DONALDSONCOAL

Part of the Yancoal Australia Group

ABN: 87 073 088 945

Mining Operations Plan

for the

Care and Maintenance

of the

Tasman Underground Coal Mine

for the Period Ending 1 April 2023

February 2016

Prepared by

R.W. CORKERY & CO. PTY. LIMITED

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Newcastle Coal Company Pty Ltd

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TITLE BLOCK

Tasman Underground Coal Mine

Mining Operations Plan

Name of Mine: Tasman Underground Coal Mine

MOP Commencement Date: 02 April 2016

MOP Completion Date: 01 April 2023

Mining Authorisations (Lease / License No.): ML1555

Name of Authorisation / Authorisation holder(s): Newcastle Coal Company Pty Ltd

Name of Mine Operator (if different): N/A

Name and Contact Details of the Mine Manager (or equivalent):

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Manager Mining Engineering
Phone: (02) 4015 1100

Name and Contact Details of Environmental Representative:

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Phone: (02) 4015 1193

Name of Representative(s) of the Authorisation Holder(s): Aaron McGuigan

Title of Representative(s) of the Authorisation Holder(s): Operations Manager

Signature of Representative(s) of the Authorisation Holder(s):

Date 26 February 2016 **FINAL**

Version: 1

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LIST OF ACRONYMS

AEMR	Annual Environmental Management Report
AHD	Australian Height Datum
DRE	Division of Resources and Energy
DTIRIS	Department of Trade and Investment, Regional Infrastructure and Services
EL	Exploration Licence
ML	Mining Lease
MOP	Mining Operations Plan
ROM	Run-of-Mine

1. INTRODUCTION

1.1 SCOPE AND FORMAT

This Mining Operations Plan ("MOP") for the Tasman Underground Coal Mine has been prepared by R.W. Corkery & Co. Pty. Limited on behalf of Newcastle Coal Company Pty Ltd (the "Company"). Newcastle Coal Company is a fully owned subsidiary of Donaldson Coal Pty Ltd. Donaldson Coal Pty Ltd became part of Yancoal Australia Limited in July 2012. The Tasman Underground Mine (the "mine") is located approximately 20km west of Newcastle and 18km south of Maitland, New South Wales (**Plan 1A**).

This MOP is the fifth MOP document submitted for the mine, and is applicable for the period ending 01 April 2023. The contents of this MOP provide relevant information relating to the care and maintenance of the mine following the completion of closure and rehabilitation activities in 2014/2015.

This MOP has been prepared in accordance with the requirements of Mining Lease (ML) 1555 and generally follows the format and content requirements identified in ESG3: *Mining Operations Plan (MOP) Guidelines (September 2013)* prepared by NSW Trade and Investment, Regional Infrastructure and Services - Division of Resources and Energy (DTIRIS – DRE). **Table 1** provides a summary of where the required tables, figures and plans are presented.

Table 1
Summary of Required Tables, Figures and Plans

Section of MOP	Table/Plan Reference	Source
Inside cover	MOP Title Block	-
Section 1.1	Table 1 Summary of Required Tables, Figures and Plans	MOP
Section 2.3	Material Production Schedule during MOP term – Not Applicable (mining operations have ceased)	-
Section 5.1.1	Table 10 Primary & Secondary MOP Domains	ESG3
Section 5.3	Table 13 Summary of Rehabilitation Phases	Donaldson Coal Pty Ltd
Section 6	Table 13 Rehabilitation Performance Indicators and Completion Criteria	Approved Closure MOP / Donaldson Coal Pty Ltd / Best Practice
Section 9.2	Table 18 - Trigger Action Response Plan	Best Practice
Section 13	Plan 1A to 1C – Pre-mining Environment	Donaldson Coal Pty Ltd
Section 13	Plan 2 – Mine Domains at Commencement of MOP	
Section 13	Plan 3A to 3G – Not applicable (mining operations have ceased).	
Section 13	Plan 4 – Final Rehabilitation and Post Mining Land Use	
Section 13	Plan 5 – Rehabilitation and Post Mining Land Use Cross Sections – Not Required (final landform already completed)	

1.2 HISTORY OF OPERATIONS

The Company undertook construction and mining activities within ML 1555 between 2006 and 2013 in accordance with approved MOPs. Activities during that period included the following.

(i) Construction of the surface infrastructure and facilities within an approximately 11.1ha area (the surface infrastructure area) overlapping the northern boundary of ML 1555 and including amenities, workshop, car park and the coal handling area.

(ii) Excavation of a small box cut, commencement of initial mining operations within the Fassifern seam, including creation of three mine portals and underground roadways, and construction of the ventilation, conveying and coal stockpiling systems.

(iii) Mining of coal within the Fassifern seam including first and second workings.

All of these activities were reported through the respective Annual Environmental Management Reports (AEMRs). Mining of coal ceased mid-July 2013 following exhaustion of economic coal within the approved operational boundaries. Rehabilitation activities commenced shortly after with sealing of the mine portals in December 2013. The removal of surface infrastructure was completed in May 2014 and final landform shaping and revegetation was completed in September 2014. Since that time the mine has been under care and maintenance whilst the revegetated landform continues to develop towards a sustainable community acceptable for the relinquishment of ML 1555.

1.3 CURRENT CONSENTS, AUTHORISATIONS AND LICENCES

The only remaining environmental / planning approval applicable to the mine is ML 1555. The Company also previously operated the mine under a development consent and environment protection licence, both of which have been surrendered. A summary of these approvals and their status is provided in **Table 2**.

Table 2
Tasman Underground Coal Mine – Consents, Leases and Licences

Consent/Lease/Licence	Issue Date	Expiry Date	Details / Comments
Mining Authorisations*			
Mining Lease ML 1555*	7 September 2004	6 September 2025	Granted by the (then) Department of Primary Industries - Mineral Resources. Incorporates 960.9ha of surface area.
Exploration Authorisations*			
Exploration Licence 5337	8 August 1997	4 August 2017	Granted by DTIRIS for Minerals Group 9 and incorporating a surface area of 2 394ha.
Development Consent			
Development Consent 274-9-2002	16 March 2004	Surrendered	The Development Consent was surrendered to the Department of Planning & Environment on 16 July 2015.
Other Approvals & Licences			
Environment Protection Licence No. 12483	8 May 2006	Surrendered	The EPL for the Tasman Mine was surrendered to the EPA on 08 July 2015 and processed by EPA on 20 July 2015.
* See **Plan 1A**			

The mine was classified as a State Significant Development in accordance with the *State Environmental Planning Policy (State and Regional Development) 2011*. Consequently, the mine is considered a Level 1 Mine for the purpose of MOP preparation in accordance with the ESG3 *Mining Operations Plan (MOP) Guidelines (September 2013)*.

1.4 LAND OWNERSHIP AND LAND USE

The land upon which the surface infrastructure is located is private land owned by Newcastle Coal Company Pty Ltd with surrounding land consisting of a combination of Crown and Council land, including Mount Sugarloaf Reserve and parts of Heaton State Forest and a number of private land holdings. Details of land ownership on and in the vicinity of the mine and the boundaries of ML 1555 and EL 5337 are shown on **Plan 1C**.

Land use surrounding the mine includes: native vegetation conservation and recreation - the Sugarloaf State Conservation Area and compensatory habitat area established by the Company; and a combination of rural and residential. TransGrid also operates a number of high voltage powerlines within and surrounding the mine.

1.5 STAKEHOLDER CONSULTATION

The Company and/or its representatives undertook extensive consultation during the preparation of the operational MOPs, subsidence management plans and environmental management plans.

Further consultation was undertaken with the following agencies during the preparation and implementation of the Closure MOP in relation to the final landform and approach to closure and rehabilitation.

- DRE.
- Department of Planning & Infrastructure (now Department of Planning & Environment).
- Cessnock City Council and Lake Macquarie City Council.
- Environment Protection Agency.
- Office of Environment and Heritage.
- NSW Office of Water (now Department of Primary Industries Water).
- Roads and Maritime Services.

Consultation was also undertaken with TransGrid, Ausgrid and members of the Community Consultative Committee.

Ongoing consultation will be undertaken with DRE throughout the care and maintenance phase and, as required, with other stakeholders.

2. PROPOSED MINING ACTIVITIES

2.1 PROJECT DESCRIPTION

Previous mining operations at the mine were underground operations utilising bord and pillar techniques. Mining operations were completed in 2013 and no further mining will be undertaken. The principal activities during this MOP term relate to ongoing care and maintenance of the completed rehabilitation.

2.2 ASSET REGISTER

All operational infrastructure and assets have previously been removed and the mine rehabilitated. **Table 3** details the rehabilitated secondary domains, their size and, where applicable, retained assets. **Plan 2** identifies the location and area of each domain and further description of each are provided in Section 5.1.

Table 3
Major Assets per Domain

Secondary Domain	Approx. Size (ha)	Assets	Use and Demolition Requirements
A – Infrastructure Area	0.7	Retained section of mine access road.	This section of access road has been retained for long-term land access. No demolition or further rehabilitation works are required.
B – Water Management Area	0.24	Retained water management dams.	The retained water management dams will be utilised for long-term management of runoff from the final landform. These dams were desilted, resized and shaped during the establishment of the final landform. No further demolition or rehabilitation works required.
C – Rehabilitated Area – Grassland	3.9	No remaining assets.	No further demolition or rehabilitation works required.
F – Rehabilitated Area - Forest	6.4	No remaining assets	No further demolition or rehabilitation works required.
J - Conservation and Biodiversity Offset Area	11	No assets.	No demolition or rehabilitation works required.

2.3 ACTIVITIES OVER THE MOP TERM

No further operational activities will be undertaken during the MOP term. Ongoing care and maintenance activities during the MOP term are discussed in Section 7.2.

3. ENVIRONMENTAL ISSUES MANAGEMENT

3.1 ENVIRONMENTAL RISK ASSESSMENT

A risk assessment focusing upon rehabilitation-specific risks has been undertaken as part of this MOP and builds upon the risk assessments included in previous MOPs. This risk analysis has been undertaken generally in accordance with *AS/NZS ISO 31000:2009 Risk Management – Principles & Guidelines*.

Tables 4, **5** and **6** present the consequence, likelihood and risk rating used during this analysis. **Table 7** presents the results of the risk analysis are based upon the current rehabilitated landform and implementation of the care and maintenance activities outlined in Section 7.2.

Table 4
Qualitative Consequence Rating

Level	Descriptor	Description
1	Negligible	No detrimental impact on the environment is measurable or envisaged.
2	Minor	An event which could have temporary and minor effects on the environment, such as a non-reportable environment incident.
3	Moderate	An event which would create substantial temporary or minor permanent damage to the environment, such as a reportable incident not likely to result in prosecution.
4	Major	An event which could have a substantial and permanent consequence to the environment such as an environmental incident which would result in prosecution, adverse local publicity and community complaints.
5	Severe	A major event which could cause severe damage to the environment with actual or potential loss of credibility with key stakeholders, environmental liability, regulatory intervention, national publicity/complaints, or could close the operation prematurely.
Note: Rating modified after AS/NZS ISO31000:2009 Risk Management – Principles & Guidelines		

Table 5
Qualitative Likelihood Rating

Level	Descriptor	Description
A	Certain	Is an ongoing occurrence or will occur under all conditions
B	Almost Certain	Is expected to occur in most circumstances
C	Likely	Will probably occur in most circumstances
D	Possible	Will probably occur under favourable circumstances
E	Unlikely	May occur, but only under favourable circumstances
F	Rare	Not expected to occur, unless subject to exceptional circumstances
G	Very Rare	Theoretically possible but not expected to occur
Source: Rating modified after HB 89:2012 – Figure B7		

Table 6
Qualitative Risk Rating

Likelihood	Consequences				
	1 Negligible	2 Minor	3 Moderate	4 Major	5 Severe
A Certain	M	H	H	VH	VH
B Almost Certain	M	M	H	VH	VH
C Likely	M	M	H	H	VH
D Possible	L	M	M	H	H
E Unlikely	L	L	M	M	H
F Rare	L	L	L	M	M
G Very Rare	L	L	L	L	M

L = Low M = Moderate H = High VH = Very High

Source: Modified after HB 89:2012 - Figure B8

Table 7
Key Rehabilitation-related Risks during the MOP Term

Issue	Activity												
	Exploration[1]	Land preparation, vegetation and topsoil stripping[1]	All construction activities including earth moving[1]	Mine development and extraction[1]	Use/maintenance of roads, tracks and equipment[1]	Waste management[1]	Processing facilities and infrastructure[1]	Product stockpiling and handling[1]	Water management including storm event contingencies	Hazardous materials and fuel, handling/spills management[1]	Sewerage[1]	Rehabilitation activities	Rehabilitated land and remaining features
Air pollution, dust / other	NA	NA	NA	NA	NA	NA	NA	NA	L(1G)	NA	NA	L(1F)	L(1F)
Erosion / sediment minimisation	NA	NA	NA	NA	NA	NA	NA	NA	L(3F)	NA	NA	L(2F)	L(2F)
Surface water pollution	NA	NA	NA	NA	NA	NA	NA	NA	L(3F)	NA	NA	L(2F)	L(2E)
Groundwater pollution	NA	NA	NA	NA	NA	NA	NA	NA	L(1G)	NA	NA	L(1G)	L(1G)
Contaminated or polluted land	NA	NA	NA	NA	NA	NA	NA	NA	L(1G)	NA	NA	L(1G)	L(1G)
Threatened flora protection	NA	NA	NA	NA	NA	NA	NA	NA	L(3G)	NA	NA	L(3G)	L(3G)[2]
Threatened fauna protection	NA	NA	NA	NA	NA	NA	NA	NA	L(3G)	NA	NA	L(3G)	L(3G)[2]
Weed control and management	NA	NA	NA	NA	NA	NA	NA	NA	L(2G)	NA	NA	L(2F)	L(2F)
Operational noise	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vibration and air blast	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Visual amenity, stray light	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	L(2G)	L(1G)[2]
Natural heritage conservation	NA	NA	NA	NA	NA	NA	NA	NA	L(1G)	NA	NA	L(1G)	NA
Aboriginal heritage	NA	NA	NA	NA	NA	NA	NA	NA	L(1G)	NA	NA	L(1G)	NA
Bushfire	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	L(4G)	L(4G)
Hydrocarbon contamination	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	L(1G)	NA
Public safety	NA	NA	NA	NA	NA	NA	NA	NA	L(3F)	NA	NA	L(3F)	L(3F)

Note: 1. No operational activities would be undertaken during the MOP term.
2. Adverse impacts are extremely unlikely. The rehabilitated landform will have an overall positive effect.

3.2 ENVIRONMENTAL RISK MANAGEMENT

3.2.1 Geology, Geochemistry and Characterisation

As the mine has been rehabilitated, no ROM coal or other materials potentially presenting a geological / geochemical constraint remain at surface. Therefore, no specific environmental risk management measures related to geology, geochemistry and characterisation are required during this MOP term.

3.2.2 Material Prone to Spontaneous Combustions

As the mine has been rehabilitated, no ROM coal or other materials prone to spontaneous combustion remain at or near surface. Therefore, no specific environmental risk management measures related to spontaneous combustion are required during this MOP term.

3.2.3 Material Prone to Generating Acid Mine Drainage

No acid mine drainage issues were experienced during operations at the mine. As the mine has been rehabilitated, no materials prone to generating acid mine drainage are present at or near surface. Therefore, no specific environmental risk management measures related to acid mine drainage are required during this MOP term.

3.2.4 Mine Subsidence

All previous underground mining activities were undertaken in accordance with approved subsidence management plans and specified subsidence monitoring was completed. Given that mining ceased in July 2013, no specific subsidence risk management measures are required during this MOP term. However, monitoring of previously mined areas will continue in accordance with approved subsidence monitoring plans until approval is given by the Principal Subsidence Engineer of DRE to cease monitoring.

3.2.5 Soil Types and Suitability

All available soil material and growth medium has previously been respread during the completion of final rehabilitation. Therefore no management measures relating to soil stockpiles or soil respreading are required during this MOP term. The need for soil ameliorants, such as gypsum or fertiliser, will continue to be reviewed throughout the MOP term in the event that revegetated areas are not appropriately stabilising.

3.2.6 Surface Water and Erosion and Sediment Control

Surface water on the rehabilitated landform is principally managed using two retained water management dams. These dams have been formed through the reshaping of the previous operational Dams A and B. The retained water management dams were designed and constructed in accordance with Managing Urban Stormwater: Soils & Construction (Landcom, 2004), have storage capacities of 1.9ML and 1.6ML and have rock-lined spillways. The remaining landform is free draining with slopes less than 18 degrees. Where required, drainage paths have also been rock lined to provide additional stabilisation.

As at the commencement of this MOP, no major erosion has been observed and no additional mitigation measures have been required to be implemented. However, if required during the term of this MOP, additional stabilisation would be implemented. Further detail on care and maintenance activities is provided in Section 7.2.

3.2.7 Flora and Fauna

No further clearing or disturbance of vegetated areas will be required during the MOP term. Given this and that no significant activities are planned during the MOP term, no specific flora or fauna management measures are necessary beyond the continued monitoring and maintenance of rehabilitated areas.

3.2.8 Other Risks

Bushfire

The potential for care and maintenance activities for the rehabilitated landform to result in a bushfire are considered very low. The principal management measure would be the adoption of the Company's emergency response plan which includes procedures for responding to fire. Notably, the Seahampton Rural Fire Service is located only 4.1km by road from the mine.

Noise and Air Quality

Given the low intensity of any on site activities required during care and maintenance, no specific noise or air quality management measures would be required.

Public Safety

As all infrastructure and equipment has been removed from the site and the area fully rehabilitated. Additionally, the surface infrastructure area is secured by lockable gates and standard rural fencing to discourage unauthorised entry.

No additional public safety measures are planned during the MOP term.

Lighting and Visual

As any care and maintenance activities would be undertaken during daylight hours and would be low intensity, no specific measures relating to lighting or other visual management measures would be required.

Aboriginal Heritage

As no Aboriginal heritage items are located within the former surface infrastructure area, no specific management measures are considered necessary. Additionally, as underground mining has ceased and subsidence monitoring indicates a stabilisation of subsidence no further monitoring within the underground mine area is considered necessary.

4. POST MINING LAND USE

4.1 REGULATORY REQUIREMENTS

Regulatory requirements specifically affecting the progress towards the post mining land use are detailed in **Table 8**.

Table 8
Regulatory Requirements for Rehabilitation

Source Document	Subject	Paraphrased Rehabilitation Requirement
ML 1555	Rehabilitation	Disturbed land must be rehabilitated to a sustainable / agreed end land use to the satisfaction of the Director-General so that: • there is no adverse environmental effects outside the disturbed area and the land is properly drained and protected from soil erosion; • the state of the land is compatible with surrounding land uses; • the landforms, soils, hydrology, flora and fauna require no greater maintenance than the surrounding land; • re-establishment of vegetation appropriate to the area; and • the land does not pose a threat to public safety. *Condition 13*
	Rehabilitation Security	Provide and maintain a security deposit. *Condition 25*

As noted in Section 1.3, no other environmental or planning approvals currently apply to the mine with the development consent and environment protection licence having been surrendered.

4.2 POST MINING LAND USE GOAL

The primary goal for rehabilitation of the surface infrastructure area is to create a stable final landform consistent with the surrounding landscape and containing suitable vegetation communities for native vegetation conservation and ongoing use of existing transmission line easements.

The primary goal for rehabilitation of any subsidence impacts is to return the area back to the original land use.

The completed final landform for the surface infrastructure area is displayed on **Plan 4**.

4.3 REHABILITATION OBJECTIVES

In order to achieve the nominated post mining land use goal, the objectives of rehabilitation activities are as presented in **Table 9**.

Table 9
Rehabilitation Objectives and Targets

Phase	Objective	Target
Site Decommissioning (Surface Infrastructure)	Decommission and remove all surface infrastructure (unless required for a lawful post mining land use).	All surface infrastructure removed except nominated section of mine access road (providing ongoing access) and two water management dams.
Landform Establishment	Provide a geotechnically stable landform	Site specific geotechnical review determines that the retained slopes are not likely to actively erode or 'slip' to an extent requiring further earthworks and profiling.
	Provide a non-polluting landform	Water quality monitoring results show the landform is non-polluting within the meaning of Section 120 of the *Protection of the Environment Operations Act 1997*.
	Ensure the final landform / retained structures are safe and secure.	All surface infrastructure has been removed unless otherwise agreed with DTIRIS. The mine portals are sealed in accordance with current guidelines.
Growth Medium Development (Soil Management)	Provide a suitable cover of growth medium that will enable the establishment of, and sustain the nominated vegetation.	Achieve minimum standards (as nominated in **Table 12**) for soil/growth medium chemistry.
Ecosystem Development (Biodiversity Management)	Rehabilitate any areas impacted by subsidence to a standard which enables the continuation of the existing land use.	Areas impacted by subsidence are returned to the existing land use within a timeframe agreed upon with the landholder.
	Rehabilitate the surface infrastructure area to vegetation communities suitable for native vegetation conservation and ongoing use of existing transmission line easements.	Disturbed areas are revegetated using local native plant species to provide a self-sustaining grassland (beneath transmission lines) or forest community.
Ecosystem Sustainability (Land Use)	Revegetated areas have maintenance requirements no greater than analogous sites not disturbed by mining related activities.	Rehabilitation monitoring confirms that the established vegetation communities are self-sustaining. Rehabilitation monitoring confirms that non-target species (weeds) are not adversely impacting the targeted revegetation communities and / or present management requirement similar to analogous sites not disturbed by mining activities.
Other	Relinquishment of the Mining Lease and the return of the security lodged over the Mining Lease within a reasonable time after the end of the mine life.	Following this MOP term pending future operation of the Tasman Extension Project.

5. REHABILITATION PLANNING AND MANAGEMENT

5.1 DOMAIN SELECTION

5.1.1 Introduction

A domain is a land management unit within ML 1555. Domains may comprise primary or secondary domains as follows.

1. Primary or operational domains – categorised on the basis of mine-related activities occurring within each domain.
2. Secondary or post-mining land use domains - categorised on the basis of similar post-mining land use objectives and rehabilitation outcomes.

Table 10 lists the domains defined within the ESG: *Mining Operations Plan (MOP) Guidelines (September 2013)* and highlights those applicable to this MOP.

Table 10
Primary and Secondary MOP Domains

Code	Primary Domains (operational)[1]	Code	Secondary Domains (Post Mining Land Use)
1	Infrastructure Area	**A**	**Infrastructure**
2	Tailings Storage Facility	**B**	**Water Management Area**
3	Water Management Area	**C**	**Rehabilitation Area – Grassland**
4	Overburden Emplacement Area	D	Rehabilitation Area – Pasture
5	Stockpiled Material	E	Rehabilitation Area – Woodland
6	Void (Open cut void)	**F**	**Rehabilitation Area – Forest**
7	Rehabilitation Area – Pasture	G	Rehabilitation Area – Rural Land Capability Classification I to VIII
8	Underground Mining Area (SMP)	H	Relinquished Lands
9	Conservation and Biodiversity Offset Area	I	Final Void
		J	**Conservation and Biodiversity Offset Area**

Bold and highlighted domains applicable to this MOP

1. Given that the mine has been decommissioned and rehabilitated prior the commencement of this MOP and prior to the application of *ESG3: Mining Operations Plan (MOP) Guidelines, September 2013*, no operational domains remain or have been defined.

Source: *ESG3: Mining Operations Plan (MOP) Guidelines, September 2013* – Table 4.

5.1.2 Primary Domains

Given that previous MOPs were prepared in accordance with guidelines pre-dating ESG: *Mining Operations Plan (MOP) Guidelines (September 2013)* and that the mine has been decommissioned and rehabilitated, no operational domains remain or have been defined for the purposes of this MOP.

5.1.3 Secondary Domains

Plan 4 presents the location of the secondary domains and the following subsections provide a short description of each.

5.1.3.1 Domain A – Infrastructure

This domain applies to the retained section of mine access road providing long-term access to the transmission line easements and firefighting.

5.1.3.2 Domain B – Water Management Area

This domain applies to the retained water management dams reconfigured to the final landform.

5.1.3.3 Domain C – Rehabilitation Area – Grassland

This domain incorporates the areas within the surface infrastructure area that are located within the existing transmission line easements.

5.1.3.4 Domain F – Rehabilitation Area – Forest

This domain incorporates the areas within the surface infrastructure area that are not located within the existing transmission line easements or associated with the retained section of mine access road or water management dams.

5.1.3.5 Domain J - Conservation and Biodiversity Offset Area

This domain incorporates the compensatory habitat area established to the south of the surface infrastructure area.

5.2 DOMAIN REHABILITATION OBJECTIVES

Table 9 presents the general post mining rehabilitation objectives and targets. More specific objectives for each rehabilitation domain are presented in **Table 11**. These objectives have been used to develop the performance indicators and completion/relinquishment criteria presented in Section 6.

5.3 REHABILITATION PHASES

The phases in the rehabilitation process commence after completion of active mining / use of a component area. The rehabilitation phases progress through logical steps ending where the land is able to meet its nominated end land use in a sustainable way and can be relinquished.

The rehabilitation hierarchy used in this MOP follows the guidance provided Explanatory Note 2(h) of ESG3, which references six separate phases as follows.

Table 11
Rehabilitation Domain Objectives

Secondary Domain	Rehabilitation Objective
A – Infrastructure Area	• Mine access road to be retained for future use to access power line easements.
B – Water Management Area	• No residual soil / sediment contamination within the retained water management dams that poses a threat of environmental harm. • The retained water management dams are reconfigured to match the final landform and are appropriately designed.
C – Rehabilitated Area – Grassland and F – Rehabilitated Area - Forest	• Infrastructure removed and domain made safe, including sealing of portals. • Domain free from hazardous materials. • Area is revegetated using local native plant species. • Stable soils with a self-sustaining vegetation community. • Non-target species (weeds) are not adversely impacting the targeted revegetation community and / or present management requirement similar to analogous sites not disturbed by mining activities.
J - Conservation and Biodiversity Offset Area	• The Compensatory Habitat Area continues to be maintained until lease relinquishment.

Phase 1: Decommissioning

Decommissioning will include the cessation of infrastructure usage, disconnection of services, its demolition and removal from the mine. Remediation of any contamination will also be undertaken during this phase.

All decommissioning activities have been completed prior to the commencement of this MOP.

Phase 2: Landform Establishment

The landform establishment phase involves the earthworks required to construct and/or profile all or part of each domain to the approved final landform. The constructed landform should be suitable for the proposed final land use and blend, as far as practicable with the adjacent topography. This stage also includes the construction of any drainage structures needed for the area.

All landform establishment activities have been completed prior to the commencement of this MOP.

Phase 3: Growth Medium Development

The growth medium development phase involves the placement of available soil material / growth medium on the final landform and preparation of the surface for revegetation. Soil preparation may include fertiliser or ameliorant application and ripping or scarifying the surface. This phase is not applicable to Domains A - Infrastructure and B - Water Management.

The initiation of the growth medium development phase has been completed prior to the commencement of this MOP. Ongoing monitoring to ensure this phase has been successfully implemented will continue for a period of at least 5 years since the placement of growth medium in August 2014.

Phase 4: Ecosystem and Land Use Establishment

The ecosystem and land use establishment phase involves the establishment and maintenance of vegetation on the completed landform. On completion of ecosystem and land use establishment for a final land use of Rehabilitated Grassland or Forest (Domains C & F), the established vegetation will achieve key characteristics, such as projected foliage cover, species richness, canopy height and density that are within a specified proportion / range of analogue sites.

Phase 5: Ecosystem and Land Use Sustainability

The ecosystem and land use sustainability phase occurs once monitoring illustrates the achievement of relevant performance indicators with respect to ecosystem development. It is expected that the rehabilitated landform will remain within this phase for the majority of the MOP term whilst progress is made towards achieving completion criteria and ultimately lease relinquishment.

Phase 6: Land Relinquishment

On achievement of the nominated closure criteria for ML 1555, the land will be relinquished and the rehabilitation security held by DRE released in full for that component of the final landform.

Table 12 provides a summary of the completed phases for the secondary domains at the end of this MOP period.

Table 12
Summary of Rehabilitation Phases Proposed for Completion at the end of the MOP Term

Rehabilitation Phase	Domain				
	A – Infrastructure Area	B – Water Management Area	C – Rehabilitated Area – Grassland	F – Rehabilitated Area – Forest	J – Conservation and Biodiversity Offset Area
Active Mining Area	✓	✓	✓	✓	NA
Decommissioning	✓	✓	✓	✓	NA
Landform Establishment	NA	✓	✓	✓	NA
Growth Medium Development	NA	NA	✓	✓	NA
Ecosystem and Land use Establishment	NA	NA	✓	✓	NA
Ecosystem and land use Sustainability	NA	NA	✓	✓	✓
Relinquished Lands	×	×	×	×	×

Note: ✓ = rehabilitation phase completed at end of MOP term
P = rehabilitation phase partially completed at end of MOP term
× = rehabilitation phase not completed at end of MOP term
NA = not applicable

Source: Donaldson Coal Pty Ltd

6. PERFORMANCE INDICATORS, AND COMPLETION/RELINQUISHMENT CRITERIA

Performance indicators and completion criteria provide a means by which the progress of rehabilitation can be measured to quantitatively demonstrate the successful achievement of a biophysical process, i.e. the standards that are to be met by successful rehabilitation.

Rehabilitation indicators and performance criteria are inter-related as a performance indicator is an attribute of the biophysical environment (e.g. slope, percentage groundcover, pH etc.) that can be used to approximate the progression of the biophysical process against a defined end point, i.e. the completion/relinquishment criterion.

Table 13 provides the performance indicators and completion criteria approved for the mine as part of the mine closure MOP to achieve the nominated post mining land use goals and rehabilitation objectives (refer to Sections 4.3 and 5.3).

It is noted that details of monitoring completed against completion criteria will be reported through the respective AEMR and either a final AEMR or separate relinquishment report.

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Table 13
Rehabilitation Performance Indicators and Completion Criteria

Objective	Performance Indicator	Completion Criteria	Rehabilitation Monitoring Methodology	Monitoring Frequency	Justification/ Source	Progress at start of MOP	Expected Completion	TARP Ref No.[1]
Phase 1 – Decommissioning								
Domain A – Infrastructure Area								
Access road to remain as part of the future land use is safe and can be utilised by TransGrid for access to power easement.	Potential hazards (i.e. electrical. mechanical etc.) have been effectively isolated.	Relevant services disconnected and infrastructure removed.	Inspection & report, including photographs.	Single occurrence following decommissioning (unless follow up actions identified).	Agreed Closure MOP Criteria	Complete[2]		-
	Structural integrity.	The structural integrity of the access roads has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use.						
	Appropriate security measures have been implemented to minimise the potential for unauthorised access during the period that the site is transitioned to the intended final land use.	Establishment of fence above former adit / portal area and gate at entrance from George Booth Drive.						
Domain B – Water Management Area								
There is no residual soil contamination on site that is incompatible with intended land use or that poses a threat of environmental harm.	Dams are drained and soils / sediments tested for contamination and removed / remediated as required.	Contaminated land assessment indicates contamination acceptable for final land use.	Contamination report prepare by qualified person.	Following decommissioning with follow up validation testing if required.	Agreed Closure MOP Criteria	Complete[2]		-
Domains C & F – Rehabilitation Area – Grassland & Forest								
All infrastructure and services that are not to be utilised as part of the future intended land use are removed.	Services: removal of all services (power, water, communications).	Relevant services disconnected and infrastructure removed.	Inspection & report, including photographs.	Single occurrence following decommissioning (unless follow up actions identified).	Agreed Closure MOP Criteria	Complete[2]		-
	Portal Area: removal of the conveyor and associated structures.							
	Office and Workshop: demolition and removal of all offices and workshop related facilities including refuelling facilities.							
	Pumps, pipes and power: removal of water management infrastructure. Where underground pipelines are to remain in situ, the location of the infrastructure has been marked on the final landform plan and a note has been included on the Section 149 Certificate for the site.							
There is no residual soil contamination on site that is incompatible with intended land use or that poses a threat of environmental harm.	Contamination is be appropriately remediated so that appropriate guidelines for land use are met. Where practical exposed carbonaceous material will be removed from the site or suitably' capped	Contaminated land assessment indicates contamination acceptable for final land use.	Contamination report prepare by qualified person.	Following decommissioning with follow up validation testing if required.	Agreed Closure MOP Criteria	Complete[2]		-
Domain J – Conservation and Biodiversity Offset Area								
No decommissioning activities applicable to the Compensatory Habitat Area.								
Phase 2 – Landform Establishment								
Domain A – Infrastructure Area								
No landform establishment activities applicable to infrastructure.								
Domain B – Water Management Area and *Domain D – Rehabilitation Area – Pasture*								
All surface water management infrastructure has been designed in accordance with an industry leading practice standard.	Assessment of catch dams has been made to confirm capacity is appropriate.	Capacity of catch dams confirmed as appropriate for earthworks phase of works as determined by a suitably qualified engineer.	Letter report prepared by suitably qualified engineer.	Single occurrence following reshaping of water management dams.	Agreed Closure MOP Criteria	Complete[2]		

1. Trigger Action Response Plan included as **Table 18**. 2. Report to DRE Review of Security Bond Requirements for ML 1555 – Tasman Underground Mine (Donaldson Coal, Undated).

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Table 13 (Cont'd)
Rehabilitation Performance Indicators and Completion Criteria

Objective	Performance Indicator	Completion Criteria	Rehabilitation Monitoring Methodology	Monitoring Frequency	Justification/ Source	Progress at start of MOP	Expected Completion	TARP Ref No.[1]
Phase 2 – Landform Establishment (Cont'd)								
Domains C & F – Rehabilitation Area – Grassland & Forest								
Landform established to conform with surrounding landscape and is suitable to support a sustainable native ecosystem.	Maximum slope of final landform.	A geotechnical assessment undertaken by a suitably qualified person following the completion of the landform establishment concludes that the landform is stable and suitable for the final land use objective.	Geotechnical review / report.	Single occurrence following completion of final landform establishment (unless further works required).	Agreed Closure MOP Criteria	Complete[2]		-
	longitudinal grade of contour drains is sustainable.	A geotechnical assessment undertaken by a suitably qualified person concludes that the drainage line is stable and sustainable and suitable for the final land use objective.						
	Landform is stable.	Gully erosion: No areas of active gully erosion (i.e. >1m deep and 1m wide). Tunnel erosion: No evidence of tunnel erosion. Rill erosion: Limited to isolated areas of minor rilling up to 200mm deep.	Site inspection and photography.	Annually until lease relinquishment.				1
Domain J – Conservation and Biodiversity Offset Area								
No landform establishment activities applicable to the Compensatory Habitat Area.								
Phase 3 – Growth Medium Development								
Domain A – Infrastructure Area								
No growth medium development activities applicable to infrastructure.								
Domain B – Water Management Area and *Domain*								
No growth medium development activities applicable to water management areas.								
Domains C & F – Rehabilitation Area – Grassland & Forest								
Soil Quality	Surface Soil pH	Soil pH to be in the range of analogue sites after 5 years.	Soil analysis report (included in AEMR or relinquishment report).	Annually for a minimum of 5 years.	Agreed Closure MOP Criteria	In Progress	2020	2
	Surface Soil Conductivity	Soil conductivity to be consistent after 5 years.						
	Hazardous material	Surface layer to be free of any hazardous material.						
	Surface soil Nitrogen and Phosphorous levels	Surface soil Nitrogen and Phosphorous levels to be within 20% of levels in adjacent analogue site after 5 years.						
	Run-off water quality	Run-off water quality to be <1000us/cm after 5 years.						3
Phase 4 – Ecosystem and Land Use Establishment								
Domain A – Infrastructure								
No ecosystem and land use establishment activities applicable to infrastructure.								
Domain B – Water Management Area								
No ecosystem and land use establishment activities applicable to water management area.								
Domains C & F – Rehabilitation Area – Grassland & Forest								
Establishment of a representative number of species and at a similar density to a reference ecological community.	Foliage Cover	Native foliage cover of each vegetation stratum is at least 75% of the analogue sites.	Monitoring report prepared by suitably qualified or experienced person. Photographs.	Annually for a minimum of 5 years.	Tasman 2012 Disturbance Area Annual Ecological Monitoring:	In Progress	2020	4
	Canopy Height	The overstorey stratum is at least 25% of the analogue sites.						
	Species Richness	Native species richness is 50% or greater than the analogue sites in a standard 20m x 20m plot.						
		The proportion of native species in each vegetation stratum in a standard 20m x 20m plot is similar to analogue sites.						
	Natural Regeneration	Widespread evidence of natural regeneration of native species from each vegetation stratum.						
	Canopy Stem Densities	Canopy stem densities are equivalent to or greater than analogue sites at year 10.						

1. Trigger Action Response Plan included as **Table 18**.
2. Report to DRE Review of Security Bond Requirements for ML 1555 – Tasman Underground Mine (Donaldson Coal, Undated).

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Table 13 (Cont'd)
Rehabilitation Performance Indicators and Completion Criteria

Objective	Performance Indicator	Completion Criteria	Rehabilitation Monitoring Methodology	Monitoring Frequency	Justification/ Source	Progress at start of MOP	Expected Completion	TARP Ref No.[1]
Phase 4 – Ecosystem and Land Use Establishment (Cont'd)								
Establishment of a representative number of species and at a similar density to a reference ecological community (Cont'd)	Key Species	Key species as detailed below are present within rehabilitation areas. Trees Spotted gum (*Corymbia maculata*), smooth-barked apple (*Angophora costata),* broad-leaved white mahogany *(Eucalyptus umbra). Eucalyptus fergusonii,* grey gum *(Eucalyptus punctata),* forest oak *(Allocasuarina* torulosa), red ironbark *(Eucalyptus fibrosa)* and grey ironbark *(Eucalyptus paniculate* subsp. *paniculata).* Shrubs Gymea lily *(Doryanthes exCelsa), Macrozamia reducta,* prickly shaggy pea *(Podolobium ilicifolium),* hairy bush-pea *(Pultenaea* villosa), and large-leaf hop-bush *(Dodonaea triquetra).* Ground Layer Wiry panic *(Entofasia stricla),* kangaroo grass *(Themeda australis),* blady grass *(Imperata cylindrica), Desmodium rhytidophyllum,* and many-flowered mat-rush *(Lomandra multiflora subsp. multiflora).*	Monitoring report prepared by suitably qualified or experienced person. Photographs.	Annually for a minimum of 5 years.	Tasman Compensatory Habitat Baseline Report. Tasman Disturbance Area Annual Ecological Monitoring. Vegetation Mapping of the Lake Macquarie LGA	In Progress	2020	4
Weed and pest animal species are controlled.	There are no significant weed infestations and weeds do not comprise a significant percentage of any stratum.	Monitoring indicates no significant weed infestations and weeds do not comprise a significant percentage of any stratum.	Monitoring report prepared by suitably qualified or experienced person. Photographs.	Annually for a minimum of 5 years.	Agreed Closure MOP Criteria Standard Industry Practice	In Progress	2020	4
	There are no significant feral fauna populations causing unacceptable damage to the area.	Monitoring indicates feral species are in no greater populations than those found in analogue sites.						-
Domain J – Conservation and Biodiversity Offset Area								
No Ecosystem and Land Use Establishment activities applicable to the Compensatory Habitat Area.								
Phase 5 - Ecosystem and Land Use Sustainability								
Domain A – Infrastructure								
No ecosystem and land use sustainability activities applicable to infrastructure.								
Domain B – Water Management Area								
No ecosystem and land use sustainability activities applicable to the water management area.								
Domains C & F – Rehabilitation Area – Grassland & Forest								
Vegetation association / ecosystem is self-sustaining.	Vegetation develops and maintains a litter layer.	Evidenced by a consistent mass and depth of litter over subsequent seasons.	Monitoring report prepared by suitably qualified or experienced person. Photographs.	Biennially, or as otherwise agreed with DRE, until lease relinquishment.	Tasman Disturbance Area Annual Ecological Monitoring	In Progress	2023	5
	Vegetation health.	% of healthy shrubs and/or trees ranked healthy sick or dead is similar to that of analogue sites.						
	Species reproduction.	Species are capable of setting viable seed, flowering and/or are otherwise reproducing as evidenced by monitoring.						
Domain J – Conservation and Biodiversity Offset Area								
Vegetation association / ecosystem is maintained.	Monitoring identifies no significant loss of target species abundance except that which can be attributed to natural events or influences beyond the control of the Company, such as prolonged drought or bushfire.	No significant loss as determined in comparison with monitoring results prior to closure.	Monitoring report prepared by suitably qualified or experienced person. Photographs.	Biennially, or as otherwise agreed with DRE, until lease relinquishment.	Tasman Compensatory Habitat Baseline Report and Annual Ecological Monitoring.	In Progress	Post MOP	6
	There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum.	No significant weed infestation as determined in comparison with monitoring results prior to closure.						
	Appropriate bushfire hazard controls have been implemented on the advice from the NSW Rural Fire Service.	Bushfire hazard has been minimised in accordance with advised controls.						
1. Trigger Action Response Plan included as **Table 18**.								

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7. REHABILITATION IMPLEMENTATION

7.1 STATUS AT MOP COMMENCEMENT

Table 14 presents a summary of the status of rehabilitation at the commencement of this MOP. Full details of the rehabilitation activities completed to date are outlined within the approved Closure MOP.

Table 14
Status of Rehabilitation at the Commencement of the MOP

Secondary Domain[1]	Status of Rehabilitation at the Commencement of the MOP
A - Infrastructure	The mine access road has been 'decommissioned' with only the specified section of roadway retained and a gate and fencing installed to deter unauthorised access. No further rehabilitation works required.
B - Water Management Area	The retained water management dams have been desilted, contamination testing completed and re-shaped commensurate with the final landform. No further rehabilitation works required.
C - Rehabilitation Area – Grassland	All services and infrastructure has been removed, the final landform has been shaped to the approved landform, growth medium has been spread and vegetation established in accordance with the final rehabilitation plan. Domains C and F are currently within Ecosystem and Land Use Establishment Phase.
F - Rehabilitation Area – Forest	
J - Compensatory Habitat Baseline	No rehabilitation activities relevant to this domain.
Underground Mine Area	All disturbances resulting from subsidence impacts have been rehabilitated, inspected and reported in accordance with the approved subsidence management plans. No further rehabilitation activities are required within the Underground Mine Area, however, monitoring of subsidence impacts will continue until approval is granted by the Principal Subsidence Engineer of DRE to cease.
Source: Donaldson Coal Pty Ltd	Notes: 1. see **Plan 2** and **4**

7.2 PROPOSED REHABILITATION ACTIVITIES DURING THE MOP TERM

No specific rehabilitation activities are planned during the MOP term. The principal activities to be completed include ongoing monitoring of the status of the soil / growth medium and the progress of the established vegetation communities. Further detail relating to the planned monitoring is outlined in Section 8.1.

If required, maintenance activities will be completed and may include:

- erosion and sediment control, such as installation of hay bales, silt fencing and rock armouring;
- addition of soil ameliorants, such as fertiliser, gypsum or lime;
- mechanical or chemical weed control; and
- supplementary seeding or planting of tube stock.

If monitoring identifies non-compliance with a trigger action, actions outlined within the trigger action response plan will also be implemented (see Section 9.2 and **Table 18**).

7.3 SUMMARY OF REHABILITATION AREAS DURING THE MOP TERM

Table 15 presents a summary of the rehabilitation that will be implemented during the term of this MOP.

Table 15
Rehabilitation at Commencement and Completion of MOP

Secondary Domain	Rehabilitation Phase	Start of MOP (ha)	End of MOP (ha)
A – Infrastructure Area	Active	0	0
	Decommissioning	0	0
	Landform Establishment	0	0
	Growth Medium Development	0	0
	Ecosystem Establishment	0	0
	Ecosystem Sustainability	0.7	0
	Relinquished Lands	0	0.7
B – Water Management Area	Active	0	0
	Decommissioning	0	0
	Landform Establishment	0	0
	Growth Medium Development	0	0
	Ecosystem Establishment	0	0
	Ecosystem Sustainability	0.24	0
	Relinquished Lands	0	0.24
C - Rehabilitated Area – Grassland	Active	0	0
	Decommissioning	0	0
	Landform Establishment	0	0
	Growth Medium Development	0	0
	Ecosystem Establishment	3.9	0
	Ecosystem Sustainability	0	0
	Relinquished Lands	0	3.9
F - Rehabilitated Area - Forest	Active	0	0
	Decommissioning	0	0
	Landform Establishment	0	0
	Growth Medium Development	0	0
	Ecosystem Establishment	6.4	0
	Ecosystem Sustainability	0	0
	Relinquished Lands	0	6.4
J - Compensatory Habitat Baseline	Active	0	0
	Decommissioning	0	0
	Landform Establishment	0	0
	Growth Medium Development	0	0
	Ecosystem Establishment	0	0
	Ecosystem Sustainability	11	0
	Relinquished Lands	0	11
	Total	**22.24**	**22.24**
Source: Donaldson Coal Pty Ltd			

7.4 RELINQUISHMENT PHASE ACHIEVED DURING MOP PERIOD

It is expected that Ecosystem and Land Use Sustainability will be achieved during the MOP term, however, lease relinquishment is unlikely to occur until following the MOP term and will be dependent upon the future operation of the Tasman Extension project.

8. REHABILITATION MONITORING AND RESEARCH

8.1 REHABILITATION MONITORING

Rehabilitation monitoring will focus upon determining whether progress towards achieving the relevant performance indicators and completion and relinquishment criteria presented in Section 6 and **Table 13** is being achieved. **Table 13** also presents the proposed rehabilitation monitoring methodology and frequency for each indicator and criteria identified. This monitoring was largely outlined within the approved Closure MOP. A summary of the monitoring is outlined as follows.

Single Occurrence Monitoring Events

A range of 'one off' or single occurrence monitoring events will be completed for the following.

- Contamination inspection and report to confirm no contamination remains on final landform or within the sediment of the retained water retention dams.
- Geotechnical inspection and letter report to confirm landform is stable.
- Inspection and letter report by qualified engineer to confirm that the retained water management dams have been reshaped as approved and are suitable for the final landform.
- Inspection to confirm retained access road meets required completion criteria.
- Inspection to confirm all other services and infrastructure has been removed.

These inspections will be supported by photographs and, where applicable, letter reports which will be attached to the relinquishment report.

General Annual Walk Over Inspections

Annual walkover inspections will also be completed to review the following aspects of the rehabilitation.

- Revegetation germination rates.
- Presence of second generation seedlings.
- Plant/tree health.
- Presence of treeless areas and requirement for any additional planting to be undertaken.
- Weeds or feral animals and the need for control.
- Testing of soil material and confirmation of requirement for application of soil ameliorants, e.g. fertiliser, gypsum or lime[1].
- Presence of erosion and need for repair of eroded areas.

[1] Annual soil monitoring will continue for a period of 5 years following testing which confirms compliance with the completion criteria.

- Presence of areas of excessive compaction or crusting that is affecting plant growth.
- Need for fire management.
- Quality and effectiveness of fencing.
- Signs of disturbance, either by animals or humans.

The results of the annual walkovers will be reported as part of the AEMR (or simplified annual report).

Floristic Monitoring

Floristic monitoring will be undertaken once revegetation has reached a level of maturity where performance indicators for ecosystem establishment can begin to be accurately measured (approximately 3 years following initial revegetation). This monitoring will continue until the revegetated areas meet the agreed completion criteria. Initially floristic monitoring will be undertaken on a biennial basis (every 2 years) but may be refined based on the outcomes of the monitoring. Additional monitoring may also be recommended in the event that the completion criteria have not been met, or if substantial progression towards the criteria cannot be demonstrated. The monitoring methods detailed below are indicative and will be refined throughout the MOP term.

Typically, standard 20m x 20m survey plots will be established in revegetation areas. Plot sites will be selected by considering a range of attributes that may influence or determine the success of the rehabilitation and will consider the spacing of plots as well as topographic position and aspect. In addition, analogue sites will be monitored to provide comparative vegetation structure and floristic data in order to establish whether rehabilitation has achieved the stated objectives and criteria as outlined in **Table 13**. The locations of each survey plot will be marked by star pickets, with the location also recorded by GPS to ensure that the monitoring is undertaken within the defined locations and is comparable over time.

Within each plot, roughly 45 to 60 minutes will be spent searching for all vascular flora species present. Searches of each plot is generally undertaken through parallel transects from one side of the plot to another. Most effort is spent on examining the groundcover because, at most sites, this stratum will support the majority of species. Species within the plot are assigned a cover-abundance value (see **Table 16)** to reflect their relative cover and abundance in the plot. A modified Braun-Blanquet 6-point scale (Braun-Blanquet 1927, with modifications by Poore 1955 and Austin et al. 2000) is used to estimate the cover-abundances of all plant species within each plot.

The use of semi-quantitative monitoring has several distinct advantages over non-quantitative transects, including:

- providing a quantitative examination of species distribution and abundance;
- being likely to detect inconspicuous or rare species (especially forbs and grasses) within the given sampling area as a smaller area is surveyed in a concentrated search; and
- providing a basis for any subsequent monitoring required.

The specified monitoring will be completed by an appropriately qualified and competent person.

Table 16
Modified Braun-Blanquet Crown Cover-abundance Scale

Class	Cover-abundance*	Notes
1	Few individuals (less than 5% cover)	Forbs, sedges and grasses: <5 individuals Shrubs and small trees: <5 individuals
2	Many individuals (less than 5% cover)	Forbs, sedges and grasses: 5 or more individuals Shrubs and small trees: 5 or more individuals Medium-large overhanging tree
3	5% - less than 20% cover	No notes
4	20% - less than 50% cover	No notes
5	50% - less than 75% cover	No notes
6	75% - 100% cover	No notes

8.2 RESEARCH AND REHABILITATION TRIALS

No rehabilitation trials will be undertaken as rehabilitation has been completed using well understood techniques utilised at surrounding mining operations, including the Donaldson Open Cut Coal Mine.

9. INTERVENTION AND ADAPTIVE MANAGEMENT

9.1 THREATS TO REHABILITATION

Section 3.1 of this document presents an assessment of environmental risks associated with the mine. Similarly, this subsection presents an analysis of the specific risks or threats to advancing the rehabilitation completed within ML 1555 to the relinquishment phase. This analysis of threats to rehabilitation and relinquishment has been prepared broadly in accordance with the requirements of *AS/NZS ISO31000:2009 Risk Management – Principles & Guidelines.*

In summary, threats to rehabilitation were identified based on the non-achievement of the performance indicators and completion criteria identified in **Table 13**. For each threat, potential adverse outcomes were identified and allocated a risk based on the potential consequences and likelihood of occurrence. Where risks were determined to be unacceptable, namely those risks classified as "moderate" or above, a Trigger Action Response Plan has been developed and is presented in Section 9.2.

Tables 6, **7** and **8** present the consequence, likelihood and risk rating used during this analysis. **Table 17** presents the results of the risk analysis.

9.2 TRIGGER ACTION RESPONSE PLAN

Table 18 presents the Trigger Action Response Plan for each of the rehabilitation threats and potential adverse outcomes identified in **Table 17** as having a risk rating of moderate or above. **Table 18** also provides individual reference numbers for each Trigger Action Response.

Table 17
Analysis of Rehabilitation Threats

Rehabilitation Threat	Potential Adverse Outcome	Consequence of Occurrence	Likelihood of Occurrence	Risk Rating
Failure to disconnect services / remove infrastructure.	Unable to complete rehabilitation or establish the identified final land use.	Not Applicable. All services and infrastructure have been removed and confirmed through inspection.		
Failure to address contamination.	Contaminated land present.	Not Applicable. Contaminated land testing has been completed and contaminated material remediated.		
Final landform does not conform to approved final landform.	Slopes too steep to be rehabilitated as planned.	Not Applicable. Final landform and water management dams completed and surveyed. Final slopes are at or less than approved final slopes and dams conform to approved design.		
	Retained water management dams do not confirm to approved design.			
Final landform not safe and stable.	Geotechnical instability of final landform.	4	G	L
	Excessive erosion of final landform.	3	E	M
Respread growth material does not conform to completion criteria.	Soil does not confirm to specified soil quality parameters / not capable of sustaining vegetation community.	3	D	M
	Hazardous materials remain.	2	E	L
	Runoff water does not confirm to specified water quality criteria.	3	D	M
Incorrect species established on final landform.	Species mix on final landform does not conform to approved vegetation community.	3	E	M
Failure of vegetation establishment operations.	Vegetation community does not become established on final landform / does not meet minimum community characteristics.	3	D	M
Weed or pest management fails.	Weeds and pests become established and require significant resources to manage.	2	E	L
Vegetation community is not self-sustaining.	Vegetation health or species reproduction does not reflect analogue sites.	4	D	H
Vegetation association / ecosystem within the compensatory habitat area is not maintained.	Conservation value of the compensatory habitat area is reduced.	4	E	M

Table 18
Trigger Action Response Plan

Rehabilitation Threat	Potential Adverse Outcome	Trigger	Action/ Response	TARP Ref No
Final landform not safe and stable.	Excessive erosion of final landform.	• Monitoring identifies gully erosion, tunnel erosion or rill erosion >200mm deep.	• Suitably qualified / experienced hydrologist, engineer or rehabilitation expert engaged to assess the erosion and provide a range of recommendations to remediate the erosion. • Recommendations to be implemented in consultation with DRE.	1
Respread growth material does not conform to completion criteria.	Soil does not confirm to specified soil quality parameters / not capable of sustaining vegetation community.	• Testing confirms soil parameters not within the identified criteria (see **Table 13**).	• Suitably qualified soil scientist or rehabilitation expert engaged to prepare a report including a range of recommendation to ensure that the identified criteria are achieved / soil is suitable for sustaining the vegetation community.	2
	Runoff water does not confirm to specified water quality criteria.	• Monitoring confirms runoff water quality not within the identified criteria (see **Table 13**).	• Suitably qualified soil scientist or rehabilitation expert engaged to provide recommendations on appropriate amelioration to improve runoff water quality. • Recommendations to be implemented in consultation with DRE.	3
Incorrect species established on final landform	Species mix on final landform does not conform to approved vegetation community.	• Monitoring indicates that the species mix does not include key species (see **Table 13**).	• Suitably qualified ecologist or revegetation / rehabilitation expert engaged to assess reasons for divergence or failure of target species establishment and recommend actions to ensure that the final vegetation community corresponds as closely as possible to the approved community species and community characteristics. Additional actions may include: – sowing of additional seed mix or planting of tube stock for targeted species or additional endemic species; – soil amelioration works such as addition of fertiliser; and – additional weed control activities (mechanical and / or chemical) and/or pest management as required.	4
Failure of vegetation establishment operations.	Vegetation community does not become established.	• Monitoring indicates that the vegetation community does not meet minimum community characteristics (see **Table 13**).		

Table 18 (Cont'd)
Trigger Action Response Plan

Rehabilitation Threat	Potential Adverse Outcome	Trigger	Action/ Response	TARP Ref No
Vegetation community is not self-sustaining.	Final landform requires significantly more management than undisturbed analogue sites.	• Monitoring indicates that: – established vegetation is not replacing itself through successive generations; or – the proportion of vegetation ranked as sick or dead is substantially greater than analogue sites.	• Suitably qualified ecologist or revegetation / rehabilitation expert engaged to assess reasons for additional management requirements and recommend actions to align management required with that of the analogue sites. Additional actions (to be undertaken in targeted areas) may include: – sowing of additional seed mix for targeted species or additional species endemic to the pre-disturbance community; – use of tube stock, seed and mulch mix or other application techniques; – soil amelioration works such as addition of fertiliser; and – additional weed control activities (mechanical and / or chemical) and/or pest management as required.	5
Vegetation association / ecosystem within the compensatory habitat area is not maintained.	Conservation value of the compensatory habitat area is reduced.	• Monitoring indicates that: – there is a significant loss of abundance of key species; or – there is significant weed infestation; or – bushfire hazards have not been appropriately minimised.	• Suitably qualified ecologist or revegetation / rehabilitation expert engaged to assess reasons and recommend actions. Additional actions may include: – completion of targeted weed control and/or pest management;; – exclusion of any disturbing activities; and – implementation of additional bushfire hazard reduction measures.	6

10. REPORTING

The Company will prepare an *Annual Environmental Management Report* (AEMR), or modified version as agreed with DRE, for each reporting period. The AEMR will include a summary of environmental monitoring and copies of any relevant specialist consultant reports, including those prepared in accordance with Section 8.1.

The AEMR will consider the results of monitoring against the key performance indicators / completion criteria and identify trends in the monitoring results. Any additional rehabilitation works or activities undertaken as a result of the implementation trigger action response plan will also be reported.

11. REVIEW AND IMPLEMENTATION OF THE MOP

11.1 REVIEW OF THE MOP

This MOP will be reviewed annually in conjunction with the preparation of the AEMR. Any adjustments that may arise will be tracked in accordance with the colour coding outlined in the ESG3 guidelines and submitted to DRE for approval.

11.2 IMPLEMENTATION

Table 19 outlines the roles and responsibilities of personnel who have responsibility for monitoring, review and implementation for this MOP.

Table 19
Roles and Responsibilities for MOP Implementation

Role	Responsibilities
Manager Mining Engineering	Accountable for the overall environmental performance of the operations, including the implementation and outcomes of this MOP. Provide necessary resources required to implement the rehabilitation process outlined within the MOP. Ensure employees are competent through training and awareness programs.
Environment and Community Manager	Ensure the implementation of this MOP, including reporting of non-compliances with the trigger values, and subsequent implementation of the relevant action response plan. Ensure that monitoring, report review and preparation are undertaken as outlined within this MOP. Report the progress of rehabilitation and monitoring in the relevant AEMR.
All employees	Follow direction provided by the Manager Mining Engineering and Environment and Community Manager. Ensure all activities are consistent with the plans and objectives detailed in this MOP.

12. REFERENCES

Donaldson (undated). *Report to DRE Review of Security Bond Requirements For ML 1555 – Tasman Underground Mine.*

Landcom (2004). *Managing Urban Stormwater: Soils and Construction (Blue Book).*

13. PLANS

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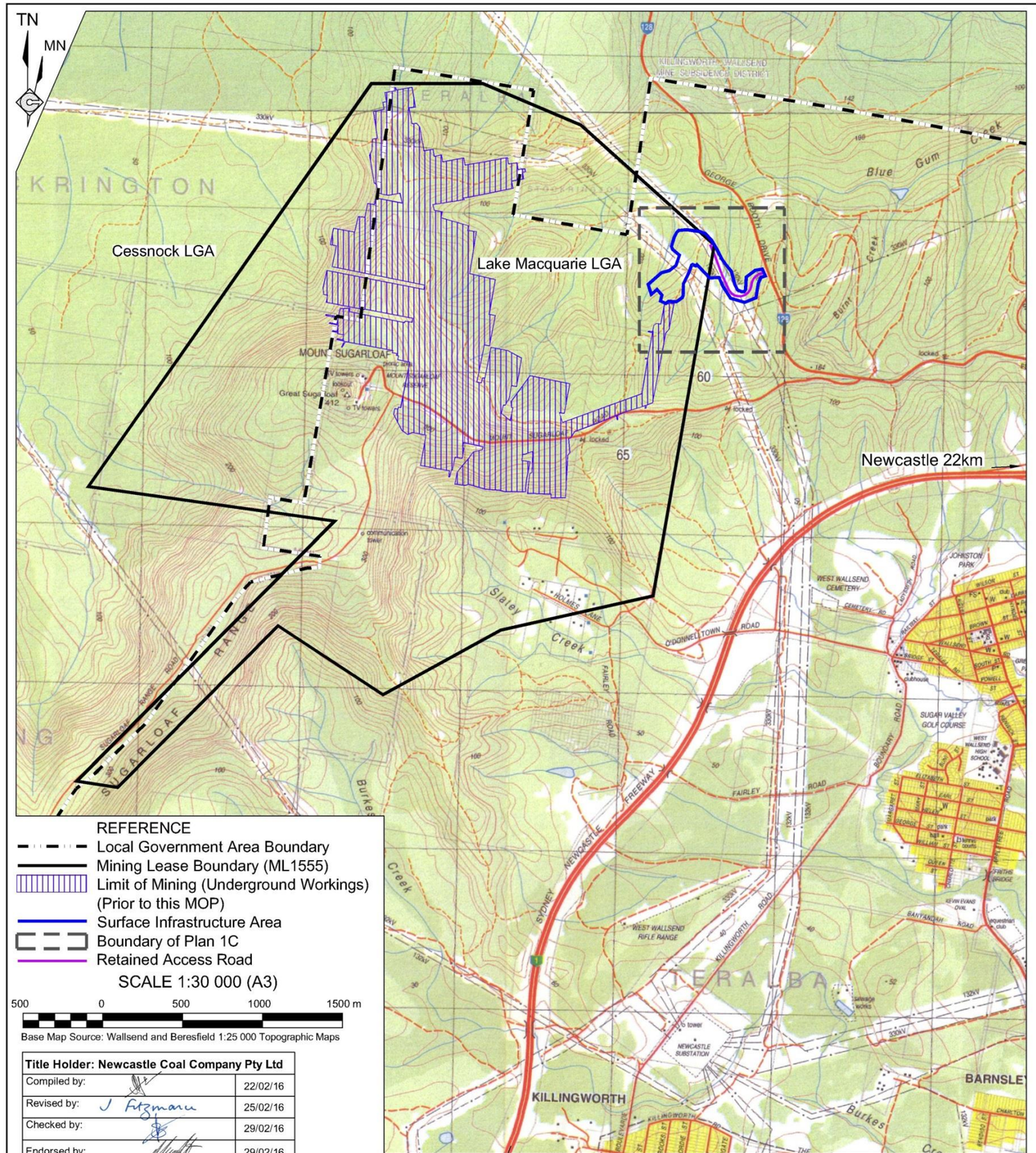


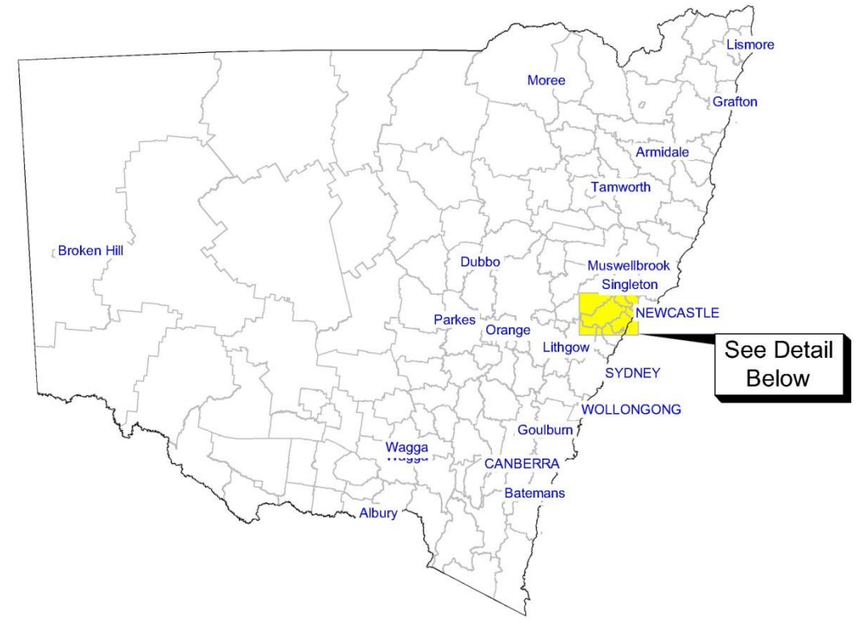
REFERENCE
- Local Government Area Boundary
- Mining Lease Boundary (ML1555)
- Limit of Mining (Underground Workings) (Prior to this MOP)
- Surface Infrastructure Area
- Boundary of Plan 1C
- Retained Access Road

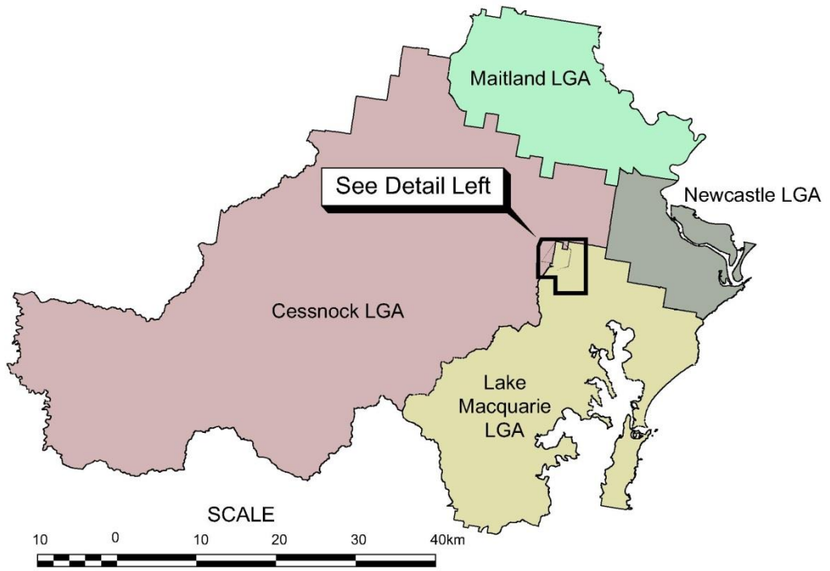
SCALE 1:30 000 (A3)

500 0 500 1000 1500 m

Base Map Source: Wallsend and Beresfield 1:25 000 Topographic Maps

Title Holder: Newcastle Coal Company Pty Ltd	
Compiled by:	22/02/16
Revised by: J Fitzmaurice	25/02/16
Checked by:	29/02/16
Endorsed by:	29/02/16





Plan 1A
PROJECT LOCALITY

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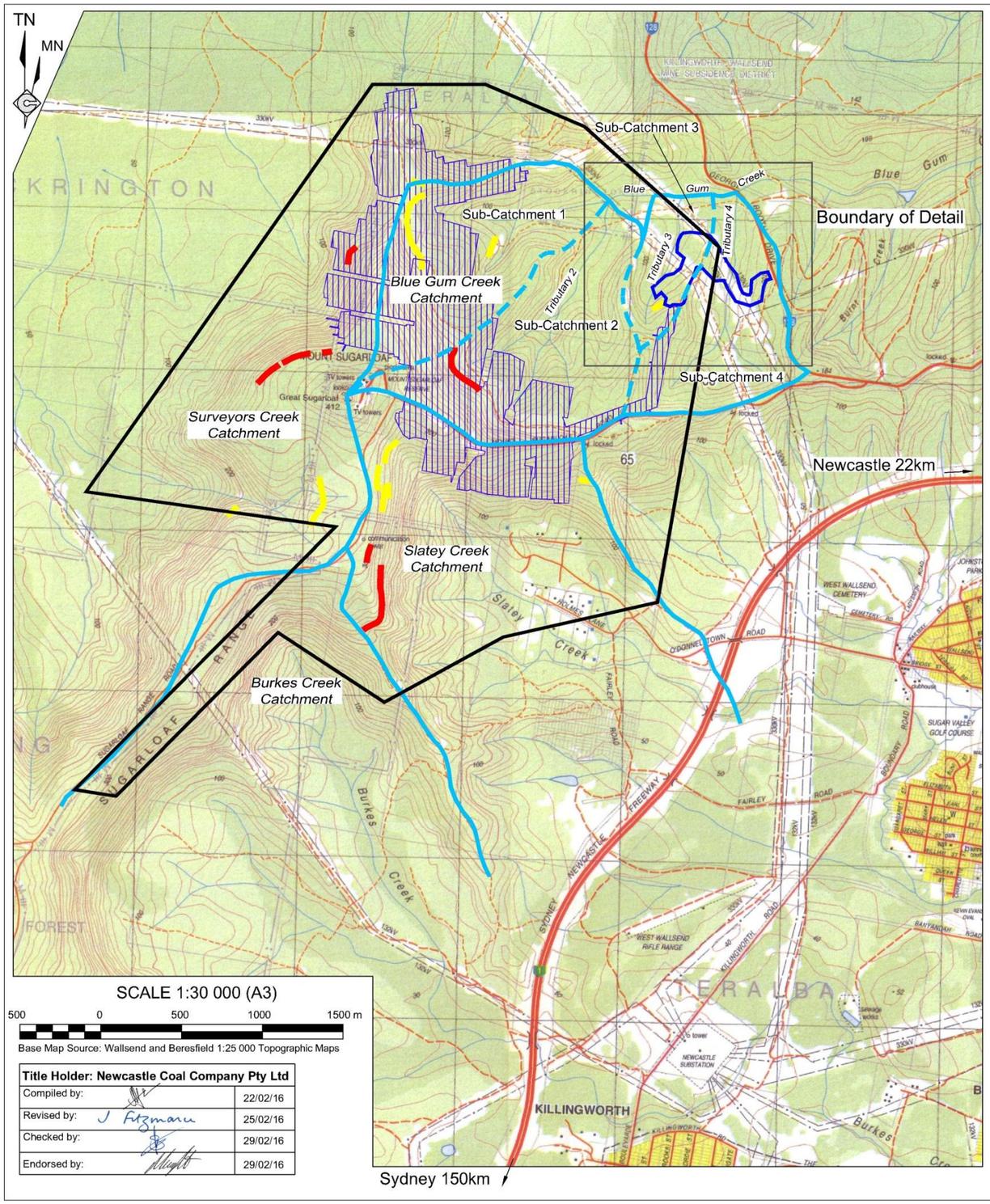

SCALE 1:30 000 (A3)

500 0 500 1000 1500 m

Base Map Source: Wallsend and Beresfield 1:25 000 Topographic Maps

Title Holder: Newcastle Coal Company Pty Ltd	
Compiled by:	22/02/16
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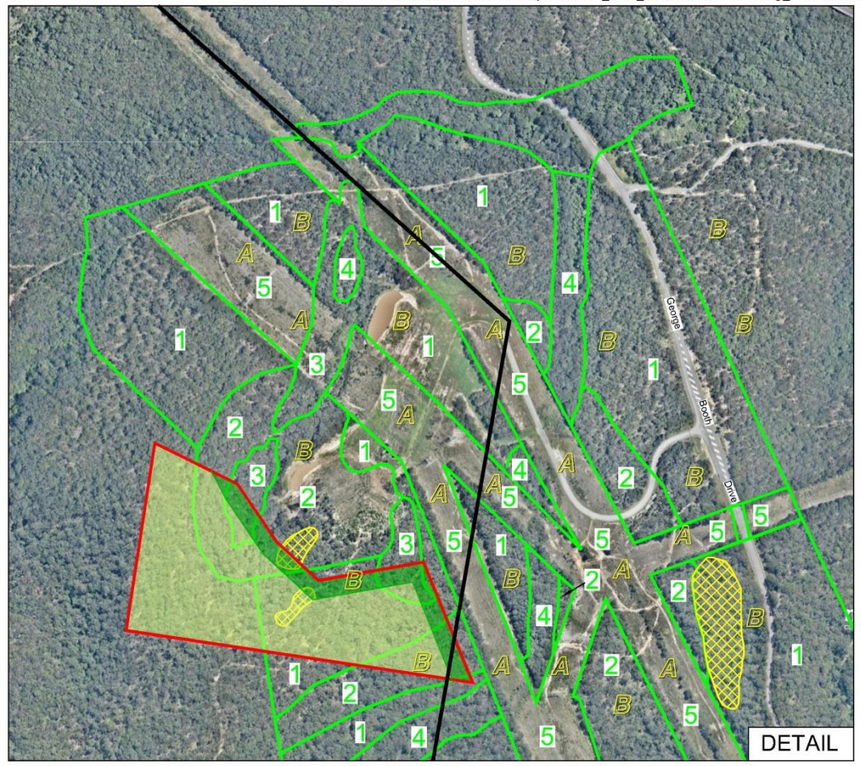

DETAIL SCALE 1:10 000

100 0 100 200 300 400 500 m

Base Photograph Source: Nearmap - Date of Photography: 20 November 2015

REFERENCE
- Mining Lease Boundary (ML1555)
- Limit of Mining (Underground Workings) (Prior to this MOP)
- Surface Infrastructure Area
- Catchment Boundary
- Sub-catchment Boundary
- Cliff (>15m High)
- Cliff / Rock Slope (3m-15m High)

Land Use
- A / B — Transmission Line Easement / Native Vegetation
- **Vegetation Community Boundary**
- 1 — Northern Ironbark - Spotted Gum Open Forest
- 2 — Smooth Barked Apple - Red Bloodwood Woodland / Open Forest
- 3 — Smooth Barked Apple - Basked Mahogany - Stringybark Open Forest
- 4 — Spotted Gum & Northern Ironbark Open Forest / Tall Open Forest
- 5 — Disturbed / Regenerating
- *Tetratheca juncea*

Compensatory Habitat Area
- Subject Site
- Core Habitat
- Buffer Area

Plan 1B
PRE-MOP ENVIRONMENT - NATURAL ENVIRONMENT

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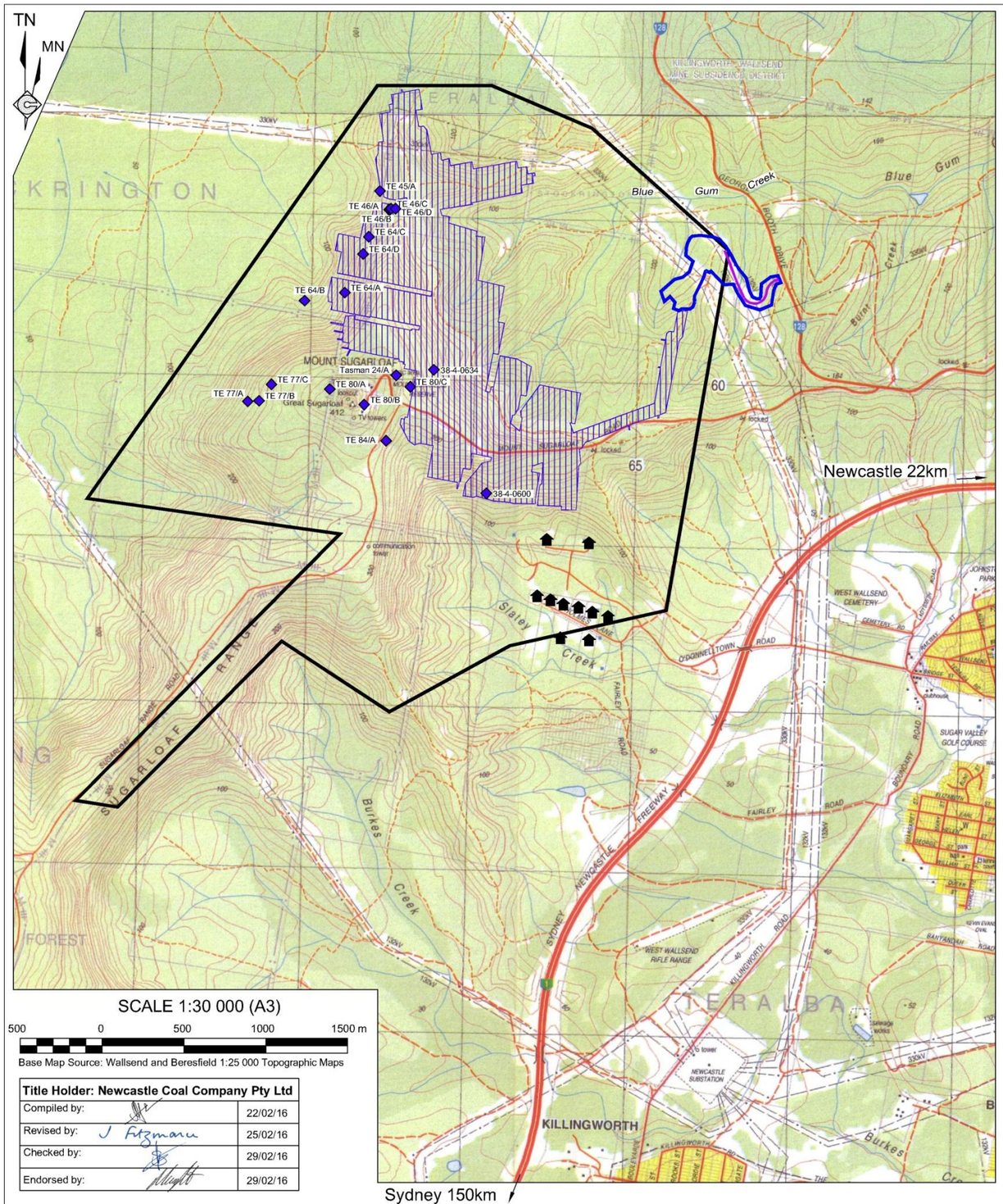

SCALE 1:30 000 (A3)

500 0 500 1000 1500 m

Base Map Source: Wallsend and Beresfield 1:25 000 Topographic Maps

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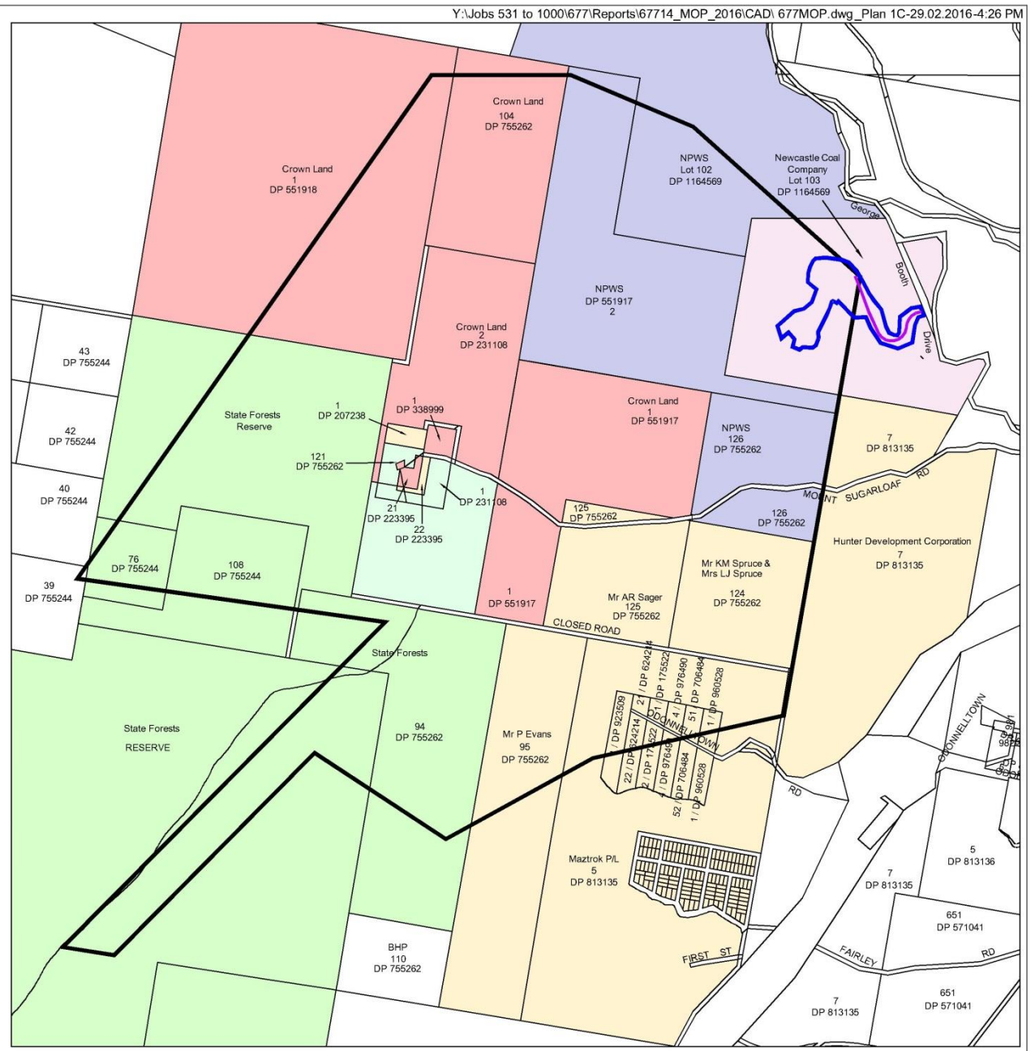
Sydney 150km



REFERENCE
- Mining Lease Boundary (ML1555)
- Limit of Mining (Underground Workings) (Prior to this MOP)
- Surface Infrastructure Area
- Retained Access Road
- Cadastral Boundary
- Residence
- TE 80/A Aboriginal Heritage Site

Reference	Land Ownership
	Crown Land
	NPWS
	Council
	State Forest
	Private
	Private (Company Owned)

Plan 1C
PRE-MOP ENVIRONMENT - BUILT ENVIRONMENT

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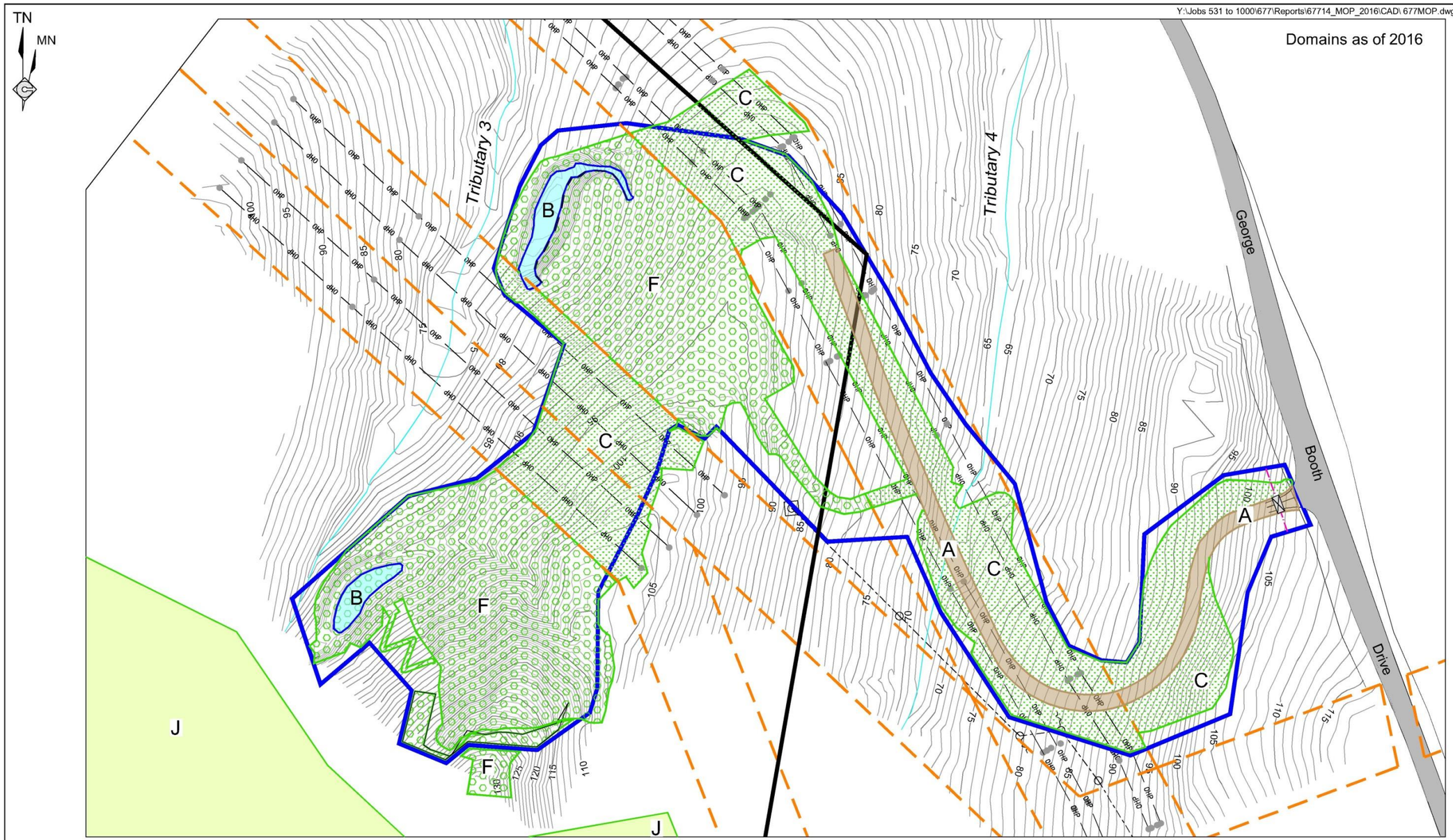

SCALE 1:3 000 (A3)

50 0 50 100 150m

Title Holder: Newcastle Coal Company Pty Ltd	
Compiled by:	22/02/16
Revised by: J Fitzmaurice	25/02/16
Checked by:	29/02/16
Endorsed by:	29/02/16

Base Map Source: Donaldson Coal Pty Ltd

- Mining Lease Boundary (ML1555)
- Surface Infrastructure Area
- Transmission Line Easement
- Sealed Road / Area
- Creek / Drainage Line
- 110 Contour (m AHD)(Interval = 1m)
- OHP Overhead Powerline / Pole
- 330kV Staunchion
- Gate
- Fence

REFERENCE

Secondary Domains
- A. Infrastructure Area
- B. Water Management Area
- C. Rehabilitation Area - Grassland
- F. Rehabilitation Area - Forest
- J. Conservation and Biodiversity Offset Area

Plan 2
MINE DOMAINS AT COMMENCEMENT OF MOP

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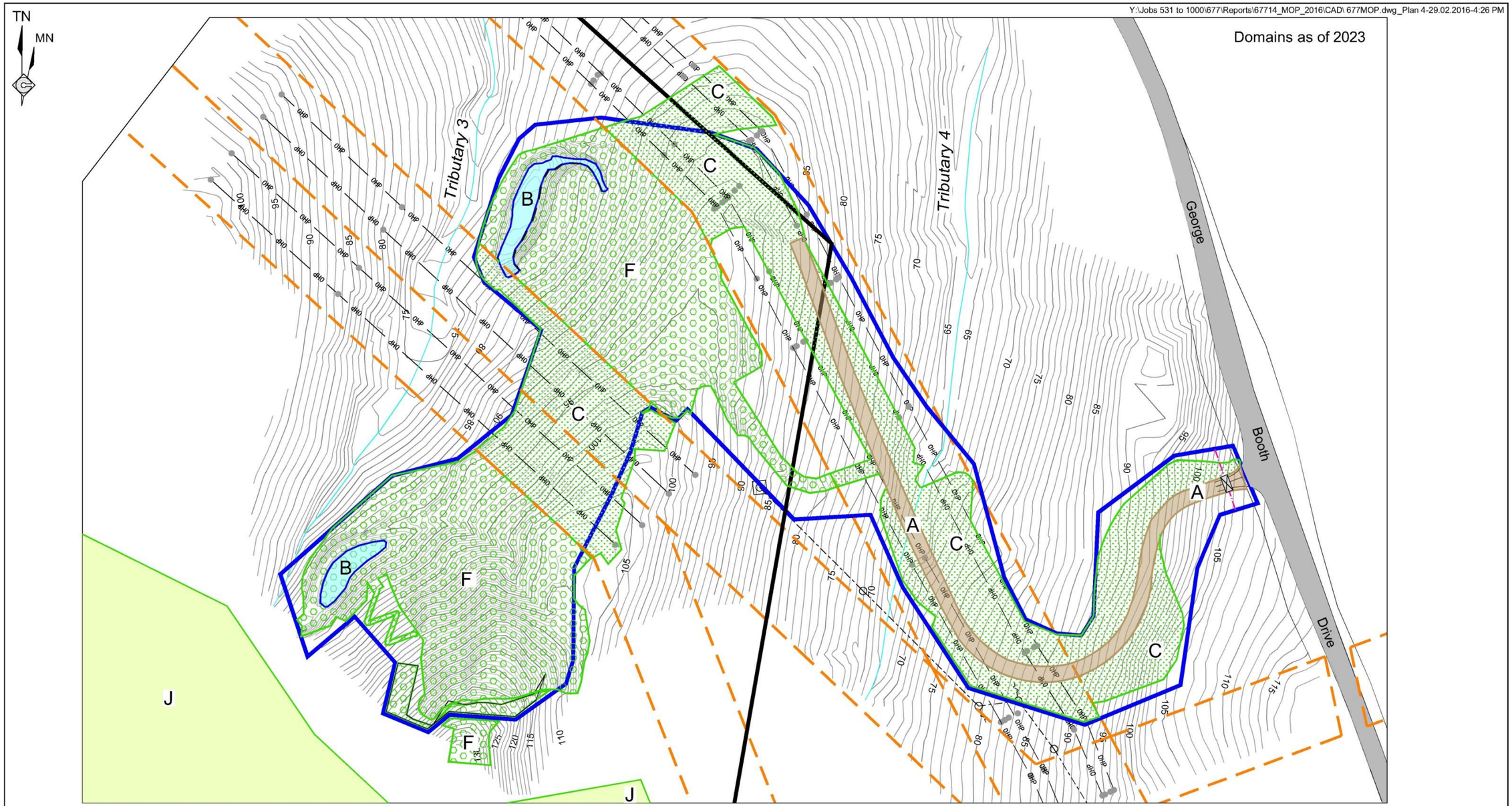

SCALE 1:3 000 (A3)

50 0 50 100 150m

Title Holder: Newcastle Coal Company Pty Ltd	
Compiled by:	22/02/16
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Base Map Source: Donaldson Coal Pty Ltd

- Mining Lease Boundary (ML1555)
- Surface Infrastructure Area
- Transmission Line Easement
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- Creek / Drainage Line
- 110 Contour (m AHD)(Interval = 1m)
- OHP Overhead Powerline / Pole
- 330kV Staunchion
- Gate
- Fence

REFERENCE

Secondary Domains
- A. Infrastructure Area
- B. Water Management Area
- C. Rehabilitation Area - Grassland
- F. Rehabilitation Area - Forest
- J. Conservation and Biodiversity Offset Area

Plan 4
FINAL REHABILITATION AND POST MINING LAND USE

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