

# Muswellbrook Coal Company Limited



Established 1907

## LAND MANAGEMENT PLAN (LMP)

December 2015

Version	Date	Section Modified	Reason for Modification	Review Team
1	February 2005	All	Original Management Plan	MCC Technical Services Department Brett Peterkin and Associates
2	December 2010	All	5 Yearly Review	MCC Technical Services Department Carbon Based Environmental
3	December 2015	All	5 Yearly Review	MCC Environmental, Technical Services and Production Departments

**Approved by Senior Operations Manager:** Grant Clouten – signature on file

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## **1.0 INTRODUCTION**

Muswellbrook Coal Company (MCC) is a wholly owned subsidiary of the Idemitsu Kosan Company Ltd. Group. MCC has a long association with coal mining at Muswellbrook, with underground coal mining commencing in 1907 and open cut operations in 1944. The mine is located on Muscle Creek Road, approximately 3 kilometres to the north-east of Muswellbrook.

On December 1, 2003, Development Consent for DA 205/2002 was granted by Muswellbrook Shire Council (MSC) to extend the former MCC No.1 Open Cut. The No.1 Open Cut Extension commenced operations in March 2005 and has a capacity to produce up to 2,000,000 tonnes coal per annum. This approval has subsequently been modified to allow the relocation of the Mine Infrastructure Area (MIA) and to extend the mine life to 2020.

### **1.1 SCOPE**

The Development Consent requires the preparation, approval and implementation of an Environmental Management Strategy (EMS) and subordinate Environmental Management Plans (EMP). One of these EMPs is the Land Management Plan (LMP). Whilst this plan specifically addresses issues related to land management, it should be read in conjunction with other EMP's.

This LMP has been prepared in consultation with Division of Resources and Energy (DRE) and Department of Primary Industries – Water (DPI-Water) to the satisfaction of Muswellbrook Shire Council (MSC).

### **1.2 OBJECTIVES**

The objectives of the LMP are to reduce the impact of mining operations on existing native flora and fauna species, implement sustainable land practices and enhance habitat connectivity within the site and surrounding areas.

## 2.0 STATUTORY REQUIREMENTS

The relevant approval conditions are shown in **Table 1** along with information on where they are addressed in this plan.

**Table 1: Statutory Requirements**

Approval/ Licence Condition No.	Condition	Section
<b>Development Consent</b>		
3.11	The Applicant shall prior to the commencement of operations prepare a Land Management Plan for the DA area to provide for proper land management in consultation with DIPNR and DMR, and to the satisfaction of MSC. The plan shall include, but not be limited to:	This plan
3.11 (i)	management proposals for pastures and remnant vegetation;	4.1, 4.2, 4.8, 5.0
3.11 (ii)	clear illustration of the design of rehabilitated landforms and final landform;	Figure 1
3.11 (iii)	prevention and rehabilitation of land degradation;	4.0
3.11 (iv)	mechanisms to ensure that the diminution of higher land capability classes on the site does not occur, including specific strategies for the rehabilitation of areas of cropping land of capability classes of I-IV. Details must be provided to explain how land capability classes are to be maintained, and how integration of woodland/forest cover with pasture land is to be provided for fauna corridors and linkages to densely forested areas, microclimate and agricultural land use;	4.0, 5.0
3.11 (v)	progressive reshaping of slopes to less than 10 degrees, unless otherwise indicated in an accepted mining Operations Plan for the DA area;	5.0
3.11 (vi)	progressive rehabilitation of disturbed areas;	5.0
3.11 (vii)	feral animal control;	4.7
3.11 (viii)	proposals for weed and vermin control, including development and implementation of an eradication plan; regular inspections to identify areas of weed infestation; maintenance of regular contact with neighbouring property owners; and regular maintenance of topsoil stockpiles to eradicate weed infestation;	4.7, 4.8
3.11 (ix)	procedures to ensure that all suitable topsoil is recovered during Mining Operations and property managed to maintain its quality prior to respreading over areas of rehabilitation. This shall include details of a strategy for controlling weeds in topsoil stockpiles, particularly with respect to Galenia;	Refer to Soil Stripping Management Plan
3.11 (x)	consideration of any adverse characteristics in the overburden material on the land rehabilitation program;	5.1

Approval/ Licence Condition No.	Condition	Section
3.11 (xi)	a quantification of the requirements for topsoiling of all rehabilitated lands and a calculation of any deficit in the available topsoil;	4.6
3.11 (xii)	assessment of the potential for recycling of standing timber removed from the site; and	N/A – all tree clearing has been completed
3.11 (xiii)	a strategy for sustainable land management and enhancement of agricultural values and production across the entire site, taking into account biodiversity and Aboriginal heritage values as appropriate	Whole plan

Government Department Name Changes:

DMR is now known as Division of Resources and Energy (DRE). The acronym DRE will be used throughout this management plan.

DIPNR is now known as NSW Department of Primary Industries – Water (DPI-Water) for the purposes of this management plan. The acronym DPI-Water will be used throughout this management plan.

### 3.0 EXISTING ENVIRONMENT

#### 3.1 MINING ENVIRONMENT

Mining at MCC is set amongst an area of existing disturbed and mined land. Surrounding land uses include a combination of agricultural activities, such as, grazing of beef cattle, light industrial and rural-residential.

During the Environmental Assessment process five vegetation communities were identified. These included: Rehabilitated Grasslands/Forest, Red Gum-Rough-barked Apple Open Forest, Narrowed-leaved Ironbark Woodland, Grassland and Aquatic Forbland. Grassland vegetation communities dominate the majority of the western and central portions of the mining area. The agricultural sustainability of the site is limited to low intensity agriculture, which is suitable for grazing but not cultivation.

A portion of the land to be mined is subject to continual subsidence and pot holing from past underground mining operations. The mining of this area will result in a more stable and safer landform.

#### 3.2 SOILS

NSW Department of Primary Industries – Agriculture has a system of classification of lands according to five classes of agricultural suitability as shown in **Table 2**.

**Table 2: Soil Classification – Agricultural Suitability**

Class	Description
<b>Class 1</b>	Arable land suitable for intensive cultivation where constraints to sustained high level of agricultural production are minor or absent.
<b>Class 2</b>	Arable land suitable for regular cultivation for crops but not suited to continuous cultivation. It has a moderate to high suitability for agriculture but edaphic (soil factors) or environmental constraints reduce the overall level of production and may reduce the cropping phase to a rotation with sown pastures.
<b>Class 3</b>	Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with pasture. The overall production level is moderate because of edaphic or environmental constraints. Erosion hazard, soil structural breakdown or other factors including climate may limit the capacity for cultivation and soil conservation or drainage works may be required.
<b>Class 4</b>	Land suitable for grazing but not cultivation. Agriculture is based on native pastures or improved pastures based on minimum tillage techniques. Production may be seasonally high but the overall production level is low as a result of major environmental constraints.
<b>Class 5</b>	Land unsuitable for agriculture or at best only light grazing. Agricultural production is low or zero as a result of severe constraints, including economic factors, which preclude land improvement.

During the Environmental Assessment process a study into the land capability of soils on the mine site were undertaken. The study determined that the land is largely Class 4 Land suitable for grazing but not cultivation. Constraints include slope, soil structure, rockiness and the degree of existing erosion.

### 3.3 LAND CAPABILITY

NSW Department of Primary Industries – Agriculture has developed a system of agricultural capability classification based on environmental factors, which may limit the use of land. These factors include widespread influences such as climate, land slope and form and local soil limitations such as soil depth, erodibility, water holding capacity, rockiness, salinity and the degree of existing erosion. One or a number of the factors in combination may restrict land use and limit land capability.

Based on assessment of these limiting factors, land is classified into eight classes, with the restriction on use or the likelihood of erosion damage increasing from Class I to Class VIII (Table 3).

**Table 3: Rural Land Capability**

Land Class	Land Suitability	Land Definition
<b>Class I</b>	Regular Cultivation	No erosion control requirements
<b>Class II</b>	Regular Cultivation	Simple requirements such as crop rotation, minor strategic works
<b>Class III</b>	Regular Cultivation	Intensive soil conservation measures required such as banks and waterways
<b>Class IV</b>	Grazing, occasional cultivation	Simple practices such as stock control, fertiliser application
<b>Class V</b>	Grazing, occasional cultivation	Intensive soil conservation measures required such as banks, contour ripping
<b>Class VI</b>	Grazing only	Managed to ensure groundcover is maintained
<b>Class VII</b>	Unsuitable for rural production	Green timber maintained to control erosion
<b>Class VIII</b>	Unsuitable for rural production	Should not be cleared, logged or grazed

An assessment of detailed topographical and soils information in the Environmental Assessments determined that a refined pattern can be described over the mining area. The Class V lands are those where the Yellow Duplex soils are formed in situ from the sedimentary sequence of the Greta Coal Measures with generally a good cover of native grasses. Steeper side slopes and the drainage lines have been grouped as Class VI Land. These areas have poorer cover and active sheet and gully erosion, necessitating only judicious grazing. Class IV Lands are those with moderate slope. There is good ground cover and occasional rocky outcrop making these areas suitable for grazing without constraints other than satisfactory management.

## 4.0 LAND MANAGEMENT

### 4.1 LAND USE

The final land use of the mine site will aim to include a combination of approximately 50% of pasture and 50% of native trees. The final landform as approved in the Mining Operations Plan is shown in **Figure 1**.

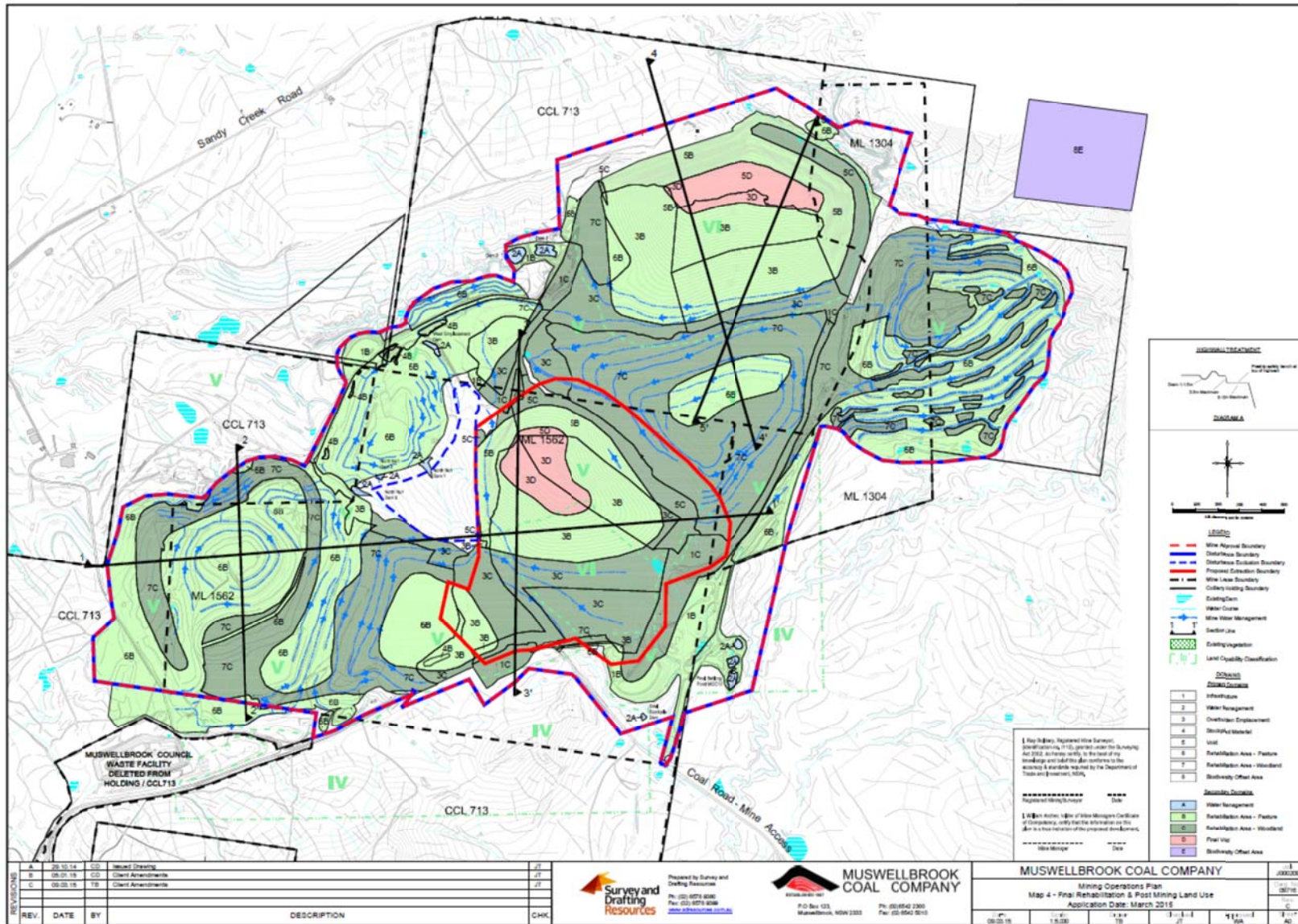


Figure 1: Final Landform



MCC has had experience in the successful rehabilitation of mined land in both pasture and native vegetation. The knowledge gained from this experience will be extended and incorporated into ongoing rehabilitation practices.

The final land use for mining voids is discussed in the Final Void Management Plan.

The landscape management design principles are based on standard design principles, methods and legislation outlined in the Department of Mineral Resources Synoptic Plan – Integrated Landscapes for Mine site Rehabilitation (1999) for the Upper Hunter;

All rehabilitation will be undertaken in accordance with the Mining Operations Plan.

#### **4.2 PASTURE ESTABLISHMENT**

Gently sloping areas of the rehabilitated overburden emplacement will be suitable for the establishment of pasture. Pasture species will be in accordance with those specified in the Mining Operations Plan. Sowing pasture to sections of the rehabilitated mine site will provide for a sustainable long-term industry once mining operations have been completed.

#### **4.3 TREE ESTABLISHMENT**

The establishment of native trees to cover 50% of mined land rehabilitation will re-instate habitat, mitigate against impacts on flora and fauna and enhance the ecological value of the land post mining. Species to be used will be in accordance with those specified in the Mining Operations Plan. The location of native vegetation re-instatement will be designed to incorporate continuous corridors across the mine site that link in Bells Mountain and Skelletar Ridge remnant vegetation. Tree establishment areas will also contain habitat features (such as fallen trees) that are strategically placed within the rehabilitation to enhance the successful re-colonisation of a broad spectrum of fauna.

#### **4.4 WATER MANAGEMENT**

Water management will be undertaken in accordance with the Site Water Management Plan.

#### **4.5 EROSION AND SEDIMENT CONTROL**

Erosion and sediment control management will be undertaken in accordance with the Erosion and Sediment Control Plan.

#### **4.6 TOPSOIL MANAGEMENT**

Topsoil stripping will be undertaken in accordance with the Soil Stripping Management Plan.

MCC will have a shortage of topsoil for use in the rehabilitation process. Other ameliorants such as Organic Growth Medium (OGM) are being sourced to make up for this shortfall.

#### **4.7 FERAL ANIMAL CONTROL**

The vermin species of specific concern at MCC include Feral Pigs, Wild Dogs, European Foxes, European Rabbits and Feral Cats.

Feral animal control will be undertaken on an annual or as required basis depending on the severity of feral animal populations. Control programs, such as baiting programs, will be developed in consultation with relevant authorities and neighbouring landowners so that all legislative requirements are addressed and domestic animals are not exposed to any control regimes.

All work will be implemented in consultation with the staff of the Local Land Services and with adjoining land users to achieve a coordinated approach to pest management.

The control programs will be linked to the trigger for action or what pressure the pest species has placed on the project area e.g. Wild Dogs predating on stock and/or native fauna.

#### **4.8 WEED CONTROL**

All noxious weeds will be managed and controlled as per the requirements of the *Noxious Weeds Acts 1993*. This work will be undertaken in consultation with the Local Land Services, the Upper Hunter Weeds Authority and neighbouring landholders (as required) utilising a combination of control strategies.

All topsoil stockpiles will be regularly monitored and managed for weed infestation particularly Galenia. The weed Galenia is of particular concern for mining operations. The weed is opportunistic and infests areas that have been recently disturbed. These areas will be inspected regularly for weeds, with control measures being applied to infestations.

Weed control and eradication techniques include:

- Promotion of vigorous growth of pasture to out compete weeds;
- Minimisation of area available for weed infestation, through prompt revegetation of bare areas;
- Spaying with selective herbicides; and
- Physical removal by chipping.

### **5.0 REHABILITATION ACTIVITIES**

#### **5.1 OVERBURDEN CHARACTERISATION**

Overburden will be characterised by way of visual inspection to determine material with adverse characteristics. This unsuitable material will be buried at depth and much as practicable. If unsuitable material is found on the surface of a final shaped landform, suitable ameliorative material will be incorporated with the overburden. A thicker layer of topdressing material may also be spread across the unsuitable material to assist in revegetation.

#### **5.2 REHABILITATION PLANNING**

Rehabilitation of the overburden emplacement will be conducted progressively over the life of the mine and will be scheduled to commence as soon as possible after mining disturbance. This approach will minimise the disturbed area at any point in time and reduce

the visual impact of the project, and minimise the potential for generation of wind blown dust and water run-off. Scheduling of rehabilitation will be generally in accordance with the timeframes shown in the approved Mining Operations Plan.

### **5.3 FINAL LANDFORM DESIGN**

The proposed final landform will consist of areas of overburden emplacement with the majority of slopes less than 10 degrees, but may be steeper in localised areas of up to 14 degrees, excluding the final void batters (in accordance with the Mining Operations Plan).

The conceptual final landform is shown in **Figure 1**. 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.

### **5.4 SEEDING**

Seeding activities will be undertaken following the completion of shaping and topdressing of disturbed areas. Experience gained throughout the life of the mine will be used as a guide to develop seeding strategies for ongoing rehabilitation activities. The respective seed mixes are shown in the Mining Operations Plan.

### **5.5 REHABILITATION MONITORING**

Rehabilitated areas will be monitored after rehabilitated works have been completed, to demonstrate that the rehabilitation objectives are achieved. The monitoring program is outlined in the Mining Operations Plan and the results will be compared to the closure criteria detailed in the Mining Operations Plan. A summary of the results of the monitoring program will be reported in the Annual Environmental Management Report. The results of the monitoring program will be used to guide any maintenance works that are required.

## **6.0 EXTERNAL REPORTING**

Within 2 weeks of approval of this LMP, a copy will be made available to the Community Consultative Committee (CCC), relevant agencies and for public viewing via the MCC website.

The performance of MCC's LMP will be reported through the Annual Environmental Management Report (AEMR).

## **7.0 ENVIRONMENTAL AUDITS**

In accordance with the Project Approval, every three years MCC will fund an Independent Environmental Audit that will be performed by an independent third party that has been endorsed by MSC. The audit will include consultation with relevant agencies.

These environmental audits will assess the environmental performance of MCC and compliance against the predictions in the EIS, conditions of the Project Approval, mining leases, water licences and Environmental Protection Licence, and review the adequacy of

strategies, plans and/or programs and recommend measures or actions to improve the environmental performance of MCC.

## 8.0 REVIEW OF MANAGEMENT PLAN

The LMP will be reviewed;

- Within 3 months of changes to Development Consent conditions relating to land management;
- Following an independent environmental audit which recommends changes to the LMP;
- If there is a relevant change in legislation; and
- Every five years, or as directed by MSC, in accordance with Condition 3.2(f) of the Development Consent Conditions.

## 9.0 RESPONSIBILITIES

**Table 4** outlines the responsibilities relating to the LMP.

**Table 4: Management Plan Responsibilities**

Position	Task	Timing
Senior Operations Manager	Provide adequate resources to implement the requirements of the LMP	Annual review
Environmental Coordinator	Coordinate rehabilitation activities	Annually
	Coordinate rehabilitation monitoring	Annually
	Coordinate feral animal control programs	As required
	Coordinate weed control programs	As required
	Coordinate reviews of the LMP	As outlined in LMP
	Coordinate reporting as required in LMP	Annually