in Appendix 7 and the final landform plan shown in Appendix 8.<br>• **Summary of Table 14 Rehabilitation Objectives below:**<br>**Mine Site (whole)**<br>• Safe, stable and non-polluting<br>• Final landforms designed to incorporate natural micro-relief and natural drainage lines to integrate with surrounding landforms<br>**Final voids**<br>• Designed as long term groundwater sinks and to maximise groundwater flows across back-filled pits to the final void<br>• Minimise to the greatest extent practicable:<br>• The size and depth of final voids<br>• The drainage catchment of final voids<br>• Any high wall instability risk<br>• Risk of flood interaction.<br>**Agricultural land**<br>• Rehabilitate at least 33 hectares of Class II agricultural capability land in the area identified in the rehabilitation plan (see Appendix 7)<br>• Rehabilitate other areas identified for agricultural use in the rehabilitation plan to sufficient agricultural capability to support grazing<br>**Revegetation areas**<br>• Restore at least 2,642 hectares of self-sustaining woodland ecosystems in accordance with the rehabilitation plan, including at least 500 hectares of White Box Yellow Box Blakely's Red Gum Woodland.<br>**Creek diversions and realignments**<br>• Flows to mimic pre-development flows for all flood events up to and including the 1 in 100 year ARI<br>• Incorporate erosion control measures based on vegetation and engineering revetments<br>• Incorporate structures for aquatic habitat<br>• Revegetate with suitable native species<br>• **Surface Infrastructure to be decommissioned and removed, unless DRE agrees otherwise.**<br>**Community**<br>• Ensure public safety.<br>• Minimise the adverse socio-economic effects associated with mine closure. | • Section 6.1<br>• Section 7<br>• Section 9 |
| | Schedule 3 Condition 42 | Rehabilitation Strategy | The Proponent shall prepare a revised Rehabilitation Strategy which must:<br>(a) Be prepared in consultation with the DRE and Council, and be submitted to the Secretary for approval by the end of September 2015, unless otherwise agreed with the Secretary;<br><br>(b) Investigate options for:<br>• Increasing the area to be rehabilitated to woodland on the site;<br>• Reducing the size of final voids on site; and<br>• Beneficial future land use of disturbed areas, including voids;<br><br>(c) Describe and justify the proposed rehabilitation plan for the site, including the final landform and land use; and<br><br>(d) Include detailed rehabilitation objectives for the site that comply with and build on the objectives in Table 14 (summarised above in S3 C41A). | Rehabilitation Strategy document as a whole. |
| | Schedule 3 Condition 43 | Progressive Rehabilitation | **Schedule 3 Condition 43**. The Proponent shall carry out rehabilitation progressively, that is, as soon as reasonably practicable following disturbance (particularly on the face of emplacements that are visible off-site). Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation. | Section 7.8 |
| | Schedule 3 Condition 44 | Rehabilitation (RMP) | The Rehabilitation Management Plan (RMP) should describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final landform including final voids, and final land use. | • Section 2.2<br>• Section 7 |

| Project Approval Source | Consent Condition Number | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|---|
| **Consolidated Project Approval DPIE Approval 24/9/2010 (09_0062)** | Schedule 3 Condition 36. | Biodiversity offset and Rehabilitation Species | Biodiversity offset strategy as outlined below and as generally described in the EA (and shown in Appendix 7), to the satisfaction of the Secretary.<br>**• Mt Arthur Conservation Area / Existing Vegetation / 105 Ha.**<br>**• Saddlers Creek Conservation Area / Existing Vegetation and vegetation to be established / 295 Ha.**<br>**• Thomas Mitchell Drive Off-site Offset Area / Existing Vegetation and vegetation to be established / 495 Ha.**<br>**• Thomas Mitchell Drive On-site Offset Area / Existing Vegetation and vegetation to be established / 222 Ha.**<br>**• Roxburgh Road 'Constable' Offset Area / Existing Vegetation and vegetation to be established / 110 Ha.**<br>**• Additional Offset Area / Existing Vegetation and vegetation to be established / 165 Ha (TBC Established by EOY 2014).**<br>**• Middle Deep Creek Offset Area / Existing Vegetation and vegetation to be established / 410 Ha.**<br>**• Rehabilitation Area / Vegetation to be established / 1915 Ha (TBC Established by EOY 2014).**<br>**• Re-established woodland in the Rehabilitation Area at least 2 years prior to the completion of open cut mining activities associated with the project.** | • Section 7<br>• Section 8.1<br><br>Biodiversity offset areas are managed under the BioMP. |
| | Schedule 3 Condition 38 | Rehabilitation | **The offset strategy and/ or rehabilitation strategy should focus on:**<br>**a) Significant and/or threatened plant communities, including:**<br>• Upper Hunter White Box – Ironbark Grassy Woodland;<br>• Central Hunter Box – Ironbark Woodland;<br>• Central Hunter Ironbark – Spotted Gum - Grey Box Forest;<br>• Narrabeen Foot slopes Slaty Box Woodland;<br>• Hunter Floodplain Red Gum Woodland Complex;<br>• White Box Yellow Box Blakely's Red Gum Woodland;<br>• Hunter Lowlands Red Gum Forest; and<br><br>**(b) Significant and/or threatened plant species, including:**<br>• River Red Gum (Eucalyptus camaldulensis);<br>• Pine Donkey Orchid (Diuris tricolour);<br>• Tiger Orchid (Cymbidium canaliculatum);<br>• Weeping Myall (Acacia pendula); and<br><br>**(c) Habitat for significant and/or threatened animal species.** | • Section 6<br>• Section 7<br><br>Biodiversity offset areas are managed under the BioMP. |
| | Schedule 3 Condition 39 (c) | Rehabilitation (repeat aspect) | The proponent shall make suitable arrangements to provide appropriate long term security for **woody vegetation to be established in the Rehabilitation Area at least 2 years prior to the completion of mining activities.** | Section 7.3 |
| | Schedule 3 Condition 40 | Biodiversity Management Plan | The biodiversity management plan should describe how the implementation of the offset strategy would be integrated with the overall rehabilitation of the site (see below); including a description of short, med, long term measures used to:<br>• Implement the biodiversity offset strategy and ,manage the remnant vegetation and habitat **on site and in the offset areas;**<br>• Detailed performance and completion criteria for the implementation of the offset strategy;<br>**• Implement revegetation and regeneration within the disturbance areas and offset areas, including establishment of canopy, sub-canopy (if relevant), understorey and ground strata**<br>• Protection of vegetation and soil outside the disturbance areas;<br>**• Rehabilitating creeks and drainage lines that occur on the site, both inside and outside the disturbance areas (such as the White's Creek Diversion), to ensure no net loss of aquatic habitat**;<br>• Conserving and reusing topsoil;<br>• Managing impacts on fauna;<br>**• Collecting and propagating seed and salvaging, transplanting and/or propagating threatened flora and native grassland, in accordance with the Guidelines for the Translocation of Threatened Plants in Australia (Vallee et al., 2004);**<br>• Controlling weeds and feral pests; and<br>• Bushfire management.<br><br>In addition, it should include:<br>• A program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;<br>**• 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<br>• Details of who would be responsible for monitoring, reviewing, and implementing the plan. | Section 7 |
| | Schedule 3 Condition 42 | Rehabilitation Strategy | The Rehabilitation Strategy shall:<br>(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;<br><br>(b) Be prepared in consultation with relevant stakeholders, including I&I NSW, Council and the CCC;<br><br>(c) Investigate options for the future use of disturbed areas including voids upon the completion of mining;<br><br>(d) Describe and justify the proposed rehabilitation strategy for the site, including the final landform and use;<br><br>(e) Define the rehabilitation objectives for the site, as well as the proposed completion criteria for this rehabilitation; and<br><br>(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. | Rehabilitation Strategy document as a whole. |
| | Schedule 3 Condition 43 | Progressive rehabilitation | The Proponent shall:<br>(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<br><br>(b) Achieve the rehabilitation objectives in the Rehabilitation Strategy (see condition 42), to the satisfaction of the Director-General of I&I NSW. | Section 7.8 |

| Project Approval Source | Consent Condition Number | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|---|
| **Bayswater No 3 DA 210/93** | Condition 28(ib) | Rehabilitation duty to report | Rehabilitation report in respect of open cut operations. | RMP Document as a whole |
| **Bayswater Rail Loading Facility and Rail Loop (DA 105-04-00)** | Condition 2.4(a)(vi) | Rehabilitation | **Condition 2.4(a)(vi)**<br>• Measures to connect existing areas and future areas of habitat rehabilitation to form a network of wildlife corridors throughout the site and to adjoining lands to facilitate species recruitment through natural immigration (including details of the habitat corridor proposed in Section 4.9.7 of the EIS);<br>• Details of the integration of this plan with the Bayswater flora and fauna management plan and this plan's inter-relationship with the proposed Mount Arthur North project, if approved.<br><br>**Condition 2.6(a) and (b)**<br>The Applicant shall:<br>(a) Carry out rehabilitation of all areas associated with construction and operation of the railloading facility and rail loop to the satisfaction of the DLWC; and<br><br>(b) Report on the success or otherwise of progressive rehabilitation in the AEMR. | Section 7.3 |

***Appendix 1, Table 3 – Mt Arthur Coal Mine DRAFT Environmental Impact Assessment(s) Summary of Rehabilitation Commitments***

<table>
<tr><th>EIS (Name/ Date) and relevant consent</th><th>Rehab Commitment Aspect</th><th>Rehab Commitment Details</th><th>Section/s of the Rehabilitation Strategy</th></tr>
<tr><td rowspan="4">EA Mt Arthur Coal Mine, Open Cut Consolidation, dated 2014<br><br>Project Approval 09_0062.</td><td>Rehabilitation Objectives</td><td>Section 2.9 and Section 5.1.1<br>The key objectives of the Mt Arthur Coal mine rehabilitation programme are:<br>• Achieving a land capability following the cessation of mining that is comparable to pre-mining land capability and considers stakeholders' interests.<br>• Allowing for sustainable post-mining land use(s) to occur.<br>• Establishing a clear set of indicators to be met.<br>• Increasing areas of native vegetation and available fauna habitat.<br>• Improving linkages between existing areas of remnant vegetation.<br>• Increasing the average percentage of native woodland to improve habitat value (i.e. at least 30% of rehabilitation areas will be returned to native woodland).<br><br>Section 2.14<br>The rehabilitation concepts described above would remain for the Modification with the exception that the Saddlers Pit void would be backfilled as part of the final landform profiling for the Modification.<br><br>Section 5 provides rehabilitation methodologies that apply to the existing operations.</td><td>• Section 6<br>• Section 7</td></tr>
<tr><td>Rehabilitation</td><td>Section 4.6.4<br>The Modification would require refinement of the location of the 'rehabilitation areas'. The existing NSW and Commonwealth Environmental Approvals specify 'rehabilitation areas' in the existing biodiversity offset strategy (Table 4-13). This includes 1,915 ha of vegetation (including 500 ha of Box-Gum Woodland) to be established in corridors as shown on Figure 4-8. This is greater than 30% of the disturbance area for open cut operations at the Mt Arthur Coal Mine.</td><td>• Section 6.1<br>• Section 7.3<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP).</td></tr>
<tr><td>Rehabilitation and Biodiversity</td><td>Section 4.6.4, refer Figure 4-8 and<br>Table 4-13<br>Revised Biodiversity Offset Strategy
<table>
<tr><th>Area</th><th>Offset Type</th><th>Existing Minimum Size (ha)</th><th>Proposed Minimum Size (ha)</th></tr>
<tr><td colspan="4">Development Consent Condition 36</td></tr>
<tr><td>Mt Arthur Conservation Area</td><td>Existing vegetation</td><td>105</td><td>105<br>(no change)</td></tr>
<tr><td>Saddlers Creek Conservation Area</td><td>Existing vegetation and vegetation to be established</td><td>295</td><td>426</td></tr>
<tr><td>Thomas Mitchell Drive Off-site Offset Area</td><td>Existing vegetation and vegetation to be established</td><td>495</td><td>495<br>(no change)</td></tr>
<tr><td>Thomas Mitchell Drive On-site Offset Area</td><td>Vegetation to be established</td><td>222</td><td>222<br>(no change)</td></tr>
<tr><td>Roxburgh Road 'Constable' Offset Area</td><td>Existing vegetation and vegetation to be established</td><td>110</td><td>110<br>(no change)</td></tr>
<tr><td>Additional Off-site Offset Area</td><td>Existing vegetation and vegetation to be established</td><td>165</td><td>250.1*</td></tr>
<tr><td>Edderton Road Revegetation Area</td><td>Existing vegetation and vegetation to be established</td><td>154</td><td>154<br>(no change)</td></tr>
<tr><td>Rehabilitation Areas</td><td>Vegetation to be established</td><td>1,761**** (including 500 ha of Box-Gum Woodland)</td><td>2,642** (including 500 ha of Box-Gum Woodland)</td></tr>
<tr><td>Middle Deep Creek Offset Area (HVEC-owned land)</td><td>Existing vegetation and vegetation to be established</td><td>632*** (including 493 ha of Box-Gum Woodland)</td><td>1,042 (including 596 ha of Box-Gum Woodland)</td></tr>
<tr><td></td><td>Total</td><td>3,939</td><td>5,446.1</td></tr>
</table>
Source: Appendix D.<br>
Highlighted rows have been updated.<br>
* HVEC would provide an additional 21.3 ha offset for Central Hunter Ironbark - Spotted Gum - Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC and an additional 63.8 ha offset for Central Hunter Grey Box – Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions EEC in a location to be determined. It is envisaged that this would be facilitated by a change to Condition 37, Schedule 3 of PA 09_0062, which describes the existing requirement for an additional 165 ha of offset area.<br>
** This value is 34 percent of the total mine disturbance footprint.<br>
*** Umwelt (2011) – requirement of EPBC Act Approval (EPBC 2011/5866).<br>
**** This number excludes the Edderton Road Revegetation Area.</td><td>• Section 6.1<br>• Section 7.3<br><br>Biodiversity offset areas are managed under the BioMP.</td></tr>
<tr><td>Final Void</td><td>Section 5, Table 5-1<br>• Safe and stable rehabilitation of final voids.<br>• Void use is compatible with long-term plans for voids.<br>• Void water consistent with predictions of gradual change over a long time frame.<br><br>Section 5.1.5<br>• The low wall slopes of the final void landform will be designed with an overall slope of around 18 degrees. The final void landform will be rehabilitated with vegetation species that are appropriate for the complex landform.<br>• A Final Void Management Plan will be prepared in accordance with regulatory requirements as part of the closure planning process to integrate the documentation of void management strategies.</td><td>• Section 5.3<br>• Section 7.2</td></tr>
<tr><td>Land use and Rehabilitation</td><td>Section 4.3.3<br>The rehabilitation and mine closure strategy for the Modification includes restoration of agricultural land (Section 5). The rehabilitation of this land reduces the area of agricultural land that would otherwise be sterilised by the Modification.<br><br>Section 4.6.4<br>Post-mining land use should be compatible with surrounding land uses to provide environmental and community benefits.<br><br>Section 5, Table 5-2<br>• Ensure final land use is compatible with surrounding land use.<br>• Land use will be aligned to the relevant land zonings as per the current Muswellbrook LEP.<br>• Ecosystem resilience, health and composition are monitored in rehabilitated and established landscapes.</td><td>• Section 6<br>• Section 7</td></tr>
</table>

| EIS (Name/ Date) and relevant consent | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|
| | **Soils** | **Section 4.3.2**<br>A review of soil properties within the Modification area has identified that soils may be suitable resource for a rehabilitation medium for agricultural land uses (grazing) and for native plant revegetation post-mining .<br><br>**Section 4.3.3**<br>**Soil resource management strategies:**<br>• Materials are stripped to indicated levels preferably in moist conditions, and placed directly onto reshaped areas where practical.<br>• Where topsoil must be stockpiled, efforts are made to reduce compaction with as coarsely textured a condition as possible.<br>• Stockpiles are a maximum of 3 m in height and if stored for greater than 12 months, seeded and fertilised and treated for weeds prior to respreading at approx. 0.1m in depth.<br>• Thorough seedbed preparation is undertaken to ensure optimum establishment and growth of vegetation with all topsoiled areas lightly contour ripped (after topsoil spreading) to create a "key" between the soil and the spoil.<br><br>**Section 4.6.3, Table 4-11**<br>• Topsoil should be conserved so that it can be respread onto the surface during rehabilitation.<br>• Agricultural activities could potentially resume after rehabilitation and mine closure, subject to agreement on the post-closure land use.<br>• A closure strategy for the restoration of agricultural land (Section 5). | • Section 6.2<br>• Section 7.4<br><br>Management of top soil is discussed in the RMP. |
| | **Tailings** | **Section 2.3**<br>**Tailings** (or fine rejects) are stored in the tailings emplacement area (Figure 2-1), which will be **constructed in a series of stages up to a maximum height of 280 m AHD** (HVEC, 2009).<br><br>**Section 5, Table 5-1**<br>**Tailings storage facility:**<br>• Infrastructure associated with mine related activities removed, unless deemed as being required post-mining.<br>• Contaminated or hazardous materials have been capped.<br>• Historic tailings deposits are assessed as non-acid generating.<br>• Allowance for potential subsidence of materials deposited in the tailings storage facility incorporated into final landform design. | • Section 5.3<br>• Section 7.7 |
| | **Overburden** | **Section 3.1.3**<br>**Approx. 512 million bank cubic metres of additional overburden** would be excavated as a result of the Modification.<br>• The majority of this overburden would be **used to in-fill the Northern Open Cut, with some overburden to be placed within the existing overland conveyor corridor**.<br>• The conveyor load point would be relocated, making this corridor available for the placement of overburden (Figure 3-1). This **overburden emplacement area would be constructed to approximately 360 m AHD** (the same height as the approved average height of the Northern Open Cut overburden emplacement) between the Northern Open Cut and the tailings storage areas in the Drayton sub-lease.<br><br>**Section 4.3.2**<br>Overburden mined during the development of the Modification would be used to in-fill mine voids, as well as being placed in the out-of-pit overburden emplacements.<br><br>**Section 4.1.2**<br>• Due to the occurrence of moderately sodic materials within the overburden and interburden it was recommended that any sodic materials exposed within the final surfaces of the emplacements be treated with the direct application of gypsum or lime prior topdressing.<br>• Compaction and burial of the co-disposed tailings and coarse rejects within the overburden emplacements should include a minimum cover thickness of 5m material (Dames and Moore, 2000c). | • Section 5<br>• Section 7.1 |
| | **Hazardous or contaminated material** | **Section 5, Table 5-1**<br>**Areas of active mining Overburden emplacement Final void Infrastructure areas:**<br>• Licensed hazardous materials managed in accordance with regulatory requirements.<br>• Secure and safe containment, remediation and/ or removal of waste substances.<br>• Hazardous materials assessment of infrastructure completed to identify the potential health and environmental risks associated with demolition of these facilities. | • Section 5<br>• Section 7.1<br>• Section 7.2<br><br>Management of hazardous material is discussed in the RMP. |
| | **Water (Final Landform)** | **Section 2.4**<br>Runoff from rehabilitated and revegetated areas will continue to be directed to mine water storages or be directed to sediment retention storages prior to being allowed to drain to local drainages. These areas will be allowed to free drain as the landform becomes stable.<br><br>**Section 5.1.5**<br>Water management for the final landform will involve the reconstruction of a channel in the north-west of the Mt Arthur Coal Mine through to Denman Road as shown in the Mt Arthur Coal Consolidation Project EA. This may be reconsidered in future environmental assessments if mine life is extended. | Section 7.5 |

| EIS (Name/ Date) and relevant consent | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|
| | **Water (Whites Creek)** | **Section 3.3.1**<br>• The upper catchment of Whites Creek is currently diverted around the mine infrastructure area and overburden emplacement via an open channel diversion and short pipeline. As part of this Modification, it is proposed that the upper portion of this diversion be removed and this portion of the catchment would instead drain to the site water management system.<br>• Following completion of mining, Whites Creek would be re-established to drain off-site in accordance with existing conceptual rehabilitation principles. | Section 7.5 |
| | **Native Vegetation** | **Section 5.1.2, Table 5-1**<br>• Sustainability of vegetation type and suitability to final landform type.<br>• Plant communities are aligned to the physical and chemical characteristics of the growing media.<br>• Effective habitat linkages are aligned to surrounding vegetated lands.<br>• Native vegetation establishment will consider local species and sourcing seed of local provenance.<br>• Threatening processes, such as weeds, overgrazing, uncontrolled fire and pest species will be managed in accordance with relevant legislation and selected final land use.<br>• Biodiversity Offset Management Plan, as conditioned in the Project Approval, is implemented.<br>• Plant growth characteristics will facilitate fauna recolonisation and landscape function.<br><br>**Section 4.6.3**<br>• Width of **rehabilitated corridors should be a minimum 500m.**<br><br>**Section 5.1.3**<br>**The post-mining landscape of the site and associated offset areas provide for:**<br>**• Re-establishment of significant and/or threatened plant communities, focussing on:**<br>**- Upper Hunter White Box – Ironbark Grassy Woodland;**<br>**- Central Hunter Ironbark – Spotted Gum Grey-Gum Box Forest;**<br>**- Narrabeen Foot slopes Slaty Box Woodland; and**<br>**- Hunter Floodplain Red Gum Woodland Complex.**<br>**• Re-establishment of significant and/or threatened plant species or populations, including:**<br>**- Pine Donkey Orchid (Diuris tricolour);**<br>**- Lobed Blue-Grass (Bothriochloa biloba);**<br>**- Tiger Orchid (Cymbidium canaliculatum); and**<br>**- Weeping Myall (Acacia pendula).**<br>**• Re-establishment of habitat for significant and/or threatened fauna species.** | • Section 6.1<br>• Section 7.3<br>• Section 7.8<br><br>Biodiversity offset areas are managed under the BioMP. |
| | **Habitat** | **Section 4.6.2**<br>Clearing of vegetation results in the loss of habitat for species that utilise the vegetation, and may also result in the loss of habitat resources which may negatively impact on the lifecycle and survival of fauna species that use these resources in the short and long-term (Appendix D). Habitat resources lost may be comprised of hollow bearing trees; dead wood and dead trees; rocks and fallen timber; and food trees.<br><br>**Section 4.6.4**<br>Habitat features (e.g. large hollows and some suitable logs) would continue to be salvaged during vegetation clearance activities and relocated to rehabilitation areas and the Offset area. | • Section 6.1<br>• Section 7.3<br>• Section 7.8<br><br>Habitat rehabilitation is discussed in the RMP. |
| | **Landform** | **Section 3.6**<br>The rehabilitation concepts described for the existing Mt Arthur Coal Mine would remain for the Modification with the exception that the **Saddlers Pit void would be backfilled as part of the final landform profiling for the Modification**<br><br>**S 4.3.3**<br>Undertake progressive rehabilitation of the Site to integrate constructed landforms with the surrounding landscape.<br>**Rehabilitation and landscape management strategies are detailed in Section 5 of this document.**<br><br>**Section 5, Table 5-1**<br>Stable and permanent, drainage and benching, batter slopes developed using a mix of existing methodologies and industry practice.<br>• Closure criteria and proposed final land use are developed through stakeholder consultation.<br>• All mining and overburden emplacement areas progressively rehabilitated.<br>• Slope angles and lengths meet regulatory requirements.<br>• Growing media are characterised and managed accordingly in context of the post-mining land use and landscape.<br>• Drainage is designed to maximise infiltration and prevent ponding on areas of known dispersive material.<br><br>**Section 5.1.5**<br>The key components of the final landform over the areas of active mining and overburden emplacement include:<br>• Mt Arthur North overburden emplacement height to an average height of 360 m AHD (maximum height of 375 m AHD to create visual relief on the overburden emplacement area);<br>• Development of Bayswater No 3 (Saddlers Pit) overburden emplacement height up to 250 m AHD;<br>• Development of Drayton sub-lease emplacement area up to an elevation of 290 m AHD (part of South Pit extension); and<br>• Development of an out-of-pit overburden emplacement area up to an elevation of 360 m AHD. | • Section 5<br>• Section 6<br>• Section 7 |

<table>
<tr><th>EIS (Name/ Date) and relevant consent</th><th>Rehab Commitment Aspect</th><th>Rehab Commitment Details</th><th>Section/s of the Rehabilitation Strategy</th></tr>
<tr><td rowspan="2">Mt Arthur Coal Mine Consolidation Project EA, Hansen Bailey 2009<br><br>2009</td><td>Cultural Heritage</td><td>Section 4<br>• The 2022 mine plan and conceptual final landform was modified for the Saddlers Pit area to ensure the known grinding grooves are not disturbed and remain free-draining post-mining.</td><td>This commitment has been superseded by the 2014 EIS</td></tr>
<tr><td>Vegetation/ Habitat</td><td>Section 3<br>• The landscape and revegetation management strategies undertaken at the Mt Arthur Coal Complex have been designed to incorporate the objectives of the Department of Primary Industries (DPI) 'Synoptic Plan for Mine Rehabilitation in the Upper Hunter Valley' (Synoptic Plan) (Department of Mineral Resources, 1999).<br>• As part of the South Pit Extension Project, a commitment was made to revegetate corridors to link the Saddlers Creek riparian corridor to the Mount Arthur Conservation Area (see Figure 6). This commitment superseded the commitment to create a Habitat Enhancement Area as required by the Bayswater No 3 EIS.<br>• Rehabilitation at the Mt Arthur Coal Complex is divided into: areas for biodiversity outcomes and areas of pasture (the predominant previous site land use). All rehabilitation strategies aim for a net increase in native vegetated areas at the end of mine life due to rehabilitation targeting native vegetation communities.<br>• 1,592 ha of native forest and woodland and native derived grassland will be conserved at Mt Arthur Coal through offset areas and proposed regeneration of woodlands as shown on Table 34 below:<br><br>Summary of the Mt Arthur Coal Consolidated Offset Strategy<br><table><tr><th>Description</th><th>Proposed Offset Areas (ha)</th><th>Existing Conservation Areas (ha)</th><th>Proposed Regenerated Woodland Area (ha)</th><th>Existing and Proposed Woodland Areas (ha)</th><th>Total (ha)</th></tr><tr><td>TSC Act or EPBC Act listed Forest and Woodland</td><td>158.85</td><td>126.79</td><td>299.2</td><td>585</td><td>1,169.84</td></tr><tr><td>TSC Act or EPBC Act listed Derived Grassland</td><td>482.06</td><td>29</td><td>0</td><td>511</td><td>1,022.06</td></tr><tr><td>Area of other native Forest and Woodland</td><td>59.8</td><td>226.79</td><td>200.8</td><td>487.39</td><td>974.78</td></tr><tr><td>Area of other native derived grassland</td><td>0</td><td>9.15</td><td>0</td><td>9.15</td><td>18.30</td></tr><tr><td>TOTAL</td><td>700.71</td><td>391.73</td><td>500</td><td>1,592.54</td><td>3,184.98</td></tr></table><br>Section 8.6, Commitment 14<br>The mine rehabilitation program will focus on the re-establishment of 500 ha White Box Yellow Box Blakely's Red Gum Woodland.</td><td>Table 34 commitments have been superseded by the 2014 EIS</td></tr>
</table>

| EIS (Name/ Date) and relevant consent | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|
| **Environmental Impact Statement (URS, 2000)** | **Land use and Rehabilitation** | **Section 7.2** A mine rehabilitation strategy has been developed for the site which aims to limit any reduction in post-mining agricultural land suitability, and to optimise the sustainable and productive post-mining land use of the site. | Document as a whole.<br><br>Biodiversity offset areas are managed under the |
| | **Native Vegetation** | **Section 5.3.6**<br>The establishment of woodland/ forest fauna habitat is proposed on the site to mitigate impacts on site flora and fauna and to enhance the ecological conservation value of the site and surrounding areas. This will be achieved through a combination of woodland/forest "habitat re-instatement" on rehabilitated areas and "habitat management" of woodland/ forest remnants in areas not disturbed by mining (Figure 5.5).<br><br>**Section 5.3.8**<br>Native species endemic to the local area will be used in revegetation of the Mt Arthur Coal mine site wherever possible. Local native species have evolved to survive and reproduce.<br><br>**Section 15.3.6**<br>• Progressive rehabilitation and revegetation of the mine site using indigenous flora species or improved pasture species, depending on the intended final land use.<br>• Planning and establishment of wildlife corridors over the post-mining landform consistent with the objectives of The Department of Mineral Resources 's Hunter Valley Synoptic Plan (1999).<br>• Relocation of vegetation cleared from mining areas to create compensatory habitat in rehabilitation and habitat management areas where possible. | • Section 6.1<br>• Section 7.3<br>• Section 7.8 |
| | **Pasture** | **Section 5.3.8**<br>Gently sloping areas of the rehabilitated overburden emplacement will be suitable for the establishment of pastoral grasslands (Figure 5.5). These areas will have a minimum of 400 mm of topdressing and are considered to have a Class IV land capability. | • Section 6.2<br>• Section 7.4 |
| | **Mine Rehabilitation** | **Section 15.3.8**<br>• To ensure rehabilitation and revegetation is self-sustaining and stable in the long term, providing for sustainable post mining land uses.<br>• To create stable rehabilitation landforms that are compatible with the surrounding visual landscape.<br>• To ensure progressive rehabilitation is carried out to reduce the area of exposed overburden emplacement and to reduce visual impacts over the mine life.<br><br>**Section 5.3**<br>The DMR has a general policy requirement that rehabilitated land should be compatible with the established land fabric and/or consistent with pre-mining land capability.<br><br>**Section 5.3.2**<br>The objectives of Mt Arthur mine rehabilitation are as follows:<br>• Comply with regulatory requirements.<br>• Create a stable post-mining landform.<br>• Minimise the reduction in site land capability.<br>• Minimise the visual impact of the mine on surrounding areas.<br>• Minimise the potential for water quality impacts.<br>• Minimise the generation of wind blown dust from exposed areas.<br>• Minimise the impact on site flora and fauna.<br>• Enhance the ecological conservation value of the site and surrounding areas.<br>• Enable productive post-mining land use.<br><br>**Section 5.3.6**<br>The proposed final land use of the site will consist of a mixture of grazing, woodland and forest fauna habitat, and commercial forestry. | The commitment for intended final land use of commercial forestry has been superseded. |
| | **Final Landform** | **Section 5.3.5**<br>• The proposed MAN final landform will consist of overburden emplacement area slopes which are generally 10 degrees (a slope of 6 horizontal to 1 vertical) but may steepen up to 14 degrees (a slope of 4 horizontal to 1 vertical) in isolated areas for access or drainage purposes. Any slopes above 14 degrees would require specific Department of Mineral Resource's approval.<br>• The crest of the Northern void will be approximately 100 m from the lease boundary adjacent to Denman Road subject to geotechnical stability assessment. • The final end walls and highwalls of the voids will be constructed at geotechnically stable slopes (approximately 40 degrees).<br>• Final void low walls and any final ramp batters will be a maximum of 18 degrees consistent with Department of Mineral Resource's requirements.<br>• The drainage pattern of the final landform will be designed to be compatible with the drainage of the surrounding area. It will include permanent diversion drains and contour drains constructed over the life of the mine (Section 7.3.1). | This commitment has been superseded byt the 2014 EIS. |

***Appendix 1, Table 4 – Mt Arthur Coal Mine EPBC Summary of Rehabilitation Commitments***

| Project Approval Source | EBPC Condition Number | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|---|
| **Open Cut Modification (EPBC 2014 / 7377) Preliminary Documentation, Final Approval Notice, June 2016** | 3 | **Native Vegetation/ Habitat**<br><br>**Rehabilitation and Biodiversity** | The person taking the action must compensate for the loss of 58.4 ha of the White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community and 53.4 hectares of native woodland which provides foraging and nesting habitat for the Regent Honeyeater (Anthochaera phrygia), Swift Parrot (Lathamus discolor) and Grey-headed Flying-fox (Pteropus poliocephalus) by:<br>a) securing the following offsets, prior to commencement of the action, through a legally binding conservation covenant over the conservation and offset areas:<br>i. 131 ha expansion of the Saddlers Creek Conservation area located approximately 1 km south of the proposed action area; and<br>ii. 410 ha expansion of the Middle Deep Creek Offset area located approximately 70 km north of the Action area. | • Section 6.1<br>• Section 7.3<br><br>Biodiversity offset areas are managed under the BioMP. |
| | 4 | **Biodiversity offset**<br><br>**Water (Creeks)** | The person taking the action must submit to the Department, for approval by the Minister, a revised Biodiversity Management Plan (BioMP) for the project by 30 June 2017. The BioMP must reflect the proposed Mt Arthur Coal Complex Biodiversity Offset Strategy as generally described in the Preliminary Documentation for EPBC 2011/5866, and include the additional offsets which are described in the Preliminary Documentation for EPBC 2014/7377. The Preliminary Documentation states:<br>a) the following offsets will be secured to compensate for the removal of the 58.4 ha of Box Gum Woodland CEEC and 53.4 ha of foraging habitat:<br>i. a 410 ha expansion of the existing Middle Deep Creek offset area located approximately 70 km north of the Action area; and<br>ii. a 131 ha expansion of the existing Saddlers Creek offset area located approximately 1 km south of the Action area. | Section 7.5<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP). |
| | 5 | **Biodiversity offset** | The BioMP must describe how the implementation of the offset strategy would be integrated with the overall rehabilitation of the site and with local and regional corridors, existing conservation areas and existing biodiversity commitments at the Mt Arthur Coal mine. | • Section 6<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP). |
| | 6 | **Biodiversity offset Rehabilitation Objectives** | The revised BioMP must include the additional offsets for the proposed action described in EPBC 2014/7377 and follow the requirements for the BioMP outlined in the conditions in EPBC 2011/5866 described below:<br>a) a text description and map to clearly define the location and boundaries of the conservation and offset areas and regeneration areas. This must be accompanied with the offset attributes and a shape file;<br><br>b) details of the mechanisms, legal instrument, steps and timing for registering a legally binding conservation covenant that provides enduring protection over each nominated conservation and offset area;<br><br>c) a detailed description of the current condition of the extant vegetation of each conservation and offset area identified in the Preliminary Documentation for EPBC 2014/7377 prior to any management activities. This will provide a baseline description of the vegetation condition of the additional offset areas for the purpose of monitoring;<br><br>d) details of measures to offset the impacts to the MNES described in condition 2 and 3 including:<br>i. details of management actions that will improve the condition of a minimum of 541 ha within the offset areas;<br>ii. management schedules for the offset areas identifying targeted actions for specific areas to protect and enhance the extent and condition of habitat values of the offset areas, a map showing areas to be managed;<br>iii. type of management actions for each offset area and details of methods to be used;<br>iv. timing of management actions for each offset area;<br>v. performance criteria for each action;<br>vi. a detailed monitoring plan for each action including, but not limited to:<br>• control sites; and<br>• periodic ecological surveys to be undertaken by a qualified ecologist, as agreed to in writing by the Minister, and consistent with survey guidelines for nationally threatened species and communities, to assess the success of the management actions measured against identified milestones and objectives;<br>vii. contingency measures to be implemented if performance criteria are not met;<br>viii. a process to report, to the Department, the progress of management actions undertaken in offset areas and the outcome of those actions, including identifying any need for improved management and actions to undertake such improvement; and<br>ix. details of the various parties responsible for management, monitoring and implementing the management activities, including their position or status as a separate contractor. | Section 7<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP). |

| Project Approval Source | EBPC Condition Number | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|---|
| **Open Cut Modification (EPBC 2014 / 7377) Preliminary Documentation, June 2016** | - | **Native Vegetation** | **Section 3.2**<br>**Box-Gum Woodland CEEC**<br>The following measures will be undertaken for the Action and are relevant to avoiding and mitigating impacts on the Box-Gum Woodland CEEC:<br>• Clearance of Box-Gum Woodland CEEC would be limited to 58.4 ha<br>• Controlling weeds; and<br>• Controlling feral pest animals. | • Section 6.1<br>• Section 7.3<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP). |
| | - | **Habitat and Fauna** | **Section 3.5**<br>**Grey-headed Flying-fox (*Pteropus poliocephalus*)**<br>• Revegetation of the post-mine landforms with eucalypt species that provide a potential nectar food source.<br><br>**Section 3.3 and Section 3.4**<br>**Regent Honeyeater (*Anthochaera phrygia*) and Swift Parrot (*Lathamus discolor*)**<br>The following measures will be undertaken for the Action and are relevant to avoiding and mitigating impacts on potential foraging habitat for the Regent Honeyeater:<br>• Revegetation of the post-mine landforms with eucalypt species that provide a potential nectar food source; and<br>• Controlling feral pest animals.<br><br>**Section 3.6**<br>**Spot-tailed Quoll (*Dasyurus maculatus*)**<br>• Salvage and reuse of material from the site for habitat enhancement;<br>• Revegetation of the post-mine landforms; and<br>• Controlling feral pest animals.<br><br>**Section 3.7**<br>**Large-Eared Pied Bat (*Chalinolobus dwyeri*)**<br>• revegetation of the post-mine landforms.<br><br>**Section 3.8**<br>**South-eastern Long-eared Bat (*Nyctophilus corbeni*)**<br>• salvage and reuse of tree-hollows for habitat enhancement; and<br>• revegetation of the post-mine landforms. | • Section 7.2<br>• Section 7.3<br>• Section 7.5<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP).<br><br>Habitat rehabilitation is discussed in the RMP. |
| | - | **Rehabilitation**<br><br>**Habitat** | **Attachment B, Table 19**<br>Existing impact avoidance and mitigation measures relating to rehabilitation at the Mt Arthur Coal Mine:<br>• Revegetation of the post-mine landforms;<br>• Rehabilitation of creeks and drainage lines on the site;<br>• Management of salinity;<br>• Conservation and reuse of topsoil;<br>• Nest Box Programme;<br>• Controlling Weeds;<br>• Controlling Feral Pests;<br>• Controlling Access; and<br>• Bushfire Management. | Section 7<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP).<br><br>Habitat rehabilitation is discussed in the RMP. |
| | - | **Rehabilitation**<br><br>**Native Vegetation** | **Section 8.2**<br>Refinements to the revegetation of the post-mine landforms would include:<br>• limiting the location of the 'rehabilitation areas' to approved disturbance areas;<br>• increasing the width of the 'rehabilitation areas' corridors to a minimum of 500 m;<br>• post-mining land use compatible with surrounding land uses to provide environmental and community benefits; and<br>• consideration of the landform and location of final voids. | Section 7.3<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP). |

| Project Approval Source | EBPC Condition Number | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|---|
| **Mt Arthur Coal Extension Project (EPBC 2011 / 5866) Preliminary Documentation, Final Approval Notice, September 2017** | 4 | **Native Vegetation** | The person taking the action must commence progressive regeneration of 1915 ha of woodland and forest communities, including 299.20 ha of Box Gum Woodland identified in Table 1, as described in the Preliminary Documentation within 1 year of commencement of construction. | • Section 5<br>• Section 6<br>• Section 7<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP). |
| | 7 | **Native Vegetation/ Habitat**<br><br>**Biodiversity offset** | The BioMP must include, but not be limited to, the following information:<br>a) a text description and map to clearly define the location, boundaries and size of the conservation and offset areas and the regeneration area and rehabilitation corridors. This must be accompanied with the offset attributes and a shape file;<br>b) details of the mechanisms, legal instrument, steps and timing for registering a legally binding conservation covenant that provides enduring protection over each nominated conservation and offset area;<br>c) a detailed description of the current condition of the extant vegetation of each conservation and offset area prior to any management activities. This will provide a baseline description of the vegetation condition for the purpose of monitoring;<br>d) details of vegetation communities to be re-established to achieve the 500 ha regeneration area and 1415 ha of rehabilitated corridors:<br>timing of progressive regeneration;<br>ii. criteria to determine success of re-establishment of the Box Gum Woodland and other woodland and forest communities;<br>iii. documentation including mapping of currentenvironmental values relevant to MNES of the area;<br>iv. where revegetation through planting seedlings and/or seeds is intended details of appropriate species and ratios of species relevant to historically occurring listed migratory and listed threatened species' habitat and the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Ecological Community; and the source and provenance of the seed and/or seedlings which will be used.<br><br>e) details of measures to offset the impacts to the MNESdescribed in conditions 3 and 4 including:<br>i. details of management actions that will improve the condition of a minimum of 707.7 ha within the conservation and offset areas and 299.2 ha regeneration area to 'state 1' consistent with the state and transition model for Box Gum Woodland (Rawlings et al, 2010) and listing advice for the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Ecological Community;<br>ii. management schedules for all conservation and offset areas, the regeneration area and the rehabilitation corridors identifying targeted actions for specific areas to protect and enhance the extent and condition of habitat values of the offset areas, a map showing areas to be managed;<br>iii. type of actions for each conservation and offset area,the regeneration area and rehabilitation corridors anddetails of methods to be used;<br>iv. timing of management actions for each area;<br>v. performance criteria for each action;<br>vi. a detailed monitoring plan for each action including, butnot limited to, control sites, periodic ecological surveys to be undertaken by a qualified ecologist, as agreed to in writing by the Minister, and consistent with survey guidelines for nationally threatened species and communities, to assess the success of the management actions measured against identified milestones and objectives;<br><br>vii. contingency measures to be implemented if performance criteria are not met;<br>viii. a process to report, to the Department, the progress of management actions undertaken in the conservation and offset areas, regeneration area and rehabilitation corridors and the outcome of those actions, including identifying any need for improved management and actions to undertake such improvement; and<br>ix. details of the various parties responsible for management, monitoring and implementing the management activities, including their position or status as a separate contractor. | • Section 5.1<br>• Section 6.1<br>• Section 7.3<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP). |
| | 10 | **Biodiversity offset** | If the person undertaking the action proposes to undertake any action within the offset areas, other than those management activities related to managing the offset areas, or as set out in the conditions, approval must be obtained, in writing from the Minister. In seeking the Minister's approval the person undertaking the action must provide a detailed assessment of the area where the action is proposed to take place and an assessment of all associated adverse impacts on MNES. If the Minister agrees to the action within the offset area, the area identified for the action must be excised from the proposed offset areas and alternative offsets secured in relation to the impact on MNES. | Section 6<br><br>Biodiversity offset areas are managed under the BioMP. |
| | 13 | **Biodiversity offset** | The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the Offset Strategy and Biodiversity Offset Management Plan required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media. | Section 6<br><br>Biodiversity offset areas are managed under the BioMP. |

| Project Approval Source | EBPC Condition Number | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|---|
| **EPBC (2011/5866) Appendix Preliminary Documentation for Department of Sustainability, Environment, Water, Population and Communities. Umwelt, Dec 2011** | - | **Native Vegetation**<br><br>**Biodiversity offset** | **Section 2.4**<br>Forest using trees, shrubs and native ground cover from the locality in order to offset the predicted loss of Box Woodland listed under the NSW Threatened Species Conservation Act 1995 (TSC Act) understorey from the mining areas. The proportions of forest and woodland types that will be emulated in rehabilitation are:<br>• 1.8 ha Spotted Woodland Gum forest;<br>• 92.13 ha of Narrabeen Footslopes Slaty Box Woodland;<br>• 76.41 ha of Upper Hunter Hills Exposed -Ironbark Woodland;<br>• 299.20 ha of Upper Hunter White Box -Ironbark Grassy Woodland;and<br>• 30.46 ha of central hunter Bull Oak forest regeneration.<br>The 500ha rehabilitation area is additional to the corridor revegetation.<br><br>**Section 2.6.3.1**<br>The 1915 hectares of rehabilitated woodland area is required by the MACCP Part 3A Approval. The 1915 hectares comprises:<br>• Woodland corridors (1005 hectares);<br>• Regenerated woodland (500 hectares);<br>• Edderton Road revegetation area (154 hectares);<br>• Regeneration corridors (45 hectares), and<br>• Rehabilitation areas (211 hectares).<br>HVEC will create 1005 hectares of woodland corridors to enhance habitat and corridors values at the completion of mining (shown as proposed woodland areas on Figure 6). | Section 7.3<br><br>Biodiversity offset areas are managed under the BioMP. |
| | - | **Native Vegetation and Habitat**<br><br>**Biodiversity offset** | **Section 2.4**<br>**Box-Gum Woodland CEEC**<br>The following measures will be undertaken for the Action and are relevant to avoiding and mitigating impacts on the Box-Gum Woodland CEEC:<br>• Mt Arthur Coal mine's plans have been specifically designed to prevent the clearance of known occurrences of the Box Gum Woodland, based on Mt Arthur Coal mine's approach;<br>• New Conservation Areas have been established over time in areas of significance, thereby continuing to protect further areas of Box Gum Woodland and other woodland in the Mt Arthur Coal mine;<br>• Flora and Fauna Management Plans;<br>• Natural regeneration of woodland communities through the control and, where warranted, removal of domestic stock and the control of weeds.<br>• Targeted planting and remediation will be undertaken where warranted.<br>• The encouragement of natural regeneration will in the long term increase the amount of potential habitat available for the swift parrot and regent honeyeater. | • Section 6.1<br>• Section 6.1.1<br>• Section 7.3<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP). |
| | - | **Native Vegetation and Habitat**<br><br>**Rehabilitation** | **Section 2.4**<br>Mt Arthur Coal has a commitment under the MACCP Part 3A Project Approval to return at least 30 per cent of the rehabilitation to woody vegetation, resulting in at least 1915 hectares woody vegetation at the end of mine life. This will further provide potential habitat for the regent honeyeater and the swift parrot. | • Section 5<br>• Section 6.1<br>• Section 7.2<br>• Section 7.5.1<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP).<br><br>Habitat rehabilitation is discussed in the RMP. |
| | - | **Native Vegetation**<br><br>**Rehabilitation**<br><br>**Topsoil** | **Section 2.4**<br>• Progressive rehabilitation is undertaken wherever possible in order to quickly establish and improve upon the rehabilitation and to minimise the amount of disturbed area at all times.<br><br>• To promote effective links between site rehabilitation, remnant vegetation and ecological offset areas, Mt Arthur Coal will continue to develop a series of woodland corridors across the site. Further to this, the translocation of topsoil and vegetative material is proposed to assist in the recreation of 299.2 hectares of Box Gum Woodland understorey. The seed bank existing in the soil will be supplemented with native seed and spread over the designated understorey and woodland areas.<br><br>• Maintenance works in rehabilitation areas will be completed as required to address any issues of concern identified during monitoring. Maintenance activities may include a range of responses, including:<br>- supplementary seeding of vegetated areas;<br>- weed and pest control;<br>- de-silting or repairing drainage structures and sedimentation dams;<br>- the infill and re-grading of any eroded areas; and<br>- the application of fertiliser. | • Section 6.1<br>• Section 7.3<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP).<br><br>Management of topsoil is discussed in the RMP. |

| Project Approval Source | EBPC Condition Number | Rehab Commitment Aspect | Rehab Commitment Details | Section/s of the Rehabilitation Strategy |
|---|---|---|---|---|
| | | **Habitat and Fauna** | **Section 2.4**<br>Where appropriate tree hollows are salvaged and relocated into conservation areas or rehabilitated areas (documented in the 2010 Flora and Fauna Management Plan (BHP Billiton 2010)). In summary, Mt Arthur Coal mine's tree felling protocol comprises:<br>• Selection of appropriate seasons for tree felling to minimise the number of species and individuals potentially present within tree hollows;<br>• Pre-felling habitat tree mapping;<br>• Felling of non-habitat trees a day or more prior to the felling of habitat trees,<br>• Measures to discourage the presence of species within habitat trees prior to and during felling;<br>• The felling of trees using a bulldozer, with care taken to avoid damage to hollows, or preferably, supported by a wire rope, whilst being felled;<br>• Salvage of suitable hollows using a chainsaw;<br>• Capping of salvaged hollows with marine plywood;<br>• Re-erection of salvaged hollows in Habitat Management Areas, and as mining progresses, in Habitat Reinstatement Areas;<br>• Leaving of habitat trees in their felled position for 48 hours to allow hidden and unreachable fauna species to move in to adjoining vegetation of their own volition; and<br>• All injured fauna to be taken to a local veterinarian and/or wildlife carer.<br><br>Where possible, dead trees, hollow logs, stumps and salvaged rocks will be relocated to areas not planned for mining, to provide significant compensatory habitat for ground dwelling fauna. Dead trees and other salvaged material are placed in roughly formed rows between existing vegetation areas. The structures are placed using excavators or bulldozers in rough rows approximately 15 to 20 metres apart to improve effective coverage and reduce bushfire hazard. | • Section 5<br>• Section 6.1<br>• Section 7<br><br>Biodiversity offset areas are managed under the Biodiversity Management Plan (BioMP).<br><br>Habitat rehabilitation is discussed in the RMP. |

***Appendix 1, Figure 1 – Mt Arthur Coal Mine 2000 Woodland Corridors (Source: 2000 Environmental Impact Statement)***

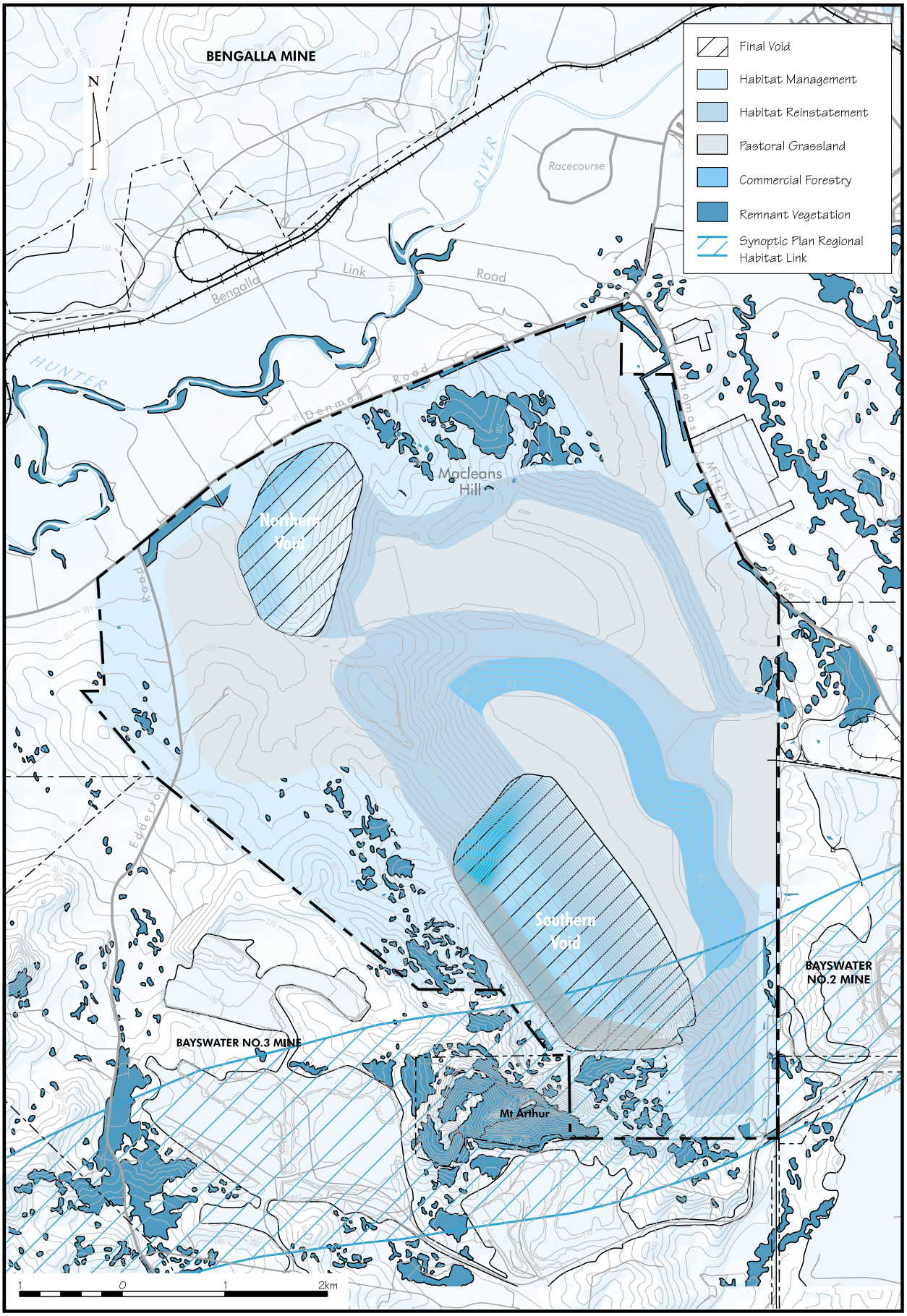
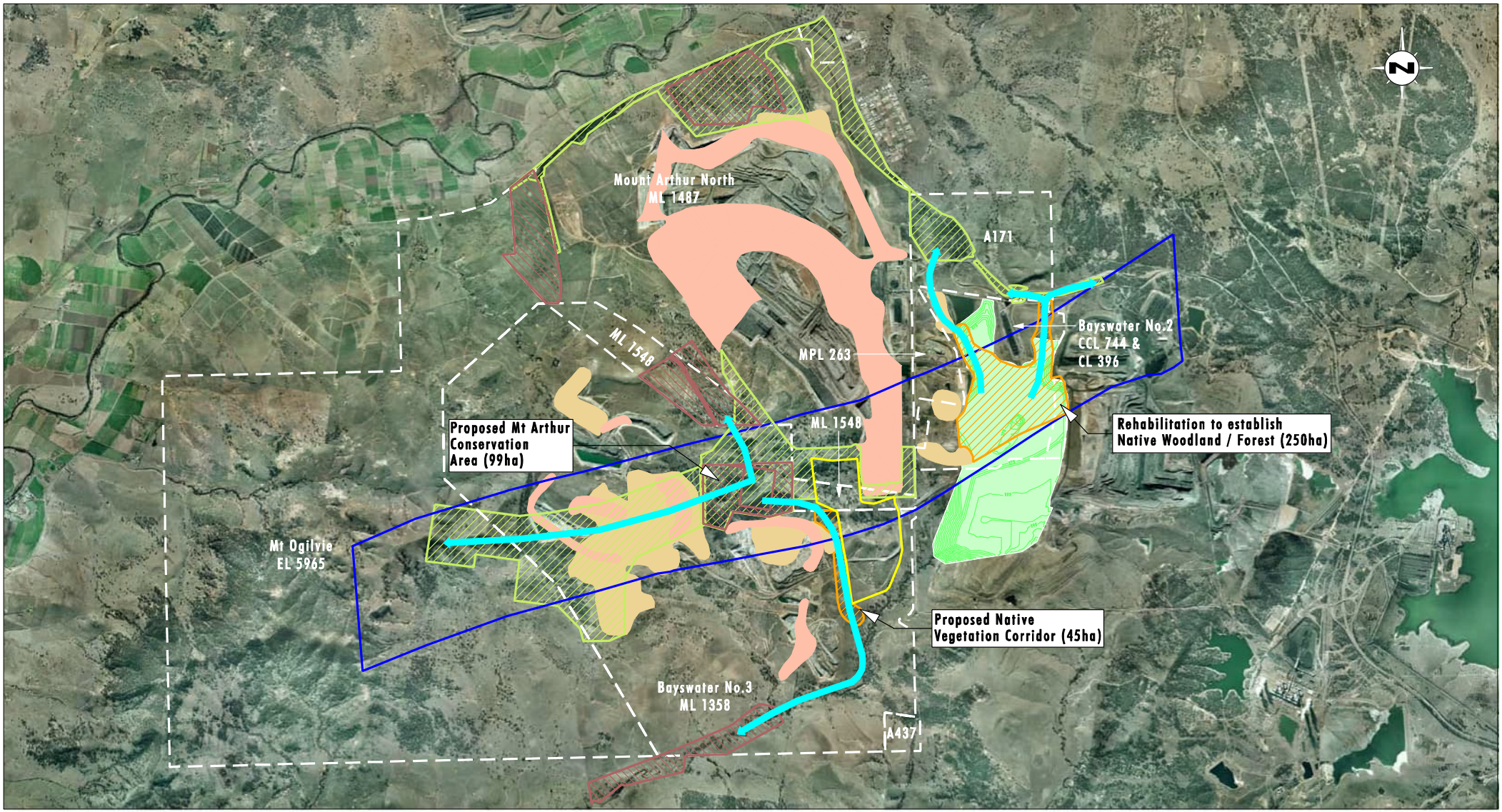



**Figure 6: Conceptual Site Land Use**

TSG 11/04/00 App E-Conceptual.cdr

***Appendix 1, Figure 2 – Mt Arthur Coal Mine 2007 Woodland Corridors (Source: 2007 Environmental Assessment (Umwelt, 2007))***




**Base Source:** Mt Arthur Coal

## Legend

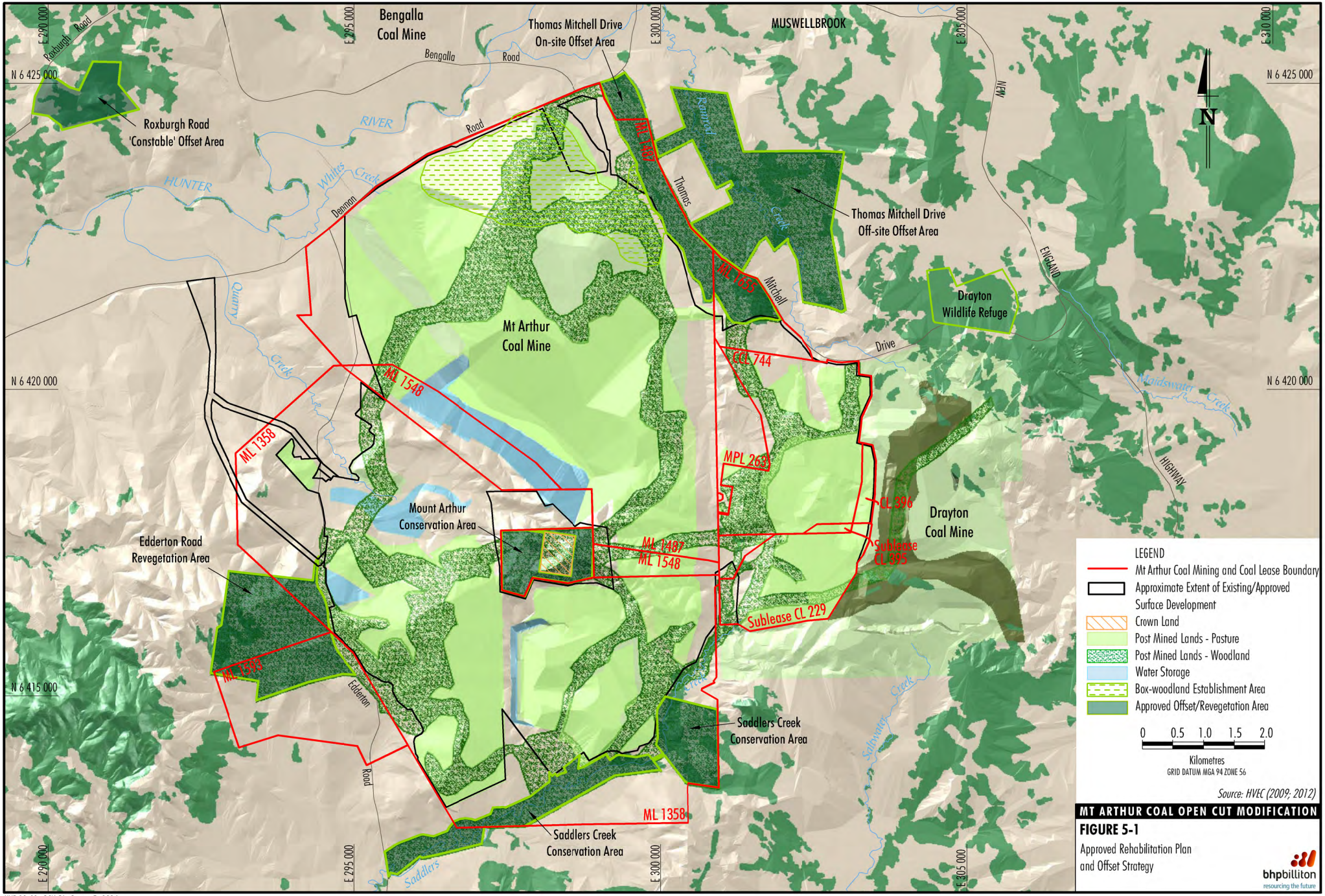
- Mining and Exploration Lease Boundary
- South Pit Extension Mining Area
- Rehabilitated Area
- Existing and Previously Proposed Rehabilitation Area - Native Trees
- Regional Habitat Links (Synoptic Plan, NSW DMR 1999)
- Heritage Management and Conservation Areas
- Habitat Management/Improvement Zones
- Proposed Vegetated Corridors - South Pit Extension Project
- Local Corridors

**File Name (A4):** R02_V1/2000_124.dgn

FIGURE 5.2

**Proposed Ecological Offset Strategy**

***Appendix 1, Figure 3 – Mt Arthur Coal Mine 2009 Approved Final Land Use (Source: 2009 Environmental Assessment (Hansen Bailey, 2009))***




**MT ARTHUR COAL OPEN CUT MODIFICATION**

**FIGURE 5-1**

Approved Rehabilitation Plan and Offset Strategy

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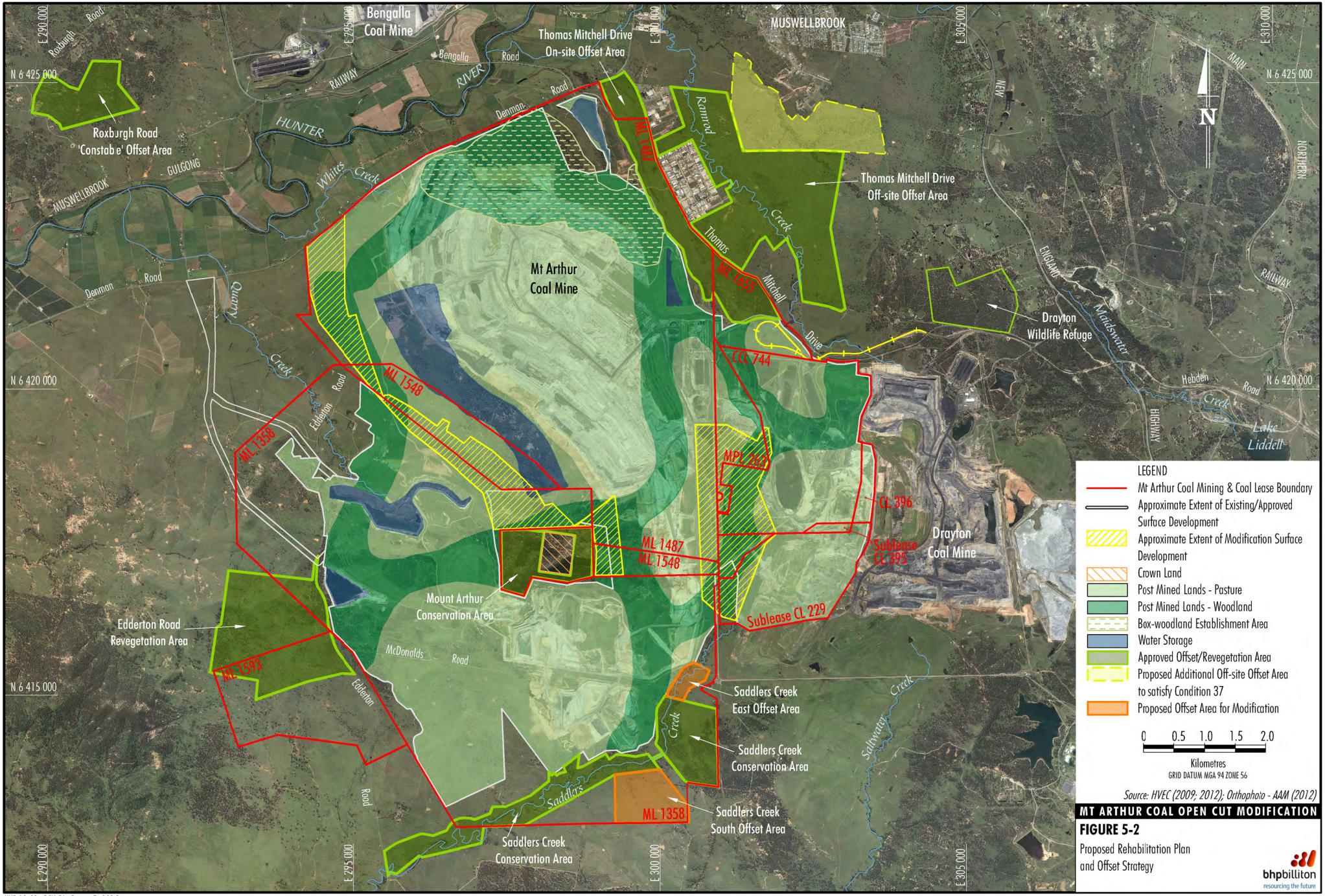
resourcing the future

***Appendix 1, Figure 4 – Mt Arthur Coal Mine 2014 Approved Final Land Use (Source: 2014 Environmental Impact Statement (Resource Strategies, 2014))***




**MT ARTHUR COAL OPEN CUT MODIFICATION**

**FIGURE 5-2**

Proposed Rehabilitation Plan and Offset Strategy

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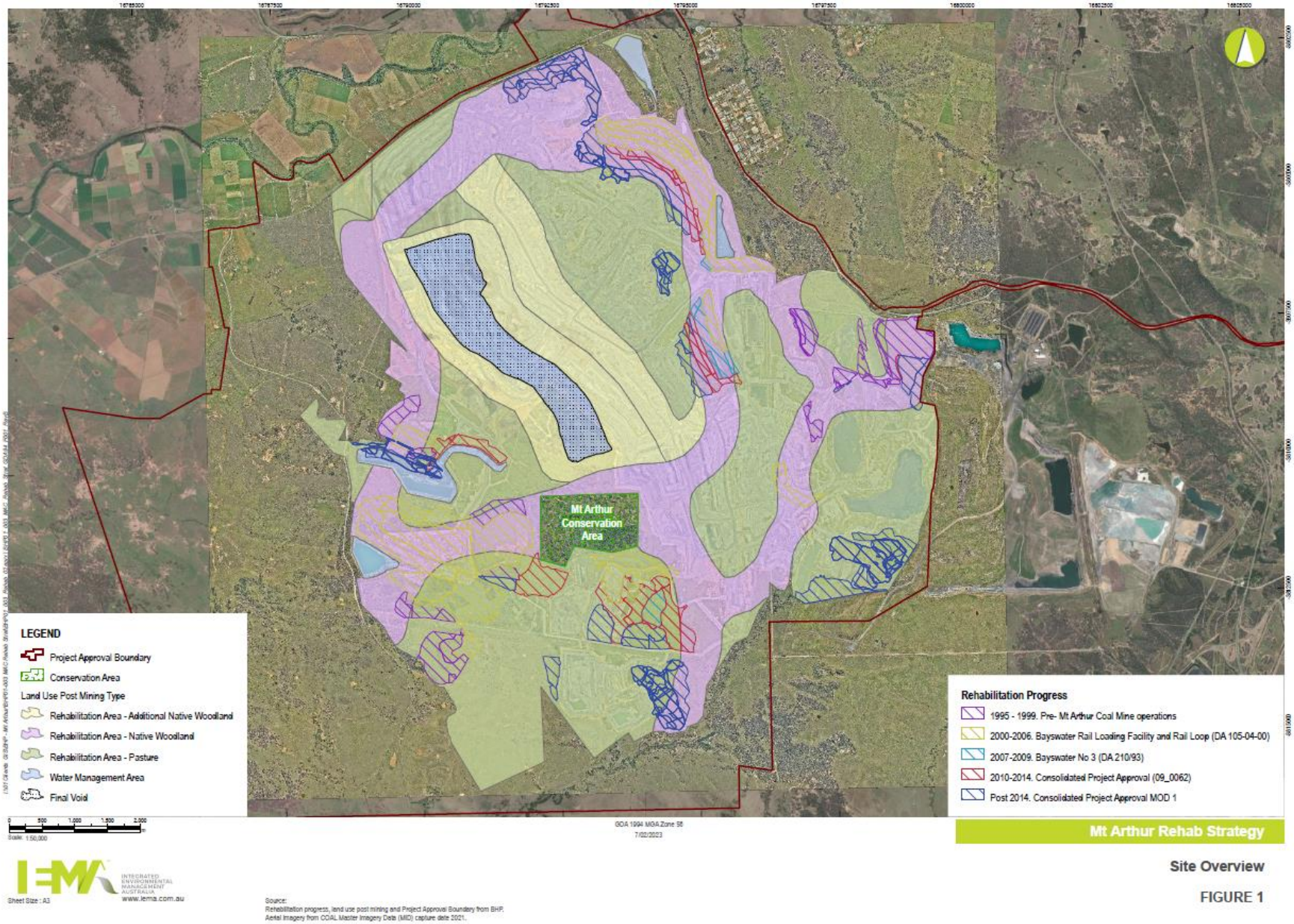
resourcing the future

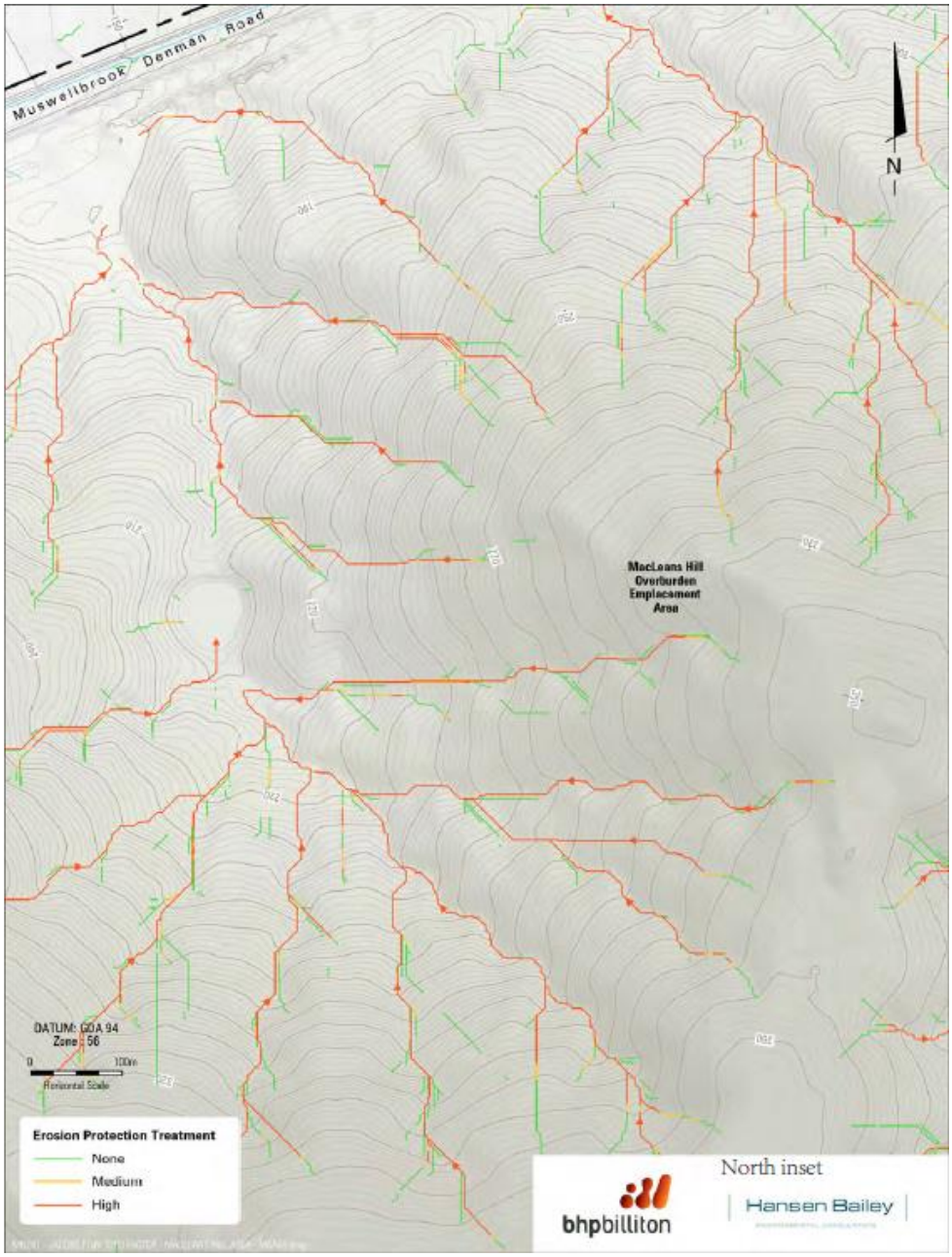
***Appendix 1, Figure 5 – Mt Arthur Coal Mine Progression of Rehabilitation***



# Appendix 2 - Topography Erosion Factor Example

Assessment of erosion risk for un-vegetated landforms (ie shaped overburden and soil materials) is shown in Appendix 4 of the FDLP report, (Landloch, 2014). Required levels of vegetative and engineered erosion management controls will be tailored to address the likelihood of erosion risk according to the colour coding. The erosion risk is further tested after the emplacement is constructed with the as built survey design. The figures in Appendix 4 (Landloch, 2014) are for understanding the erosion assessment process only, they are not final designs of the landform. Once areas are vegetated the risk reduces to unlikely.

Red = erosion is likely, orange = some erosion likely, yellow = minor erosion possible, green = erosion unlikely



# Appendix 3 – Correspondence records

Per Schedule 3, Condition 42, this Strategy was prepared in Consultation with DPE and Council. Consultation was made over the period of review to ensure consideration of community and regulator expectations are included into the rehabilitation process. Records of consultation with Muswellbrook Shire Council and the DPE are included below.

BHP Mt Arthur Caol Rehabilitation Strategy (Draft)
Comment Log following review from Muswellbrook Shire Council and Resources Regulator
15-Jun-23

| Reviewer | Aspect | MSC Ref | MSC Comment | BHP Response | Where addressed in RS |
|---|---|---|---|---|---|
| Muswellbrook Shire Council (MSC) | Consultation | 1 | Consultation with Registered Aboriginal Parties is recommended in relation to rehabilitation. Consultation should be documented in relevant sections. | Noted.<br><br>Section 8 (Consultation with Stakeholders) updated to:<br>Mt Arthur Coal will continue consultation throughout the life of the mine with neighbouring operations, agency and community stakeholders (Coal Community Consultative Committee (CCC)), to optimise landscape and land use outcomes through implementation of this Strategy. Consultation with registered Aboriginal parties is discussed in the Aboriginal Cultural Heritage Management Plan (ACHMP). Mt Arthur Coal commits to engage with local stakeholders regarding proposed operations, potential impacts and management, and opportunities. | Section 8 (Consultation with Stakeholders)<br>Para 2 |
| | | 2 | Any future revisions will need to consider Council's Rehabilitation Policy which is currently being drafted. | This is not a condition of our approval. Council can communicate its recommendations for our consideration based on its policy as part of the consultation required under our approval going forward. | Relevant to Section 10.<br>No changes made; JD to push back on council recommendation. |
| MSC | Location of Woodland Corridors | 3 | Appendix 8 of MP 09_0062 shows a woodland corridor west of the Northern Void connecting the Box Woodland Establishment Area to the Edderton Road Revegetation Area. Figure 9 of the Rehabilitation Strategy does not include this corridor and the final land use for this corridor is proposed as pasture. Officers are satisfied with this change providing: | Noted.<br>(see 3a and 3b below) | - |
| | | 3a | Confirmation is provided on whether the bund adjacent to Denman Road will be removed, and if so, provision of indicative visual landform drawings to show key views from Denman Road (noting that Denman Road is a Designated Tourist Route). Officers' preference is that the visual bund be removed post mining; and | Majority of the bund adjacent to Denman Rd will remain as it (in part) forms the alluvial cut off wall. The remainder of the bund will be used to assist with drainage.<br>Status of bund adjacent to Denman Rd will be reassessed closer to closure.<br>The Rehabilitation Strategy is a high level document with the aspirations and goals of rehabilitation rather than a prescriptive document that outlines the process of rehabilitation in granular detail. | Section 5.1 states:<br>*A flood protection bund has been constructed between Denman Road and the active mining area where the topography is lower in elevation than the 1955 peak flood level in the Hunter River. The bund options will be assessed to understand if it is required post mining.* |
| | | 3b | Indicative views of the final landform from key vantage points on Edderton Road are provided to Officers that show visual impacts will be negligible. | Considered outside of this scope.<br>The Rehabilitation Strategy is a high level document with the aspirations and goals of rehabilitation rather than a prescriptive document that outlines the process of rehabilitation in granular detail. | N/A |
| | | 4 | Officers request that an area within CL229 is planted with Native Woodland to combine with the corridors proposed under the existing approved Maxwell Underground mine - see Figure 11 from SSD 9526 (Maxwell Underground Mine).<br>  <br> | BHP are not able to commit to obligations applicable to Malabar Coal.<br>Much of this area been previously rehabilitated under the current approval (for pasture). | Section 4 (Final Landform and Land Use Statement)<br>Para 2<br>(see cell 12E) |
| | | 5 | Preference is to include a figure showing the neighbouring Malabar Coal final landform and vegetation to demonstrate vegetation connectivity and wildlife corridors. | Refer to Malabar (Maxwell resources) RMP for Malabar Coal final landform.<br>Per above, BHP cannot commit to obligations for Malabar, in addition Malabar design may change.<br><br>Section 4 (Final Landform and Land Use Statement) 2nd Para added:<br>The high level objectives for the rehabilitated final landform is to create a safe stable and non - polluting landform which are designed to incorporate natural micro-relief and natural drainage lines to integrate with surrounding landforms. Final Voids will be designed minimise their size and depth and their catchment size. The landuse objective is to create a mixture of pasture areas suitable for grazing along with large tracts of self - sustaining woodland to improve biodiversity values in the region. The concepts for these objectives are described in the following sections. | Section 4 (Final Landform and Land Use Statement)<br>Para 2 |
| MSC | Final Landform | 6 | Figure 4 of the Rehabilitation Strategy shows the conceptual post mining landscape contours which are not easily comparable to Appendix 8 of MP 09_0062. Officers understand that final landform contour spatial data is required to be provided to the Resources Regulator as part of the Rehabilitation Reforms and will be publicly available in future on the SEED website. | Mt Arthur used Resource Regulator (RR) GIS portal for submision of all GIS and has done so for a number of years (preceeding rehabilitation reforms). Public availability is subject to directive of RR. | N/A |
| | | 7 | Any new final landforms should be designed to include the following principles: | - | - |
| | | 7a | When viewed from Muswellbrook and key State owned roads (including Designated Tourist Routes), any new emplacement landforms will have micro-relief and principles of GeoFLuv applied. | The final landform has to comply with conceptual final landform design specified in approval documents.<br>Geomorphic design will be applied to all post 2013 landforms (external facing dumps).<br>Final landform design per modification report.Section 2.1 (Landform Design Principals) updated to:<br>This Strategy has also been prepared to ensure that the post mining landform supports the selected native ecosystem (woodland) and agricultural (grazing) post-mining land uses specified in the Project Approval.<br>The Rehabilitation Strategy is a high level document with the aspirations and goals of rehabilitation rather than a prescriptive document that outlines the process of rehabilitation in granular detail. | Section 2.1 , Para 1 states:<br>"Design and construction of emplacement areas following the Project Approval MOD1 will be continued using the geomorphic approach where appropriate, focusing on external batters of emplacement areas. " |
| | | 7b | Emplacement landforms across the site designed to look less "engineered" (i.e. incorporation of micro- relief to avoid simple blocky forms). | As above | As above |
| | | 7c | Surface water drainage will incorporate micro-relief to increase drainage stability and avoid major engineered drop structures. | As above | As above |
| | | 7d | Shaping in areas near road infrastructure that may enable more intensive employment land uses in the future when mining ceases. | As above | As above |

BHP Mt Arthur Caol Rehabilitation Strategy (Draft)
Comment Log following review from Muswellbrook Shire Council and Resources Regulator
15-Jun-23

| Reviewer | Aspect | MSC Ref | MSC Comment | BHP Response | Where addressed in RS |
|---|---|---|---|---|---|
| MSC | Final Voids | 8 | Table 5.1 states that the Drayton Void will be backfilled at closure and that no final void will remain. However, a final void is shown in Figure 9. Please clarify. | Figure 9 to be amended to show Drayton's void as backfilled. | Figure 9 |
| | | 9 | Belmont Void is not shown in Figure 9, however Table 5-1 states that this void will remain as a water storage, please clarify. | Belmont Void excluded from Figure 9. table has been updated to reflect this. | Figure 9 |
| | | 10 | The final void (and associated drainage network) should be shaped to reflect a less engineered profile that is more consistent with the surrounding natural environment and at less risk of erosion. | The final landform has to comply with conceptual final landform design specified in approval documents.<br>The Rehabilitation Strategy is a high level document with the aspirations and goals of rehabilitation rather than a prescriptive document that outlines the process of rehabilitation in granular detail. | Per row 15. No change to document. |
| | | 11 | The Final Void Management Plan and its trigger for review should be referenced. | Final void management plan is supreceded by Rehabilitation Strategy (RS) and RMP. | Section 7.2 title changed from "Final Void" to "Final Void Management Plan"<br><br>Section 5.3 Final Voids (sentence added at end of section):<br>Management of the Vinal Void is discussed in Section 7.2 below. |
| MSC | Conservation Agreements | 12 | Please clarify whether Conservation Agreements will apply only to areas shown as "Conservation Agreement Areas" in Figure 9. | Currently required conservation agreement areas (CA) within the woodland corridor are shown in Figure 9. CAs further afield are not shown.<br>Additional areas required through PA will be included on an 'as needed' basis. | Figure 9 |
| MSC | Final Landuse | 13 | Stock fences, dams and access tracks should be established as part of rehabilitation in areas accommodating a final land use of pasture / cattle grazing. | Noted.<br>Considered outside of this scope and not required on Figure 9. The Rehabilitation Strategy is a high level document with the aspirations and goals of rehabilitation rather than a prescriptive document that outlines the process of rehabilitation in granular detail. | Figure 9 |
| | | 14 | Officers are aware that proponents have obligations under the Mining Act 1992 to rehabilitate the site. However, these obligations can inhibit the future use of the site for other industry and utilisation of infrastructure that was constructed for the operation of the Mine and may still have an economic purpose. Whilst Council Officers acknowledge that in the first instance the site should be safe, stable, and non-polluting, there should be a move in the industry toward planning for a range of uses on sites dependent on capability, services and infrastructure and vehicle access. This may allow employment generating activities on part of the site, and similar equivalent employment numbers, rather than the simply returning all the site back to farmland and native ecosystems with minimal employment opportunities. | Noted. The Rehabilitation Strategy is a high level document with the aspirations and goals of rehabilitation rather than a prescriptive document that outlines the process of rehabilitation in granular detail. | N/A |
| | | 15 | The Hunter Regional Plan 2041 contains a discussion on strategic land use opportunities in Strategy 1.1 and 1.2 to encourage early consideration of alternate land uses in mine planning. Although the timing of when alternate land use planning is required is not clear, the proponent should incorporate any relevant outcomes of these studies as part of mine closure. | HVEC has autonomy over final land uses in accordance with its project approval. HVEC will consider all options as it progresses rehabilitation | N/A |
| | | 16 | In January 2023, Mining, Exploration and Geoscience released its Practical Guide Post Mining Land Use Guideline. Officers would like to see the Rehabilitation Strategy, or nomination of another relevant document, include a discussion on the applicability and implementation of the Guideline. | This is not a condition of our approval. RR can communicate its recommendations for our consideration based on its policy as part of the consultation required under our approval going forward. | N/A |
| | | 17 | Please show the 33ha area proposed for Class II agricultural capability land on Figure 9. | Figure 9 to be amended to show potential Class II pasture areas. | Figure 9<br>Section 6.2 |
| MSC | Rehabilitation Works, Target Vegetation and Baseline Completion Criteria | 18 | Officers are particularly interested in the type of work, target vegetation and baseline completion criteria for each of the areas shown in Figure 9. Please provide a table similar to the one below, and reissue to Council Officers for final comment prior to approval of the Rehabilitation Strategy. | Refer to the RMP.<br>The Rehabilitation Strategy is a high level document with the aspirations and goals of rehabilitation rather than a prescriptive document that outlines the process of rehabilitation in granular detail. | Section 6.1<br>Section 7.3 |
| | | 19 | Whilst it is acknowledged that the information requested in the point above is likely to be included in the Rehabilitation Strategy, Rehabilitation Management or Biodiversity Management, a Table would make it easier for staff and the public to interpret (refer example table in MSC letter). | Noted.<br>Section 1 (Purpose) recommends the RS should be read in conjunction to the RMP and BioMP. The Rehabilitation Strategy is a high level document with the aspirations and goals of rehabilitation rather than a prescriptive document that outlines the process of rehabilitation in granular detail. | Section 6.1<br>Section 7.3 |
| MSC | Alternate Flying-Fox Camps | 20 | In 2005, flying-foxes established a camp at Muscle Creek and a section of the Hunter River on land owned by Council and Australian Rail Track Corporation (ARTC). The camp is located close to residential areas and its proximity to a caravan park and public facilities including walk ways, recreational areas, sporting fields, clubs, hotels and the local hospital are the main areas of concern for the community.<br>Historically, the camps have been occupied by the threatened Grey-Headed Flying-fox and in recent years, Little Red Flying-foxes. Disturbance to threatened flying foxes and their habitat is limited by legislative requirements. Flying-foxes predominantly roost in trees within the riparian zone surrounding Muscle Creek and the Hunter River. It would be ideal to establish suitable habitat in areas outside the current camp locations, as research suggest camps can be encouraged to move out of urban areas if there is suitable habitat nearby.<br>Hunter Valley Energy Coal Pty Ltd (HVEC) own multiple parcels of land adjacent to the Hunter River to the north of Denman Road which may be suitable for an alternate flying-fox camp. Officers would like to request HVEC consider flying-fox habitat on some of these land parcels and welcome the opportunity to discuss further. | Considered outside of this scope (beyond the scope of this document), however, BHP willing to continue discussions with MSC on topic. The Rehabilitation Strategy is only in relation to the mine so this discussion is better placed outside of this forum. | N/A |
| MSC | Care and Maintenance or Premature Mine Closure | 21 | Officers would like to see Rehabilitation Strategies for all mine sites in the shire include a commitment that within a given timeframe e.g six months of either entering care and maintenance or unplanned closure, a Mine Closure Plan is prepared in accordance with the Strategic Framework for Mine Closure. | Considered outside of this scope. The Rehabilitation Strategy is a high level document with the aspirations and goals of rehabilitation rather than a prescriptive document that outlines the process of rehabilitation in granular detail. | N/A |
| Resopurces Regulator (RR) | Document Control | 1 | The suitably qualified persons who were required to prepare the Rehabilitation Strategy needs to be disclosed in the document in accordance with PA 09_0062 Schedule 3 Condition 42 (a). | Section 1 (Purpose) 4th Para added:<br>This version (Submitted uly 2023) of the Rehabilitation Strategy has been prepared by Integrated Environmental Management Australia Pty Limited (IEMA). | Section 1 (Purpose)<br>(last Para) |
| RR | Final Land Use | 2 | Notes the revised rehabilitation strategy as depicted in Figure 9 to assist in meeting the objective of increasing the average percentage of native woodland to improve habitat value. Where the revised rehabilitation strategy is approved by the Department of Planning and Environment, Mt Arthur Coal will be required to update the Final Landform and Rehabilitation Plan lodged to the Resources Regulator in accordance with Schedule 8A of the Mining Regulation. | Noted | N/A |

## Deacon, Jono

| | |
|---|---|
| From: | Deacon, Jono |
| Sent: | Tuesday, 14 March 2023 1:31 PM |
| To: | Resources Regulator |
| Cc: | Greg Kininmonth; Nixon, James |
| Subject: | Mt Arthur Coal Rehabilitation Strategy |
| Attachments: | MAC-ENC-MTP-047 Rehab Strat Draft for Consultation_Optimized.pdf |

Hello,

Under the Schedule 3 Condition 42 of Mt Arthur's Project Approval (09/0062) we are required to consult with the Resources Regulator (DRE) on the development of the Mt Arthur.

See attached draft for comment. We require feedback on this document by 31st March. If you have any questions please contact me using the below details.

Thanks,

BHP
**Jono Deacon**
**Principal Environment**
**Mt Arthur Coal / NSW Energy Coal**
D +61 4 1520 6475
E jonathon.deacon@bhp.com
Thomas Mitchell Drive
Muswellbrook NSW 2333, Australia
**bhpbilliton.com**

**Resources Regulator**
Department of Regional NSW

Tuesday 4th April 2023

Jonathon Deacon
BHP
Jonathon.Deacon@bhp.com

Via: Major Projects Portal

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Dear Jonathon,

I refer to the Mt Arthur Rehabilitation Strategy submitted to the Resources Regulator on 14th March 2023.

The Resources Regulator has reviewed the Mt Arthur Coal Rehabilitation Strategy (version 4.3, Released 3/3/23) and makes the following comments.

- The suitably qualified persons who were required to prepare the Rehabilitation Strategy needs to be disclosed in the document in accordance with PA 09_0062 Schedule 3 Condition 42 (a).

- Notes the revised rehabilitation strategy as depicted in Figure 9 to assist in meeting the objective of increasing the average percentage of native woodland to improve habitat value. Where the revised rehabilitation strategy is approved by the Department of Planning and Environment, Mt Arthur Coal will be required to update the Final Landform and Rehabilitation Plan lodged to the Resources Regulator in accordance with Schedule 8A of the Mining Regulation.

The Resources Regulator also notes that a future revision of the Rehabilitation Strategy will be required following the proposed modification that is intended to be lodged by Mt Arthur Coal to revise the final landform plan in the lead up to the closure of the site. Noting that there are some uncertainties regarding the final landform design and capping strategy associated with the tailings emplacement facility, the Regulator will continue to provide regulatory oversight of this issue to ensure that the final rehabilitation outcome of this area is sustainable.
As such it is expected that the rehabilitation of the tailings emplacement facility will be required to be addressed as part of any future modification of the development consent and any revisions to the Rehabilitation Strategy document.

It should be noted that the Resources Regulator does not provide any endorsement of the proposed rehabilitation methodologies presented in the plans provided. Under the conditions of a mining authorisation granted under the Mining Act 1992, the Resources Regulator requires the holder to adopt a risk-based approach to achieving the required rehabilitation outcomes.

The applicability of the controls to achieve effective and sustainable rehabilitation is to be determined based on site-specific risk assessments conducted by the authorisation holder. An authorisation holder may also be directed by the Resources Regulator to implement further risk control measures required to achieve effective rehabilitation outcomes during the life of the mine.

*BACKGROUND*

The Mining Act Inspectorate within the Resources Regulator undertake risk-based compliance and enforcement activities in relation to obligations under the *Mining Act 1992*. This includes undertaking assessment and compliance activities in relation to mine rehabilitation activities and determination of security deposits. To ensure consistency, the Regulator requests the opportunity to review a copy of the draft development consent prior to any approval of the project.

The Mine Safety Inspectorate within the Resources Regulator is responsible for ensuring the mine operators' compliance with the Work Health and Safety (WHS) legislation, in particular the effective management of risks associated with the principal hazards as specified in the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*.

*CONTACT*

Should you require any further information or clarification, please contact the Regulator on 1300 814 609 (Press Option 2 Press Option 5) or email nswresourcesregulator@service-now.com.

Yours sincerely,

**Matthew Newton**

Principal Inspector – Environment and Rehabilitation Operations

Resources Regulator

## Deacon, Jono

| | |
|---|---|
| From: | Deacon, Jono |
| Sent: | Tuesday, 14 March 2023 11:10 AM |
| To: | Theresa Folpp |
| Cc: | Nixon, James |
| Subject: | FOR CONSULTATION - Rehabilitation Strategy |
| Attachments: | MAC-ENC-MTP-047 Rehab Strat Draft for Consultation_Optimized.pdf |

Hi Theresa,

As discussed attached is an update of the Mt Arthur Coal Rehabilitation Strategy. Under the Schedule 3 Condition 42 of Mt Arthur's Project Approval (09/0062) Muswellbrook Shire Council. Note the attached document has been compressed to allow for transmittal via email. If you would like a higher resolution document please contact me to arrange a file share.

We require feedback on this document by 31st March. Can you confirm a time over that period for the consultant that helped us prepare the document to present to you and other council staff on the process of developing the document and how it relates to Mt Arthurs other statutory documents that relate to rehabilitation (Biodiversity Management Plan, the Resources Regulators Rehabilitation Reforms and the Rehabilitation Management Plan)?

Thanks,

BHP
**Jono Deacon**
**Principal Environment**
**Mt Arthur Coal / NSW Energy Coal**
D +61 4 1520 6475
Thomas Mitchell Drive
Muswellbrook NSW 2333, Australia
**bhpbilliton.com**

muswellbrook shire council

**Enquiries**
**Please ask for** Theresa Folpp
**Direct** 02 6549 3700
**Our reference** Mount Arthur

19 April 2023

**Jono Deacon**
**Principal Environment**
**BHP Mount Arthur Coal**

Dear Mr Deacon

**Mount Arthur Coal (MP 09_0062) – Muswellbrook Shire Council (Officer) comments on Rehabilitation Strategy**

Reference is made to the following:

- Email from BHP's Jono Deacon dated 14/03/23 requesting feedback from Muswellbrook Shire Council; and
- 'Mt Arthur Coal Rehabilitation Strategy v4.3' dated 03/03/23.

The Rehabilitation Strategy was approved in 2012 with updates being undertaken in 2016, 2017, 2018 and 2020.

The 2023 update is to align the strategy with project approval requirements and to clarify rehabilitation objectives. Muswellbrook Shire Council (Council) staff appreciate the opportunity to comment on the Rehabilitation Strategy. Our comments are as follows:

**Consultation**

01. Consultation with Registered Aboriginal Parties is recommended in relation to rehabilitation. Consultation should be documented in relevant sections.

02. Any future revisions will need to consider Council's Rehabilitation Policy which is currently being drafted.

**Location of Woodland Corridors**

03. Appendix 8 of MP 09_0062 shows a woodland corridor west of the Northern Void connecting the Box Woodland Establishment Area to the Edderton Road Revegetation Area. Figure 9 of the Rehabilitation Strategy does not include this corridor and the final land use for this corridor is proposed as pasture. Officers are satisfied with this change providing:

    a) Confirmation is provided on whether the bund adjacent to Denman Road will be removed, and if so, provision of indicative visual landform drawings to show key views from Denman Road (noting that Denman Road is a Designated Tourist Route). Officers' preference is that the visual bund be removed post mining; and
    b) Indicative views of the final landform from key vantage points on Edderton Road are provided to Officers that show visual impacts will be negligible.

04. Officers request that an area within CL229 is planted with Native Woodland to combine with the corridors proposed under the existing approved Maxwell Underground mine - see Figure 11 from SSD 9526 (Maxwell Underground Mine).


05. Preference is to include a figure showing the neighbouring Malabar Coal final landform and vegetation to demonstrate vegetation connectivity and wildlife corridors.

**Final Landform**

06. Figure 4 of the Rehabilitation Strategy shows the conceptual post mining landscape contours which are not easily comparable to Appendix 8 of MP 09_0062. Officers understand that final landform contour spatial data is required to be provided to the Resources Regulator as part of the Rehabilitation Reforms and will be publicly available in future on the SEED website.

07. Any new final landforms should be designed to include the following principles:

    a) When viewed from Muswellbrook and key State owned roads (including Designated Tourist Routes), any new emplacement landforms will have micro-relief and principles of GeoFLuv applied.
    b) Emplacement landforms across the site designed to look less “engineered” (i.e. incorporation of micro- relief to avoid simple blocky forms).
    c) Surface water drainage will incorporate micro-relief to increase drainage stability and avoid major engineered drop structures.
    d) Shaping in areas near road infrastructure that may enable more intensive employment land uses in the future when mining ceases.

**Final Voids**

08. Table 5.1 states that the Drayton Void will be backfilled at closure and that no final void will remain. However, a final void is shown in Figure 9. Please clarify.

09. Belmont Void is not shown in Figure 9, however Table 5-1 states that this void will remain as a water storage, please clarify.

10. The final void (and associated drainage network) should be shaped to reflect a less engineered profile that is more consistent with the surrounding natural environment and at less risk of erosion.

11. The Final Void Management Plan and its trigger for review should be referenced.

**Conservation Agreements**

12. Please clarify whether Conservation Agreements will apply only to areas shown as "Conservation Agreement Areas" in Figure 9.

**Final Landuse**

13. Stock fences, dams and access tracks should be established as part of rehabilitation in areas accommodating a final land use of pasture / cattle grazing.

14. Officers are aware that proponents have obligations under the *Mining Act 1992* to rehabilitate the site. However, these obligations can inhibit the future use of the site for other industry and utilisation of infrastructure that was constructed for the operation of the Mine and may still have an economic purpose. Whilst Council Officers acknowledge that in the first instance the site should be safe, stable, and non-polluting, there should be a move in the industry toward planning for a range of uses on sites dependent on capability, services and infrastructure and vehicle access. This may allow employment generating activities on part of the site, and similar equivalent employment numbers, rather than the simply returning all the site back to farmland and native ecosystems with minimal employment opportunities.

15. The Hunter Regional Plan 2041 contains a discussion on strategic land use opportunities in Strategy 1.1 and 1.2 to encourage early consideration of alternate land uses in mine planning. Although the timing of when alternate land use planning is required is not clear, the proponent should incorporate any relevant outcomes of these studies as part of mine closure.

16. In January 2023, Mining, Exploration and Geoscience released its *Practical Guide Post Mining Land Use Guideline*. Officers would like to see the Rehabilitation Strategy, or nomination of another relevant document, include a discussion on the applicability and implementation of the Guideline.

17. Please show the 33ha area proposed for Class II agricultural capability land on Figure 9.

**Rehabilitation Works, Target Vegetation and Baseline Completion Criteria**

18. Officers are particularly interested in the type of work, target vegetation and baseline completion criteria for each of the areas shown in Figure 9. Please provide a table similar to the one below, and reissue to Council Officers for final comment prior to approval of the Rehabilitation Strategy.

19. Whilst it is acknowledged that the information requested in the point above is likely to be included in the Rehabilitation Strategy, Rehabilitation Management or Biodiversity Management, a Table would make it easier for staff and the public to interpret.

| Area* | Size (ha) | Type of work to be undertaken** | Target Vegetation | Baseline for Completion Criteria |
|---|---|---|---|---|
| Box Woodland | 500 | • Landform Establishment<br>• Growth Medium Development<br>• Ecosystem and Landuse Establishment<br>• Ecosystem and Landuse Development | See Table 6-2 of the Rehabilitation Strategy | See Table 6-2 of the Rehabilitation Strategy, approved by Cumberland Ecology in 2022. |
| Edderton Road Revegetation Area | 317 | • Described in BMP, as follows:<br>○ Management actions for this area are the same as offset areas… Management of these areas to improve condition of vegetation includes the following aims and actions: revegetation, weed control, pest and fire management, fencing, monitoring and reporting. Revegetation activities will involve natural and active regeneration.<br>○ Facilitate natural regeneration through stock removal.<br>○ Active revegetation using a variety of methods will be used where the ability to regenerate naturally within a reasonable time frame has been lost, or to prevent soil erosion. | xx | Permanently marked vegetation monitoring plots have been established within revegetation areas and appropriate benchmark sites within corresponding vegetation communities (Section 12.1 BMP).<br>Have these been approved by a regulator or ecologist? If so, please describe. |
| Rehabilitation Area – Additional Native Woodland | xx | • Landform Establishment<br>• Growth Medium Development<br>• Ecosystem and Landuse Establishment<br>• Ecosystem and Landuse Development | xx | xx. Include whether these have been approved by a regulator or ecologist. |
| Rehabilitation Area – Native Woodland | xx | A more detailed description (preferably with a figure) will be required as some of the plantings have already been undertaken. | xx | xx. Include whether these have been approved by a regulator or ecologist. |
| *Total "Revegetation Areas"* | xx | *Note - 2,642 ha (including 500ha of White Box Yellow Box Blakely's Red Gum Woodland) required under Cond 41A of MP 09_0062* | - | - |
| Rehabilitation Area - Pasture | xx | • Landform Establishment<br>• Growth Medium Development<br>• Ecosystem and Landuse Establishment<br>• Ecosystem and Landuse Development | • 33ha of Class II agricultural capability land*^. Seed mix shown in Table 11 of RMP.<br>• Remaining areas rehabilitated to Class V-VI capability land. Seed mix shown in Table 11 of RMP. | • *The land and soil capability assessment scheme* (OEH, 2012).<br>• Trial grazing to be undertaken. |

Information highlighted yellow will need to be confirmed.
*As shown in Figure 9 of the Rehabilitation Strategy
**As described in the Rehabilitation Management Plan or where stated otherwise
*^Required under *Cond 41A of MP 09_0062*

**Alternate Flying-Fox Camps**

20. In 2005, flying-foxes established a camp at Muscle Creek and a section of the Hunter River on land owned by Council and Australian Rail Track Corporation (ARTC). The camp is located close to residential areas and its proximity to a caravan park and public facilities including walk ways, recreational areas, sporting fields, clubs, hotels and the local hospital are the main areas of concern for the community.

    Historically, the camps have been occupied by the threatened Grey-Headed Flying-fox and in recent years, Little Red Flying-foxes. Disturbance to threatened flying foxes and their habitat is limited by legislative requirements.

    Flying-foxes predominantly roost in trees within the riparian zone surrounding Muscle Creek and the Hunter River. It would be ideal to establish suitable habitat in areas outside the current camp locations, as research suggest camps can be encouraged to move out of urban areas if there is suitable habitat nearby.

    Hunter Valley Energy Coal Pty Ltd (HVEC) own multiple parcels of land adjacent to the Hunter River to the north of Denman Road which may be suitable for an alternate flying-fox camp. Officers would like to request HVEC consider flying-fox habitat on some of these land parcels and welcome the opportunity to discuss further.

**Care and Maintenance or Premature Mine Closure**

21. Officers would like to see Rehabilitation Strategies for all mine sites in the shire include a commitment that within a given timeframe e.g six months of either entering care and maintenance or unplanned closure, a Mine Closure Plan is prepared in accordance with the Strategic Framework for Mine Closure.

Council staff appreciates the opportunity to comment and would be pleased to provide additional information if requested. Should you need to discuss the above, please contact Theresa Folpp, Development Compliance Officer on 02 6549 3700 or email council@muswellbrook.nsw.gov.au.

Yours faithfully

Sharon Pope
**Director Environment and Planning**

Department of Planning, Housing & Infrastructure

Our ref: MP09_0062-PA-226

Kathrine Skeen
Environment Specialist
Hunter Valley Energy Coal Pty Ltd
500 Thomas Mitchell Drive
Muswellbrook NSW 2333

27/02/2025

Subject: Mt Arthur Coal Open Cut Extension (MP09_0062) - Rehabilitation Strategy

Dear Miss Skeen

I refer to the Rehabilitation Strategy submitted in accordance with Condition 42 of Schedule 3 of the Project Approval for the Mt Arthur Open Cut Extension (MP09_0062).

It is acknowledged that the Rehabilitation Strategy was updated to include additional final void post-mining land use options. The Department has carefully reviewed the document and is satisfied that it meets the requirements of the conditions of consent (MP09_0062).

Accordingly, as nominee of the Planning Secretary, I approve the Rehabilitation Strategy (Version 5.2, dated February 2025).

You are reminded that if there are any inconsistencies between the Rehabilitation Strategy and the conditions of approval, the conditions prevail.

Please ensure you make the document publicly available on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Tegan Cole on 02 9895 6457 or via email at tegan.cole@planning.nsw.gov.au.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments

As nominee of the Planning Secretary